GRAMMATICAL METAPHOR AND THE SOCIAL GENESIS OF ABSTRACTION IN THE WRITING OF APPRENTICE SCHOLARS USING ENGLISH AS AN ADDITIONAL LANGUAGE

by

ALFREDO AFONSO FERREIRA

B.A. Honours, Simon Fraser University, 1988
M.A., Columbia University, 2004

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES
(Language and Literacy Education)

THE UNIVERSITY OF BRITISH COLUMBIA
(Vancouver)

December 2016

Abstract

A central feature of written academic discourse is variability in the degrees and functions of abstraction. By means of abstract construals, writers reconfigure direct experiences of the world into abstract, general and technical concepts, compress dynamic reasoning into more stable forms of scholarly thinking, organize discourse to facilitate its interpretation, and present a more objective interpersonal stance (Halliday, 1998). These functions of abstraction often challenge second-language (L2) academic writers using English, who may have gaps in their internalized lexicogrammatical and semantic systems of English and may also be unfamiliar with expectations in scholarly cultures that are associated with these systems (Schleppegrell, 2004b).

This study aims to better understand L2 writers' use of grammatical metaphor (GM), the central resource of language for construing abstraction (Halliday, 1994, 1998), specifically ideational GM, the sub-type (including nominalization) that is most salient in academic writing. This aim was pursued through analysis of the writing of four Japanese first-language users who were at late undergraduate to early graduate levels in their respective disciplines, and who intended to become professional scholars. The setting was an English for academic purposes (EAP) writing course at a selective national university in Tokyo.

The study adopts a transdisciplinary framework (Hasan, 2005/1992) integrating Vygotsky's psychological (1978) notion of semiotic mediation, systemic functional linguistic (SFL) theory of language as a social semiotic resource (Halliday & Matthiessen, 2004), and the sociology of education of Bernstein (1990, 1999), whose concept of socio-semantic dispositions emphasizes social subjects' robust, cultural-historically evolved tendencies in mediating knowledge through language. Conventional qualitative and quantitative methods of analyzing GM were extended through the development of nominal density (ND) analysis, an instrument that allows for direct, quantitative analysis of GM use. By these means, the study generates insight into the functions of GM-enabled abstraction in students' writing, notably in detailing the changes in these functions across the students' individual and aggregated writing corpora. While the limited data do not allow for generalization of the findings to other populations, the study makes appreciable empirical contributions to a rapidly emerging area of research in studies of L2 academic writing and L2 development.

Preface

This dissertation on second-language (L2) writers' use of grammatical metaphor (GM) in their academic writing is, as a whole, an original intellectual product of the author, Alfredo Afonso Ferreira. The setting of the case study was an EAP writing course in which the present author was also instructor. The collection of data and associated methods were approved by the University of British Columbia's Research Ethics Board (certificate # H10-02226-A006), with no major provisos in the application or complications in implementation. The primary steps taken to ensure no conflict of interest in my dual roles as instructor and researcher were to highly restrict research-related interventions during the writing course and to ensure that students' choice of whether or not to participate in the research would not affect their experiences in the writing course.

Table of Contents

List of Tables

List of Figures

Acknowledgements

I am grateful for the help of many people with this dissertation. I have benefitted in my doctoral studies from the extraordinary intellectual guidance and encouragement of my primary supervisors, Drs. Geoff Williams and Patsy Duff. Geoff has been exceptionally sensitive and sagacious as my primary academic supervisor, finding a way of guiding me in this project's transdisciplinary and technical landscape while helping me create the kind of project I had envisioned. Patsy has supported many aspects of this project throughout its exacting lifespan, including through detailed feedback at every stage. Patsy's involvement has been exceptionally varied and generous. I have come to appreciate first-hand why these two scholars, world leaders in their respective fields, are also so well-admired as engaged and caring colleagues.

My third supervisor, Dr. Steven Talmy, in addition to providing encouragement throughout the process and key references and ideas for framing the literature review, linked me to my current teaching context, UBC Vantage College. This innovative, large-scale project in content-based language teaching and learning provides me with a rich context in which to continue discussions that emerged in this dissertation. In relation to Vantage College, my deep thanks also go to the brilliant Director of the Academic English Program, Dr. Sandra Zappa-Hollman, who has helped me so much with challenge of coordinating teaching and research.

My family has supported me throughout this project and my education more generally. My daughter Lujan inspires me with her discipline and creativity. My wife, Sonomi, is a perfect friend and companion, bringing balance and love to every moment. I am grateful also to my siblings Fernando, Olivia, and Cidalia, who have heartily supported me in my passions, and to my parents for their faith in education and encouragement of excellence in our professional lives.

Many others have supported me in this project. Among them, I would like to whole-heartedly thank the Social Sciences and Humanities Research Council of Canada, the vibrant international community of systemic functional linguists, two very generous instructors at the Tokyo campus of the Teachers College, Columbia University MA TESOL program, Drs. Terry Royce and Wendy Bowcher, my fellow graduate students at UBC LLED, and, not least, my academic writing students over the years, from whom I have gained so much knowledge and inspiration. I am moved with gratitude for the collective contributions of these individuals and groups to this dissertation and my personal and professional development.

Dedication

This dissertation is dedicated to my beloved sister, Cidalia Afonso Serrambana Ferreira.

Chapter 1: Introduction

1.1 Background

A high proportion of English language scholarship is carried out by apprentice and professional scholars whose primary language is not English (e.g., Belcher, 2007; Flowerdew, 2013). A central feature of written academic discourse is variability in the degrees and functions of abstraction. Abstraction serves scholarship across the primary meaning-making functions of language in social context (Halliday & Matthiessen, 1999, 2004). By means of abstract construals, writers reconfigure direct experiences of the world into the abstract, general, and technical concepts used by specialists, such as by nominalizing human experience; they compress dynamic processes of logical reasoning into more stable forms of scholarly thinking; writers organize discourse textually; and they present a more objective interpersonal stance (Halliday, 1998). For second-language (L2) academic writers using English, the regulation of these functions of abstraction often presents challenges. The reasons for this may include unfamiliarity with expectations in scholarly cultures as well as possible gaps in the internalized lexicogrammatical and semantic systems of English that underlie the subject's capacity to reconfigure concrete events and dynamic forms of reasoning as abstract entities (Byrnes, 2009; Schleppegrell, 2004b).

Abstraction is initially defined as a process through which human experiences and reasoning are reconfigured as conceptual entities. As such, abstraction in discourse is achieved by nominalization, which is understood as the choice to represent experiences and reasoning using the grammatical structure of the nominal group, whose foundational semantic role is to construe entities rather than entities plus processes. For example, the nominal group *number* construes an entity while the nominalized nominal group (and thus grammatical metaphor) *calculation* construes an abstract entity that also construes the process of calculating (Halliday & Matthiessen, 1999). In writing and especially scholarly writing, the tendency is to represent experiences and forms of reasoning (such as *calculate*) as things (Halliday, 1998; Halliday & Matthiessen, 1999). Such 'thingifying' of discourse is a means of de-coupling ideas from the specific context of their production (the close linking of time, place and language use being a hallmark of casual speech (Halliday, 1985a)); by means of nominalization, writers stabilize ideas across social contexts and facilitate the mobility of specialist ways of conceiving the world. As

grammatical metaphor and nominalization are understood to be resources for mediating concept formation in thought, as well as in writing and speech, their functions in cognition have also been studied (Halliday & Matthiessen, 1999; Holme, 2003).

1.2 Defining grammatical metaphor

The central linguistic resource for regulating abstraction was identified by the founder of systemic functional linguistics (SFL), Michael Halliday (1985b, 1998), as grammatical metaphor (GM). The appropriate use of GM in social context is evidence of a developed, adult language system (Halliday, 1993a). The felicitous use of GM in contexts of academic writing is generally contingent on the integrated social, cultural and linguistic disposition that evolves slowly over time as the subject engages in communities of knowledge specialists. Correspondingly, the development of GM typically accelerates with secondary education, together with the development and differentiation of various forms of knowledge specialization (Derewianka, 2003). Predictably, apprentice L2 academic writers, who often have gaps in the relevant lexicogrammatical and semantic systems of English, are known to have a number of challenges with GM use (Byrnes, 2009; Schleppegrell, 2004b).

An initial explanation of the variation between concrete and abstract representation of experience and reasoning enabled by GM is provided in Figure 1.1. The figure presents an academic claim extracted from the writing of an apprentice economist and L2 user of English,

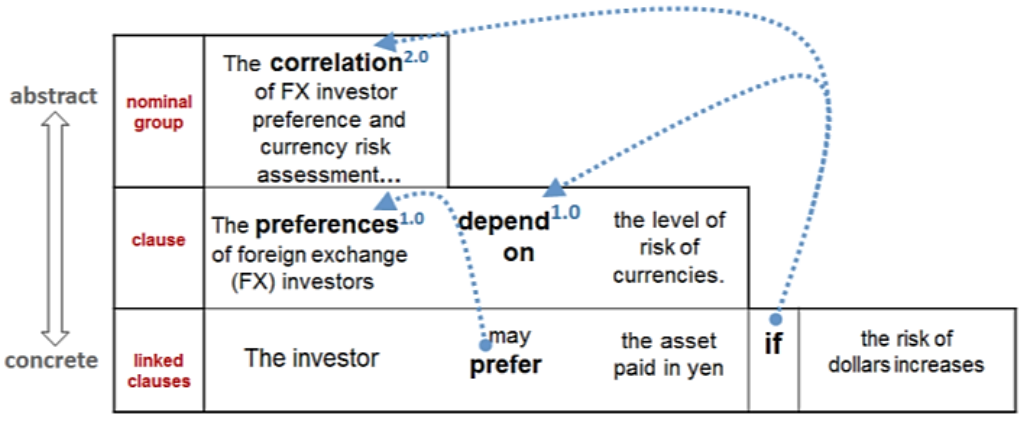


Figure 1.1. Variation in degrees of abstraction by means of grammatical metaphor

Yoshi, who is a focal subject in this study. Yoshi's wording is presented in the bottom row, and a similar claim is represented or construed at two further levels of abstraction, in the middle and top rows. (The verb *construe* is preferred because it better reflects the role of language use and users in interpreting how the world is perceived and conceived in context (Halliday & Matthiessen, 1999).) Although the wording in the bottom row – where the claim is construed using two clauses linked by a conjunction, *if* – contains some abstractions (e.g., "risk"), it is a more concrete construal of the claim than the construals in the top two rows. In contrast, the top row – which construes the claim with a lower-scale nominal group – is the most abstract construal of semantic configuration among the three.

The variation between concrete and abstract wording shown in the three rows may be perceived intuitively by most experienced readers. However, it is important to understand just how such variation in levels of abstraction is achieved; this claim, indeed, underlies the argument for including GM in L2 academic writing syllabuses (Byrnes, 2009; Schleppegrell, 2004b). The process of GM is typically explained beginning with the more concrete construal because this form of construal is generally considered developmentally prior in language learning (Halliday, 1993a). Construals often described non-technically as 'concrete' 'literal' or 'direct' are known technically as *congruent* construals, that is, construals in which a semantic configuration is construed through a developmentally-prior lexicogrammatical structure, such as when a process is construed by a verb, an entity is construed by a noun, and a logical relation is construed by a conjunction (Halliday & Matthiessen, 2004, 1999). A more detailed discussion of congruency in relation to GM is provided in Chapter 3.

A useful initial indication of one of the functions of GM in discourse – its role in reviewing ideas in order to communicate something new about them – can be gleaned from Figure 1.1 by reading the middle row followed by the top row, as if they appeared in that order in a written text. After doing so, it is easy to perceive that the top row reviews what is written in the middle row; however, lacking a verb, the claim initiated by the entity in the top row is incomplete. Thus, the writer is compelled to write something new about this known entity (Halliday & Matthiessen, 2004). This example shows how GM is functional in managing points of departure for the message (technically, Theme), which is typically also information that is already known or expected to be known by readers.

The basic explanation of how GM works is as follows. (A fuller explanation is provided in Chapter 5.) As can be seen in Figure 1.1, an arrow is drawn from the congruent construal "prefer" in the bottom row to "preference" in the middle row; "prefer" is a verb, a grammatical structure that by default realizes a semantic process (as of doing, saying or thinking). Because the lexicogrammatical choice of a verb matches the semantic choice of a process in this word "prefer", it is a congruent construal. As "preference," the meaning of "prefer" is reconstrued with a noun, as an entity; the verb has thus been nominalized. As the product of GM, the noun "preference" is not simply an entity (the semantic configuration typically realized by nouns) but rather is an entity whose meaning in context resonates with the process meaning of the verb "prefer" from which it derives. This GM involves the reconstrual of a mental process as a metaphorical – and abstract – entity-process. Since mental processes construe an aspect of human experience, the GM "preference" represents a sub-type of GM, an experiential GM. The reconstrual of "prefer" as the experiential GM "preference" is facilitated by derivational morphology, making the semantic shift between them relatively easy to trace; alternative recontruals of the process "prefer", such as with the entities *choice* or *favourite,* involves GM by means of lexical reformulation, which places greater demands on the subjects' lexicogrammatical resources than morphological shifts (Derewianka, 2003).

The other main sub-type of GM is logical GM. A logical GM involves the reconstrual of logical reasoning (such as cause-conditional reasoning), which is by default realized by such conjunctions as "if", into a grammatical feature of the clause, such as a verb, adverb, or noun. In Figure 1.1, an arrow is drawn from "if" in the bottom row to the verb "depend on" in the middle row. Thus, "depend on" is a logical GM, in this case a verb (which by default realizes a process) that resonates with the logical semantics of a conditional conjunction. Another arrow is draw between "if" and "correlation" in the top row; "correlation" is a noun, which by default realizes an entity. Thus, "correlation" is an entity with the semantic resonance of a conditional conjunction. Logical GMs tend to be harder to track because they do not involve derivational morphology; rather, logical GMs (as with many experiential GMs) involve lexical reformulation.

As can be seen, the culmination of these (and various other) GMs in the top row results in an experientially concrete and logically dynamic semantic configuration in the bottom row being worded – abstracted – by being reconstrued and reified as an entity in a nominal group.

This basic explanation for how GM works, how concrete construals of experience and logical reasoning become abstract ones, will be expanded substantially through this dissertation. It should be noted, too, that while the emphasis in this explanation is on the *packing* of ideas into gradually smaller-scale structures (such as from two linked clauses to a clause, and further to a nominal group), the reversal of this direction of the GM processes is equally important, especially in 'unpacking' dense academic discourse.

The conventional form of GM analysis is qualitative. However, in this dissertation, this model is extended for quantitative research by proposing an instrument called nominal density (ND). Essentially, ND analysis accounts for the extent of all the possible metaphorical shifts between the three scales of construal represented by the three rows in Figure 1.1. "Shift" is used here in the sense of 'movement between lexicogrammatical functions', not in the sense of 'rankshift', which typically involves embedding (Halliday, 1994), which is one sub-type of GM (further explained in Chapter 5).

A basic explanation of the quantitative calculation of ND is as follows. In Figure 1.1, the experiential GM "preference" and the logical GM "depend on" both involve a shift of a single scale or level; as such, they are given an ND value of 1.0, as shown in the figure. The shift of the logical relator "if" in the bottom row to the entity "correlation" in the top row requires a more encompassing shift, by-passing the clause level; this shift is valued at ND 2.0. In this way, ND analysis accounts for scope of linguistic mediation of experience and reasoning involved in nominalizing and abstracting discourse. While there are other types of GM with their respective ND values, this explanation provides an initial basis for understanding the functions and purposes of GM-enabled abstraction in academic discourse, and how these are analyzed qualitatively and quantitatively.

1.3 Study purposes, subjects, research questions and framework

The central aim of this study is to better understanding how apprentice L2 academic writers who intend to become professional scholars use GM to regulate the scope of abstraction in their writing assignments for a research-based, English for academic purposes (EAP) writing course. The subjects are four writing students at late undergraduate and early graduate levels in their respective programs, two in subfields of economics and two in subfields of the humanities. Two aspects of the context are important to identify: the EAP course was designed for students

from various disciplines; therefore a key feature of the writing context is that these students – who were already well into their disciplinary apprenticeships – were expected to recontextualize topics in their respective disciplines for educated non-expert readers. Another important feature of this context is that the EAP course was delivered in a highly selective national university in Tokyo; at the time of data collection, the subjects were considered very successful learners.

The research questions are as follows:

(1) What are the functions of GM as a mediating resource in students' writing for regulating the nature and extent of abstraction in the construal of valued academic knowledge?
(2) How do patterns of GM use in student writing change during the writing course?
(3) What is the relationship between the patterns of GM use and the sociocultural functions of the registers of students' texts?

These questions query the apprentice scholars' use of GM from various perspectives. The first question asks about the known functions of GMs as meaning-making resources in construing academic knowledge. The second question expands on this synoptic view of GM to consider the scope of changes in the functionality of GM in the students' writing over the three-month period of the writing course. The third question ensures that, in investigating GM in its synoptic and dynamic aspects, the objective is to understand how students use GM to make meaning in situated social contexts.

In order to address these questions, the study adopts a transdisciplinary psychological, linguistic, and sociological theoretical framework initially proposed by Hasan (2005/1992). The framework integrates Vygotsky's (1978) notion of semiotic mediation, systemic functional linguistic (SFL) theory and description of language as a social semiotic resource (Halliday & Matthiessen, 2004), and the sociology of education of Bernstein (1990, 1999), whose concept of socially-evolved semantic dispositions ties the framework together by emphasizing the social subjects' robust, cultural-historically evolved tendencies for mediating knowledge and the typically slow change in these dispositions. Although the links between academic knowledge, writing and nominalization are broadly recognized in applied linguistics, the specific explanatory links between the role of nominalizing GMs in construing disciplinary knowledge in writing and situated contexts of writing are provided by the SFL concept of register. As noted in the previous

section, conventional analysis of GM was expanded by means of nominal density analysis to allow for quantitative analysis.

1.4 Organization of the dissertation

Following this introduction, Chapters 2 and 3 review the literature; Chapters 4 and 5 are given to the methods and setting, including the pedagogical context; Chapters 6 and 7 present the analyses and findings; and Chapter 8 discusses the findings, contributions and limitations. More specifically, Chapter 2 reviews the literature in socio-cultural approaches to L2 academic writing. First, the research on situated literacy practice and content and language learning is reviewed with particular attention to tertiary contexts. The chapter then moves to review the L2 academic writing literature, which is organized by the six main socio-culturally-oriented approaches to L2 academic writing. This body of research is reviewed through the lens of semiotic mediation as conceived by Vygotsky (1998) and Hasan (2005/1992). Chapter 3 reviews the literature on nominalization and GM with a focus on L2 academic writing, including subsections on research on nominalization from within and outside of SFL, and research on the role of GM in disciplinary discourse.

Chapter 4 presents aspects of the methods, including data collection, research ethics, focal participants, and pedagogical context, including the nature of instruction on GM in the writing course and the tasks from which the primary data were drawn – the four course writing assignments. In Chapter 4, the setting is given particular attention in the description of the case study. The operationalization of GM in the study is presented in Chapter 5. This includes explanations of Halliday's GM typology (1998) and embedding as GM, the analysis of GM by means of genetic analysis (i.e., unpacking the GM by tracing the metaphorized semantic configuration through its semiotic history), and the corpus methods used to cross-examine the GM analysis of students' writing.

The second part of Chapter 5 presents the concept of nominal density (ND) and its operationalization in ND analysis. This section includes a pilot inferential statistical analysis whose purpose is to suggest future methods for validating ND statistically, especially against lexical density (LD), which is currently the main instrument for quantifying GM-mediated abstraction (e.g., Byrnes, 2009). Because of the small size of the dataset used, the results from the inferential statistical analysis should be taken as indicative only, and cannot be used to

generalize beyond the studied population. The raw quantitative data for ND, LD as well as length of clause (LC) and grammatical intricacy (GI) for all the students' writing is presented in Appendix 3.

The analysis of GM in student writing is divided into two chapters, with Chapter 6 focusing on the findings for ND aggregated by text-type and discipline. GM use in the writing is analyzed using five kinds of analysis in Chapter 6. Three of these involve analysis of aggregated data to show overall tendencies in GM use for the four students or for pairs of students in the same fields. However, an initial analysis of individual students' use of GM early in the course is provided to establish points of reference in their socio-semantic dispositions as apprentice scholars. This more fine-grained view is helpful for understanding individual variation and also provides a basis for understanding the disciplinary variation in the writing associated with GM use. A final analysis of one aspect of individual variation in GM use – a comparative analysis of degrees of change in ND and LD between the first and final texts written by each of the students – provides a bridge to the focus on individual variation in Chapter 7 while also highlighting the greater sensitivity to variation in GM use resulting from ND analysis in comparison with LD analysis.

Chapter 7 focuses on GM in Yoshi's writing while reporting more briefly on the analysis of his peers' use of GM. The analyses include various methods of sampling, from the entire corpus to comparative samples of text from early and late in the course. The focus on Yoshi's use of GM begins with an overview of his trajectory in using GM across writing assignments and drafts thereof. The focus allows for greater delicacy of analysis of various subfunctions of GM, notably the analysis of the relative distribution of ND in Themes compared with Rhemes, and the ratio of experiential compared with logical GMs as a proportion of total ND. Chapter 7 closes with a briefer analysis of GM use by each of the three other focal participants, including the trajectory of GM use during the course and the changes in the relative distributions of experiential and logical GMs. The sixteen kinds of analysis presented in the two analysis chapters are summarized in a table at the end of Chapter 7 by linguistic instrument, functional focus in GM use, scope of texts analyzed, and distillation of findings.

Chapter 8 discusses the findings and presents the contributions and limitations. The discussion begins with a reflection on the socio-political context of the case study. This is followed by a discussion of the contributions of the novel construct and instrument of ND. The

review of the methods is helpful in recapitulating and discussing the findings for the use of GM by Yoshi and his peers. These findings are then discussed with specific reference to the research questions. The chapter closes by reviewing the limitations and considering the directions for further research.

1.5 Contributions of the study

This transdisciplinary, quantitative and qualitative, multiple case study of GM use in L2 academic writing aims to contribute in several important ways to research in L2 writing, L2 development, and educational linguistics. The literature on GM is still in its infancy, with relatively few studies of L2 academic writing in tertiary settings conducted to date focusing specifically on GM. The main contribution, therefore, is empirical as the study seeks to provide broad insight into four apprentice scholars' use of GM in their course writings. While the study includes a strong focus on the variable and dynamic trajectories of students' use of GM within and across their course writings, claims of language and literacy development are tempered by recognition of the slow development of GM-related capacities and relatively brief period of data collection.

The main aspects of interest are the functions GM serves in individual texts, across drafts of the same text and across the entire corpus of the students' writing in the course. For example, insights are expected into the relative distribution of GM in Themes in order to better understand the quality of flow in text organization, and how writers order information to facilitate (or not facilitate) readers' interpretations. Likewise, the study aims to clarify the relationship between experiential and logical GMs in writing. A salient aspect of these contributions is that systematic quantitative analysis of ideational GM across a corpus of student writing is unprecedented, as is the quantitative differentiation of specific functions of GM. Furthermore, as noted below, the basis of these analyses on ND facilitates direct correspondence between qualitative and quantitative results.

One of the more interesting affordances of this analysis is the quantitative and qualitative identification of median levels of abstraction of various scales of meaning-making. For example, the changing levels of abstraction of a specific claim can be tracked across a corpus. Likewise, the method allows the characterization of median levels of abstraction of sections of a text, of texts themselves and of the corpora in which texts are situated. The coordination of quantitative

and qualitative analysis in the analyses is central to the contributions; in particular, comprehensive quantitative analysis is very helpful in identifying patterns and trends in GM use that are otherwise difficult to pick up through qualitative analysis alone.

By these kinds of analysis, the study seeks to understand the relationship between the context of the students' writing (including such factors as the assignment parameters, text-types, and the writers' purposes and disciplinary interests), the quality of their writing, and the nature of GM use in its synoptic and dynamic aspects. While the study takes place in an instructional context, the close focus on GM in student writing precludes comprehensive analysis of the relationship between instruction and student writing practice, even as a relatively detailed description of the pedagogical context is provided and, at various points in the analysis, productive if limited attention is given to the relationship between instruction and students' use of GM.

The methodological contributions of the study evolved with the study. The foundational, qualitative GM analysis is a method that combines Halliday's (1998) and Halliday and Matthiessen's (1999) approach with adaptations using transitivity systems introduced by Ravelli (1985/1999) and extended by Jones (2006). It was determined that a comprehensive analysis of GM in the students' writing was necessary for the study to adequately address the research questions and achieve the research aims; the comprehensiveness in accounting for GM use is highly desirable given the aims of the study for an enhanced understanding of GM use as an aspect of semiotic mediation and students' robust socio-semantic dispositions. Existing studies of GM tend to use proxy measures of GM, notably lexical density, grammatical intricacy and nominalizations per clause in coordination with GM analysis of extracts from the texts. As they provide useful but proxy measures of semiotic mediation, these existing instruments are limited in supporting claims of the functions of GM in the students' mediation of meaning in context and the socio-semantic dispositions with which such mediation is associated. The ND instrument addresses this gap by linking the register-wide implications of GM use directly to students' writing and other practices of mediation. In doing so, ND analysis enhances our understanding of a highly determining and yet also tacit aspect of advanced L2 language development and L2 academic writing practice.

It was, in fact, the close linking of qualitative GM analysis and its quantification in ND analysis as a direct measure of GM use that initially motived the development of the new

instrument. The immediacy of quantitative measures that can be directly linked to qualitative features of the writing facilitates understanding of GM as an aspect of semiotic mediation. Specifically, figures reporting quantitative results for students' use of GM were deemed to satisfy the need for a comprehensible picture of variation in GM use. While analyzing these figures, I recognized that the ND analysis itself provided appreciable new insights into GM use. Furthermore, when the results of the ND analysis were compared statistically with those of LD analysis, ND was found to account for greater variation in GM use than LD analysis. These observations led to the recasting of ND analysis as a new concept and research instrument for the analysis of GM-construed abstraction in discourse. Subsequent developments from this dissertation have included the use of ND analysis to isolate textual, experiential and logical functions of GM.

Thus, the primary methodological contribution of the study is the quantification of the GM. This contribution is especially valuable because ND is a direct measure of GM use and abstraction while LD and other instruments are proxy measures. That ND is a direct measure of GM use implies a direct correspondence between quantitative and qualitative analysis of GM, a feature that allows the analyst to maximize insights by shunting between these two perspectives on the data. A minor extension of this contribution is the initial attempt at statistical validation of the ND measure against LD and other instruments as a measure of GM. While the present interest is in understanding the use of GM in the case study of L2 academic writing by apprentice scholars, the ND instrument can be used as a primary or supplementary tool for discourse analysis in any research aiming to understand the role of linguistically-mediated abstraction.

Chapter 2: Semiotic Mediation in Sociocultural Approaches to Second-Language Academic Writing

2.1 Introduction

This chapter presents the theoretical framework for investigating abstraction in the writing of apprentice L2 scholars. The framework is based on Vygotsky's (1978) notion of semiotic mediation, which is adopted in the transdisciplinary psychological (Vygotsky), sociological (Bernstein), and linguistic (Halliday) perspective developed by Hasan (2005/1992). The chapter presents the framework by first discussing academic writing as situated literacy practice and as a mediating resource for content and language learning. The discussion then moves to how the main sociocultural approaches to L2 writing research orient to semiotic mediation as understood by Vygotsky and Hasan. The review closes with the discussion of SFL as the selected theoretical framework for studying abstraction and grammatical metaphor in apprentice L2 academic writing. While this theoretical chapter focuses on semiotic mediation in writing research, Chapter 3 presents grammatical metaphor as a central resource of semiotic mediation in writing, and reviews the empirical literature on GM (including nominalization) in L2 writing.

The review that follows considers six of the main sociocultural approaches to L2 academic writing research. They are academic literacies, academic discourse socialization, genre from the Sydney School of SFL, the English for Specific Purposes (ESP) approach to genre, sociocultural activity theory, and Halliday's register-based approach in SFL. These approaches are complexly interrelated in their treatment of academic writing as sociocultural practice, each with a mix of shared and unique features. They were selected as representative strands of globally diffused socioculturally oriented research in L2 academic writing. For lack of space, it is not possible to give similar attention to other relevant approaches to L2 writing, such as contrastive and intercultural rhetoric (e.g., Connor, 1996, 2011), rhetorical genre studies (e.g., Artemeva & Freedman, 2008; Bazerman, 1988, 2013; Paré, 2010) and corpus linguistics (e.g., Boulton, Carter-Thomas & Rowley-Jolivet, 2012; Flowerdew, 2008; Granger, 2003). Given the common interest in the processes involved in semiotic mediation among sociocultural approaches to L2 academic writing, the review in this chapter provides a basis for encouraging dialogue within and among these approaches. The interdisciplinary dialogue is initiated in the

following section of this chapter with the concept of semiotic mediation, and is then picked up again in the discussion section.

2.2 Semiotic mediation

The main sociocultural approaches to second-language (L2) academic writing are described and differentiated here by orientation to the concept of semiotic mediation as proposed by Vygotsky (1978) and refined by Hasan (2005/1992, 2005). Semiotic mediation is the key explanatory concept in Vygotsky's (1978) theory of human sociocultural development. Human consciousness is understood to develop over time as the person uses semiotic tools, chiefly language, in their social interactions. Semiotic mediation is the use of socially-shaped semiotic tools through which the person's social semantic dispositions – their internalized orientations to meaning – are formed. A key contribution of the concept is that it accounts for individual development of dispositions without invoking Cartesian mind-body dualism (Wells, 2007). As such, Vygotsky's concept has been highly productive in many areas of social science but especially so in studies of L2 development (Lantolf & Thorne, 2006).

Semiotic mediation as initially conceived by Vygotsky has been refined by Hasan (2005/1992). While Vygotsky (1978) provided a conceptual tool for understanding how social context and the social subject shape each other, the process as he proposed it does not adequately address social and historical contingencies in the subject's development (Luria, 1986; Hasan, 2005/1992, 2005). (In reflecting on Vygotsky's concept, it is important to recognize the cultural and historical context of his work, the largely pre-industrial rural areas of early twentieth century Russia and its neighbours). In Vygotsky's (1981) formulation of semiotic mediation, subjects are understood to internalize the interactional functions of semiosis over time through everyday interaction:

> Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an inter-psychological category, and then within the child as an intra-psychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition… it goes without saying that internalisation transforms the process itself and changes its structure and

> functions. Social relations or relations among people genetically underlie all higher functions and their relationships (p.163).

Thus, the recursive process of using language in social interactions and the internal development of language as a resource for mediating social life accompanies changes from involuntary to voluntary mental functions. Voluntary mental functions serve the purpose of self-direction through communication with the self (Vygotsky, 1986). However, initial empirical work with the concept yielded an important proviso. The work of Vygotsky's colleague Luria (1976) in rural Uzbekistan highlighted early on that the phenomenon of semiotic mediation does not itself lead to the intellectual regulation of functions. Rather, this change of consciousness was found to be the outcome of *certain forms* of mediation. Thus, semiotic mediation in Vygotsky's (1978) formulation is limited to the subject who progresses to higher order consciousness by means of the abstract semiotic system of language and participation in schooling. The relevance of literacy learning to semiotic mediation has been usefully described as follows:

> At the centre of development during the school age is the transition from the lower functions of attention and memory to higher functions of voluntary attention and logical memory… the intellectualisation of functions and their mastery represent two moments of one and the same process – the transition to higher psychological functions… The voluntariness in the activity of a function is always the other side of its conscious realisation. To say that memory is intellectualised in school is exactly the same as to say that voluntary recall emerges (Wertsch, 1985, p. 26).

However, even with schooling, children vary substantially in their development of such consciousness, such that time and schooling do *not* always lead unproblematically to privileged forms of higher order consciousness and success in school and beyond (Bernstein, 1990, 2000). A parallel finding in the development of L2 academic writing in adults is reported from empirical work in sociocultural approaches to abstraction and grammatical metaphor in L2 academic writing (e.g., Ivanič, 1998; Klein & Unsworth, 2014; Mohan & Beckett, 2001; Schleppegrell, 2004a; for a review, see the next chapter).

Writing in university calls for a honed capacity for construing specialized kinds of knowledge from a very broad range of experiences and ideas, enacting often unfamiliar kinds of interpersonal relations with readers and with scholarly communities, and organizing these complex activities into coherent texts (Schleppegrell, 2004a, 2004b). Social subjects approach these unfamiliar acts of meaning as culturally and historically formed subjects with well-established dispositions to social life as they encounter it in their everyday living:

> wherever there is language in use, i.e. discourse, there is semiotic mediation going on. From this perspective, the overwhelming experience of semiotic mediation that each and every member of a society encounters is that which occurs in local sites i.e., in the ordinary, everyday living of life, for to say that the site for semiotic mediation is discourse is to say that the site is social life (Hasan, 2005, p. 138)

Hasan's (2004, 2005) formulation of semiotic mediation as the process of forming social semantic dispositions is deeply informed by Bernstein's (1990) sociological concept of coding orientation; coding orientations are the robust socio-semantic dispositions whose variation is associated with socially-stratified distribution in forms of semiotic mediation. Hasan (2005) emphasizes meaning as the foundational principle that motivates human activity and development; this is meaning that arises in everyday social life – including of course social life in pedagogical and academic contexts – chiefly in the form of language: "The distinctive characteristic of human learning is that it is a process of making meaning – a semiotic process; and the prototypical form of human semiotic is language" (Halliday, 1993a, p. 93). The realms of second-language and academic writing practice imply new kinds of language-mediated meaning-making. From Hasan's view of semiotic mediation, learners engage in these contexts with the discursive resources afforded them by their unique social histories.

While Bernstein's and Hasan's claims are based on work with very different populations than the L2 academic writers presently in focus, the general assertion that subjects' social semiotic histories introduce contingencies and variation in their developmental trajectories is highly relevant because, as Vygotsky (1978, 1997) was apparently aware, such contingencies are associated with variation in mediation by the abstract semiotic of language versus by material tools. Hasan (2005) again provides a clear explication of his insight:

> This is where the concrete and abstract tools differ in a crucial way: the participation of a conscious other, which is a condition of mediation by the abstract tool, alters the nature of the process. We can still maintain that the mediator has the initiative and active power to impart the semiotic/semantic energy, but here the user/mediator has far less control on what happens to this mediated energy: the mediator may impart semiotic energy, but the mediatee may or may not respond to its force, or respond to it in a way not intended by the user. At the heart of semiotic mediation there is this element of uncertainty (p. 137).

Such uncertainty in semiotic mediation can readily be understood to occur in contexts of L2 use in tertiary education, where learners are expected to practice specialized ways of knowing and engaging by means of the abstract semiotic resource of language, which, in addition, is the learners' second language (see Chapter 3 for further discussion). The following statement on semiotic mediation by Hasan (2011a) draws the concept closer in social, psychological and educational terms to the context of disciplinary sub-cultures investigated in the present study:

> The central aspect of learner identity that should concern the educator has to do primarily with the learners' learning styles and the formation of these to a very large extent rests upon those conditions of semiotic mediation that the learner has experienced and is experiencing in his/her social life . . . [T]he primary point of interest for educators has to be the learner's "mental disposition"—the pathways of the brain used habitually for engaging with new information—because it is such "habits of mind" which will deal with the information presented as educational knowledge. Given this genesis of learner identity, variation is obviously inherent to the concept (Hasan, 2011a, p. xii).

This positioning of semiotic mediation draws on Hasan's (2005) close readings in psychology (Vygotsky, 1978; Wertsch, 1985) and sociology of education (Bernstein, 1990, 2000), from which Hasan and others have drawn transdisciplinary associations with SFL as elaborated by Halliday (Halliday & Matthiessen, 1999, 2004).

This chapter asks how each of the six reviewed approaches to L2 academic writing addresses "the conditions of semiotic mediation" by which learners engage as L2 academic

writers. However, characterizing the ways that social disposition or identity – Hasan (2011a) later adjusts this description, "more appropriately identities" (p. xii) – are formed in social interaction by semiotic means is difficult. In Vygotsky's terms, these "genetic processes" are "automatic" and "their automatic character creates great difficulties for psychological analysis" (Vygotsky, 1978, p. 64). Hasan (2011a) concurs, noting the analysis is "not amenable to definitive empirical proof. What can, however, be empirically proved is that where communities habitually differ in their semantic orientation [also known as *socio-semantic disposition*], there the nature of human consciousness differs systematically" (p. 70). For Hasan's and her students' empirical explorations of this question, see, for example, Hasan (2009) and Williams (2001). Luria's (1976) early study of rural Uzbeks, which takes the cognitive perspective as central, is complementary. The relation between socio-semantic variation and human consciousness is explicated in detail in Williams (2005b), linking these also to Bernstein's sociology of education.

All the approaches reviewed in this chapter take an interest in L2 academic learners' developing socio-semantic orientations such as their textual, ontogenetic and/or cultural tendencies in knowledge construction and social positioning within academic communities. The discussion of semiotic mediation in relation to L2 academic writing is relevant to the specific empirical focus of the study, which is the phenomenon of grammatical metaphor (GM) in L2 academic writing in university. As noted in Chapter 1, GM is a linguistic concept that helps explain how social subjects use the affordances of grammar to construct experience and logical relations as meaning at various degrees of abstraction (Halliday & Matthiessen, 1999). As such, GM is understood as a central resource for constructing academic knowledge in writing and enacting subjective dispositions associated with the academic communities in which subjects are engaged (e.g., Klein & Unsworth, 2014; Schleppegrell, 2004b). The deep linkages between GM and writing can begin to be appreciated from this statement by Halliday (1993a), which informs his claim that GM – the primary resource of the "synoptic mode" of writing (explained below) – marks the achievement of mature adult language:

> In a written culture, in which education is part of life, children learn to construe their experience in two complementary modes: the dynamic mode of the everyday commonsense grammar and the synoptic mode of the elaborated written grammar. Any

> particular instance, of any kind of phenomenon, may be interpreted as some product of the two – once the adolescent has transcended the semiotic barrier between them (p. 112).

As reviewed in the next two chapters, GM is an analytically traceable resource of language centrally involved in writing students' dynamic mediation – micro-genesis – of knowledge in textual instances of academic engagement. At the same time, GM is a valuable indicator of learners' developing socio-semantic dispositions as participants in producing academic texts, their shared local context of an academic writing course, and their respective disciplinary sub-cultures. This latter role is especially highlighted by ND analysis, which illuminates disciplinary variation by quantifying patterns of GM use. The traceability of this dynamism in texts is subtly indicated in Halliday's statement above that "[a]ny particular instance… may be interpreted as some product of the two," referring to commonsense, concrete, dynamic construals of experience and synoptic, elaborated, metaphorical ones. As such, GM is a suitable focus for genetic analysis (Vygotsky, 1978) in L2 academic writing, that is, the analysis of the role of semiotic mediation in the subject's social and semiotic development.

The above discussion can be distilled as a set of claims that motivate the present study as a sociocultural study of L2 academic writing. These claims reflect a social constructivist lens through which researchers seek in various ways to show that meanings realized by language are cultural artifacts (Hasan, 2005). They also reflect the constructivist view of the social subject, as researchers attribute the genesis of the subject to social interaction mediated by language and the meaning-making systems in which language plays a central role. In seeking to understand how writing develops (or does not develop) in cultural and historical context, researchers in this area understand academic enculturation as contingent, non-linear and variable between individuals. This assumption problematizes conceptions of the development of higher order thinking that is associated with academic writing as "given by nature" (Hasan, 2005, p. 132). Two specific aspects of researching L2 academic writing from a sociocultural perspective that help guide the study are writing as situated literacy practice and writing as a resource for content and language learning. These are discussed in turn below.

2.3 Second-language writing as situated literacy practice

In socioculturally-oriented approaches to L2 academic writing research, the general consensus is that to improve our understanding and support of L2 academic writing we need to account for how L2 students use the second language in and around the academic communities in which they participate (e.g., Coffin, Curry, Goodman, Hewings, Lillis, & Swann, 2003; Hyland, 2006, 2012; Leki, Cumming, & Silva, 2008; Manchón, 2009; Ravelli & Ellis, 2004; Schleppegrell, 2011). A basic assumption associated with this view is the distinction between writing as a set of practices and writing as a textual product. As noted by Cumming (1998), writing is more than a material product – the written script – of an information exchange; it is "the acts of thinking, composing, and encoding language into such text; these acts also necessarily entail discourse interactions within a socio-cultural context" (Cumming, 1998, p. 61). Importantly, Cumming's statement defines writing as a set of practices involving the writer's internal psychological processes, material actions, and situated interaction in and across contexts. This conception of writing also highlights writing as a process, which is a term used in both pedagogical and psychological modelling. Conceived as the integration of systems of meaning-making, writing is understood as a more complex set of practices than is suggested by the notion of writing as a process of completing well-ordered stages of sub-tasks.

Presenting a process view of writing, Zamel (1983) points out that writing is a "non-linear, exploratory and generative process whereby writers discover and reformulate their ideas as they attempt to approximate meaning" (p. 165). This conception of writing as a recursive, complex process of negotiated meaning-making is integrated by Breen (1987) and Breen and Littlejohn (2000), for example, in a model of process-oriented, task-based instruction. These points of departure for understanding the social dimensions of writing imply a view of writing as literacy practice (e.g., Halliday & Martin, 1993; Ivanič, 1998, 2004; Lillis, 2003; Matsuda, 2013; Martin, 1992; Ong, 1982; Schleppegrell & Colombi, 2002). As literacy practice, writing is a complex cluster of activities involving the written code through which the social subject – as writer and reader – comes to a unique, socially-shaped understanding and position in relation to specific social fields.

Reading, therefore, is centrally implicated in writing as situated literacy practice. For example, in writing instruction informed by such constructivist views, new academic writers are often encouraged to read as a writer, whereby "writerly reading is the act of thinking like a writer

while reading" (Hirvela, 2004, p. 121). Behind this claim is the recognition of writing not as a reification of knowledge to "some complete, irreducible quality (according to a mythic view of literary creation), it is not what designates the individuality of each text, what names, signs, finishes off each work with a flourish" (Barthes, 1990/1974, p. 3). Rather, writing is understood as a nexus of social subjectivities; the goal of writing "is to make the reader no longer a consumer, but a producer of the text" (Barthes, 1974/1990, p. 4).

The connections drawn by Hirvela and Barthes between reading and writing accord with Bakhtin's (1981) well-known notion of dialogism. This is the notion that all utterances – including ostensibly monologic written texts – are responses to past and future utterances in the same social field. And these views of reading accord with a fundamental feature of sign-mediated meaning noted above: "the mediator may impart semiotic energy, but the mediatee may or may not respond to its force, or respond to it in a way not intended by the user" (Hasan, 2005, p. 137). Two especially relevant aspects of readership emerge from these claims for understanding literacy and mediation (Grabe & Stoller, 2002): readership entails *past and future readers* in the academic community whose interests and questions are engaged by the writer in the process of writing, and *actual readers* of the completed written text who produce interpretive texts within the dialogic network in which the writing is a nexus.

As a literacy activity, writing has the potential to help learners move beyond the recognition of forms or even the production of social and educational norms, and move towards the generation of new potentials for academic practice, that is, the opening of new social positions in the production of specialized knowledge. In university settings in particular, writing provides a context for developing the potential for what Hasan (1996) calls *reflection literacy*: "Participation in the production of knowledge will call for an ability to use language to reflect, to enquire and to analyse, which is the necessary basis for challenging what are seen as facts" (Hasan, 1996, p. 408). The intimate association of reflection literacy and semiotic mediation as social and linguistic phenomena is clear.

The practice of such reflection literacy would thus appear to be highly relevant in L2 writing focused on content learning, a topic of the next section. In content learning, the focus on content may occlude the already cryptic role of language as, first, a resource for negotiating interpersonal relations. As Hasan (2004) notes, "[t]he crucial part played in this process [of forging a self through interaction with others] by semiotic mediation is most clearly manifested

in unselfconscious discourse: it is here that interpersonal relations are semiotically created, maintained and changed" (p. 162). In this view, reflection literacy implies subjects who make visible to themselves and others the interpersonally situated process of knowledge construction.

2.4 Writing as a resource for content learning and second-language learning

Associated with the conception of writing as a widely integrating literacy *practice* is the understanding of writing as a *resource* for learning academic content and the L2. In relation to semiotic mediation, the central aim of introducing the topic of academic writing and content knowledge learning is to emphasize that the development of knowledge is implied in the development of abstract tools such as language for mediating knowledge construction. As analyzed by Kozulin (2003), these two processes are fruitfully distinguished: "The process of appropriation of psychological tools differs from the process of content learning" (p. 25). However, studies of language development and, more specifically, of the development of grammatical metaphor, inform us that subjects learn to construct esoteric knowledge as they appropriate and internalize the mediational features of language (Derewianka, 2003; Halliday & Matthiessen, 1999; also see Chapter 3). This view is importantly different from Kozulin's claim that "[t]his difference reflects the fact that whereas content material often reproduces empirical realities with which students become acquainted in everyday life, psychological tools can be acquired only in the course of special learning activities" (p. 25).

Rather, the difference between language learning and content learning can be more clearly understood as one of part-whole relations: the development of uncommonsense or specialized content knowledge, and the *capacity* for developing it, occurs in the course of (as part of) the development of language as a resource for mediating the multiple functions of discourse in everyday context, including the capacity to construe both material and esoteric experiences. As GM is a resource that allows subjects to generate nominal, information-dense academic discourse (Halliday, 1998) by reconstruing the semantic resources of everyday word-meaning relations (e.g., the *entity* meaning of nouns is used to create an *entity-process* in de-verbal nominalizations), mature use of GM *must* develop from early, elemental systems of word-meaning relations (Halliday, 1993a; Halliday & Matthiessen, 1999). While it is quite clear that not all adult learners go on to develop enhanced capacities for the particular forms of "higher mental functions" associated, for example, with academic writing in university and the

development may be contingent on the subject's engagement in "special learning activities," it is important to recognize that language itself provides a resource precisely for the development of such content knowledge (Halliday & Matthiessen, 1999; Matthiessen, 2006).

A summary of the research into the role of writing in learners' apprenticeships in the academic content areas gives us reason for optimism about the value of writing for content learning (Hirvela, 2011). For example, studies of writing in social science areas such as education, political science, and economics show a positive relationship between L2 writing and content area learning. Hirvela's (2011) report also highlights the need to differentiate the specific nature of the populations and programmes involved and, in particular, the nature of the content-based L2 literacy instruction involved. One key instructional factor, for example, that emerged from Hyland's (2006) review of studies in English for academic purposes (EAP) appeared to have a determining force: instructor preparation (see also Gebhard, 2010). Such preparation is a central challenge for advanced-level EAP and its cousin field, Content and Language Integrated Learning (CLIL), where language instructors are expected to demonstrate insight into the content area and facilitate learners in gaining such insight (Dalton-Puffer, 2007). In CLIL, it is more often the case that language teachers have this role given that subject-area instructors are less commonly tasked with, and prepared for, teaching about the role of language in constructing subject-area knowledge (Dalton-Puffer, 2007).

These circumstances seem likely to improve, especially with developments in interdisciplinary practice and policies at the institutional level. Two general results about the nature of content learning through L2 writing provide insight into possible improvements: learners tend to value L2 writing as a means of gaining content-area knowledge, and while the process of content-area learning through L2 writing is productive, the benefits typically arise only after a significant investment of time (Hirvela, 2011). Thus, in designing and implementing such processes, teachers, faculties, and universities need time to exploit the locally-relevant links between writing and content-area knowledge (Duff, Ferreira & Zappa-Hollman, 2015; Gebhard, 2010). Generally positive results for CLIL also arise from Europe, drawing attention to the relevance of the scale of support to the policy level and corresponding timelines through which multi-scalar developments in this area can occur (Dalton-Puffer, 2007). In this regard, it is encouraging to see recent developments in public education policy also in Australia and some

states in the United States towards language-based criteria for content learning (Duff, Ferreira, & Zappa-Hollman, 2015).

The focus of the review now shifts from the contributions of L2 writing to learning in the content areas to its role in L2 learning. The contributions of writing to L2 learning are the focus of the writing-to-learn literature (Manchón, 2011). Writing is widely considered necessary for well-rounded development of language competencies, while capacities to write academically are generally considered criterial for the development of advanced language abilities, particularly those associated with professional academic practice (Hyland, 2007a; Ortega, 2011, 2015; Norris & Manchón, 2012). The focus on professional practice is salient because this is the career aim of the four apprentice scholars investigated in this study. Harklau (2002) insists that "it is important to investigate how L2 learners learn how to write, but it just as important to learn more about the instrumental role that writing can play in the acquisition of a second language in educational settings" (p. 345). In contexts of English as a foreign language (EFL), where reading and writing are the primary means of engaging with the target language, the potential of writing as a resource for language learning is especially relevant for language learning (Manchón, 2009).

Contemporary conceptions of writing as socioculturally situated practice that contributes to both content and language learning have identifiable roots in the concept of semiotic mediation and the social genesis of mind described earlier in this chapter (Lantolf & Thorne, 2006; Vygotsky, 1981). However, and unsurprisingly, socioculturally-informed approaches to L2 academic writing do vary along several dimensions in their conceptions of development. Approaches differ, for instance, on whether or to what degree learning to write is understood in terms of situated performance, the appropriation of mediating tools, the internal re-systemization of mediating tools, or the simple internalization of such tools (Manchón, 2012). Another aspect that differentiates approaches is the relative focus on the textual, contextual, broader socio-political aspects of L2 academic writing, and/or the relationship between and among these. This range implies variation in the respective focus on the mediating roles of language, register, genre, systems of cultural activity, and/or dynamics of social power that are reviewed in the next section.

2.5 Semiotic mediation in sociocultural approaches to L2 academic writing

In outlining sociocultural approaches to writing, it is recognized that, in practice, L2 academic writing research does not typically adopt single-theory frameworks. Indeed, research in L2 academic writing is frequently carried out across boundaries of the frameworks reviewed in this chapter. This state of affairs is understandable considering the explanatory power of Vygotsky's notions of the sociogenesis of mind and the complexity of academic writing as a literacy practice and factor in L2 learning. For example, in researching L2 writing as a *social* practice, it is often necessary to at least acknowledge, as virtually all studies do, some form of *intra*personal engagement, that is, a mental and/or affective dimensions of writing practice. These dimensions emerge in concepts as variable as linguistic choice in semiotic mediation, strategic decision-making in negotiating meaning, positioning and identity in relation to orders of social power, and/or intentionality.

It is also important to recognize that research in L2 academic writing (and applied linguistics more generally) may be primarily data-driven and theory *building* rather than emerging from a particular theory (Duff, 2008). This is characteristic of many case studies of L2 writing (e.g., Belcher & Connor, 2001; Casanave, 1998; Spack, 1997; see Duff, 2008, pp. 89-91). Norris and Manchón (2012), for example, encourage multiple case studies "to identify common grounds regarding the most salient variables of interest for determining the what, why, and how of L2 writing development" (p. 231). As outlined in this section, the interconnectedness between theories, methods and data contribute significantly to the vitality of sociocultural research in L2 academic writing (Leki, Cumming, & Silva, 2008; Manchón, 2009, 2012). The following sub-sections provide a brief account of the main approaches in sociocultural research on L2 academic writing, focusing on their tendencies in conceptualizing and operationalizing aspects of semiotic mediation.

2.5.1 Academic literacies

Academic literacies research is concerned with literacy as situated second-language practice, mainly in contexts of higher education. It follows that research on academic writing is well represented in this approach (Ivanič, 1998, 2004; Lillis, 2003; Street, 1984, 1995; Zamel & Spack, 1998). The general aims of academic literacies research are to support critical, transformative, equitable practice for learners and also, directly or by extension, in educational

institutions and society. These aims entail focus beyond an unelaborated "identify and induct" approach in which learners are assumed to be inducted into the conventions identified in the writing of expert practitioners (Lillis & Scott, 2007, p. 13). While recognizing the educational value of these conventions, the approach frames them in contexts of imbalances in social power, encouraging learners to negotiate new social, discursive and ontogenetic spaces for themselves as knowers. The origins of academic literacies can be traced to linguistic anthropology (e.g., Rampton, 2007), cultural studies, and Street's (1984) New Literacies, which distinguishes *autonomous*, skills-based literacy practices from *ideological* literacies, which are aimed at contesting discursive and other norms and redistributing social power.

The research methods used are for the most part ethnographic, aiming to draw out stakeholders' emic perspectives on practices as the source of ideological literacies (Lillis & Scott, 2007). Typically, the ethnographic methods employed involve multiple sources of data such as semi-structured interviews, autobiographical accounts, and/or students 'talking around' their written texts in accordance with their particular concerns and investments (Lillis, 2008). Lillis and Scott (2007) notably express a concern about varieties of academic literacies research closely associated with cultural studies approaches in which "detailed empirical observation is often lacking" (p. 13). This practice in literacies research is also critiqued by Tomaselli and Mboti (2013) researching in a South African context, where social action on literacy is in focus. Lillis and Scott (2007) espouse "transformative interest in meaning making set alongside a critical ethnographic gaze focusing on situated text production and practice" (p. 13). Correspondingly, mainstream academic literacies research seeks to develop arguments for change in practices and policies supported by evidence from situated contexts and subjects.

As outlined above, academic literacies research shows some clearly observable tendencies in relation to semiotic mediation. The aspect of semiotic mediation most in focus in academic literacies research is the ways writers use language to mediate and claim discursive space for subjective social positions – including their own – that are underrepresented and/or at risk. Thus, the role of language in enacting social positions tends to be emphasized in the approach over other functions. While language use is by nature the claim to discursive space in social context, academic literacies emphasizes the enduring subjective and socio-political implications of language use. Furthermore, while the interest is in L2 users' subjectivities as

these emerge in local practices and in context of socio-political change, the research methods are not necessarily or explicitly longitudinal.

The work of Ivanič (e.g., 1998) on academic identities is often cited as exemplary. She shows how learners gain a sense of social and discursive power by engaging in critical reflection on conventional linguistic forms – often made visible through explicit instruction in academic writing – and social orders of academic practice. This sense is the source of learners' evolving, critically-engaged semantic orientation which can be locally instantiated in academic identities.

2.5.2 Academic discourse socialization

Research in academic discourse socialization (ADS) has emerged relatively recently as a sub-type of language socialization (LS) research. Language socialization is defined as the long-term process of enculturation of novices into social positions, cultural orientations, and fields of knowledge through linguistically mediated interaction with peers and mentors (Duff, 1995, 2010a; Duff & Hornberger, 2008; Duff & Talmy, 2011; Garrett & Baquedano-Lopez, 2002). Language is theorized as both a means and product of socialization (Schieffelin & Ochs, 1986), a position that parallels Halliday's (1975; 1993a) conception of learning as learning language, learning through language, and learning about language. LS research originates mainly from anthropology but also has roots in sociology, linguistics, education, and neo-Vygotskian psychology (Duff, 2010a; Schieffelin & Ochs, 1986). Correspondingly, LS research adopts case study and ethnographic methods, with emphasis on longitudinal data and ecological validity (Duff, 2008; Kramsch, 2002). Studies in LS have been carried out internationally, and within and across educational cultures (Duff, 2010b). Key findings cluster around subjects' writing processes and challenges associated with, for example, specific instructional interventions, university courses, graduate programmes, and scholarly publication (e.g., Berkenkotter & Huckin, 1995; Berkenkotter et al.,1988, 1991; Casanave, 1992, 2002; Casanave & Vandrick, 2003; Duff, 2002, 2003, 2007; Haneda, 2006; Séror, 2008; Spack, 1997). A general description of language socialization that applies to academic discourse socialization is that it is "*lifelong* and *lifewide*" (Duff, 2003, p. 238; italics in original).

LS research problematizes assumptions that learners progress through institutionally ordered, linear models of development of the type that can be inferred in some uses of the term *apprenticeship* (Duff, 2010a). As an approach to understanding language development, although

LS research encompasses the acquisition of forms (Duff, 2010b), the approach is not concerned with natural order of acquisition of formal grammatical features advanced in second language acquisition (SLA) research (see Ellis, 2008). As such, LS research orients towards the unique trajectories experienced by subjects through the socialization process as they converge to, accommodate, negotiate, resist and/or contest cultural practices (Duff, 2010a). Diversity is recognized as well in the kinds of academic cultural practices conventionalized at various scales, including nationally (e.g., Duff, 1995) and in specific classrooms (e.g., Talmy, 2009). These features of ADS research indicate espousal of an ethos of diversity, inclusivity and generalized sociopolitical engagement in contexts of academic enculturation such as universities. In this aspect, ADS resonates with research in academic literacies. Indeed, Duff (2010a) asserts that the ways prevailing ideologies are locally contested by discursive means, and by implication the contestation itself, are within the scope of ADS research.

It is important to recognize also that ADS research frequently encompasses channels of mediation other than language. Socializing processes of mediation may be understood to be diffused in visual and other non-linguistic channels in situated contexts. This aspect of ADS research is evidenced in a subsection of Duff (2010b), "Language Socialization: Linguistic and Nonlinguistic Dimensions."

The multisemiotic scope of semiotic mediation of some ADS research is consistent with the affiliations of ADS with the neo-Vygotskian tradition of activity theory, in which semiotic mediation is understood to occur through local, culturally-organized, multimodal systems of activity. For example, studies by Morita (2004) and Abdi (2008) highlight the relevance of L2 learners' socialization to their constrained access to and participation in the multi-semiotic activity systems in their respective educational contexts. This theorization of semiotic mediation as an emergent feature of activity systems in large part accounts for the "neo" in neo-Vygotskian theory, distinguishing it from a more specific focus on the mediation of meaning by language, which is the hallmark of Vygotsky's original formulation of semiotic mediation (1978, 1997; Hasan, 2004).

Given the interest in ADS in the complex socializing effects of instructional interactions, it also recognizes the value of Vygotskian notion of Zone of Proximal Development (ZPD) or instructional scaffolding:

> the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

Further, given the fundamental interest in ADS in exploring multiple factors and directions in trajectories of socialization, ADS researchers are careful to avoid the naïve notion that learners necessarily converge to the ZPDs presented in instruction. In this sense, as mediation accounts for the subjects' multiple semiotic engagements and corresponding social dispositions more holistically, ADS research can be understood to prioritize the role of semiotic mediation in activity systems over ZPD as a factor of academic socialization.

In this relation, ADS research has come to recognize the ways socialization processes operate bi- and multi-directionally, whereby cultural learning *and* teaching are understood as inherent features of participation in discourse: participants socialize each other (Talmy, 2008). Thus, the discursive practices of ostensive apprentices also direct the cultural learning of their peers and mentors (Talmy, 2008; Duff & Talmy, 2011). From the view of semiotic mediation, as an account of the roles language and discourse play in the formation of social dispositions, this development in ADS research is crucial in accounting for the dynamic and contested nature of discourse as a point of contact of different mediating resources and subjective dispositions. As such, the development makes visible potentially under-acknowledged agentive social roles of L2 learners (Talmy, 2008).

The roots of ADS research in linguistic anthropology are evident in the frequent reliance on context-sensitive discourse analysis. While the aim is for triangulation of linguistic data sources, the approach tends to favour observation and participant interview data; for example, ADS studies of L2 academic writing may be considered sufficiently well-informed by contextual data that analysis of the writing itself is not essential (e.g., Anderson, 2016). Thus, the forms of linguistic mediation considered relevant in ADS research on writing are highly varied (Duff, 2003). They include macrofeatures of discourse such as academic genres and other routinized sociolinguistic practices, voice, language play, directness of speech acts, and various other aspects of register variation. Microfeatures of language typically in focus are lexical and grammatical choices considered to be especially revealing of subjects' affective, epistemic and

sociopolitical positioning. Various kinds of discourse analysis may be involved, including conversation analysis, speech act theory, Goffman's (1981) notion of footing, and forms of genre and register analysis. The valuing of triangulated, broadly sourced, longitudinal data in ADS research underlines an appreciation that the semantic dispositions observed in case studies emerge uniquely through long-term and multifaceted processes of meaning-making.

2.5.3 Genre-based approaches: Sydney School

Genre has emerged as a central concept in the study and instruction of L2 academic writing (Hyland, 2004). The term *genre* is generally used across applied linguistic and L2 writing research to refer to conventionalized text types. The term is defined more specifically in the two genre-based approaches to academic discourse that have focused on understanding and supporting L2 academic writing: the English for Specific Purposes (ESP) approach associated with the work of John Swales (1990, 2004), and the Sydney School approach to literacy instruction associated with SFL (Christie & Martin, 1997; Martin, 1989, 1992 (especially Chapter 7); Martin & Rose, 2008). Both approaches treat genre as a socioculturally-evolved discursive pattern that aids mediation by at once constraining and clarifying meanings in context (Christie, 1987). They also both focus on how writers achieve (or do not achieve) their rhetorical aims in a conventionalized patterning of ordered *stages* (Sydney School) or *moves* (ESP). As applied in L2 writing instruction, explicit descriptions of the conventionalized patterns that facilitate the achievement of the author's purpose by culturally recognizable means are the basis for applications of Vygotskian pedagogical principles (Hyland, 2007b), resulting in what Bernstein (1990) described as a "visible pedagogy" (p. 73). As a frequently and widely used concept for understanding how social and cultural contexts are mediated in discourse, genre is a core concept for L2 academic writing research (Hyland, 2004).

Internationally, applied linguistic research adopting SFL-based genre analysis has come to be called the Sydney School approach to genre; however, it is important to note that Sydney School theorists themselves tend to reserve this name specifically for the program of SFL-informed, genre-based literacy pedagogy. The analytic techniques, as discussed below, are more accurately referred to as SFL-based discourse semantic analysis. However, in applied linguistics, the semantic force of 'Sydney School' extends this label to include *research* associated with the

pedagogy and the discourse model. This common usage is adopted in this dissertation for ease of reference.

In the Sydney School approach, genre is defined as a "staged, goal-oriented, purposeful activity in which speakers engage as members of our culture" (Martin 1984, p. 25): [It is] "Social because we participate in genres with other people; goal-oriented because we use genres to get things done; staged because it usually takes us a few steps to reach our goals" (Martin & Rose, 2007, p.8). As such, genre is understood to be the fundamental cultural tool in subjects' mediation of sociocultural contexts. Multiple purposes agglomerate in *macro-genres* (Martin, 1992) such as research articles (RAs), which contain various *primary genres* such as procedures, reports and recounts (Martin & Rose, 2008). A writer's purposes are understood to be achieved not by producing texts that are formally classified *within* a canonically-staged genre but rather through the relations *between* genres that emerge in texts and their contexts (Martin & Rose, 2005, 2008).

In texts, authors' purposes are achieved through functionally distinguishable stages, which are understood to be realized in lexicogrammatically and discursively patterned ways corresponding to known genre descriptions, such as the primary genres of schooling (Martin & Rose, 2008) and genre families of student writing in university (Nesi & Gardner, 2012). At the more granular or delicate level, genres as cultural activity are understood to be realized by discourse systems "beyond the clause" (Martin & Rose, 2007). Individual discourse systems serve one of three general social functions or metafunctions in context, a formalization drawn initially from systemic functional grammar (in this following list, the SFG formalisms are shown in parentheses): Ideation (ideational/experiential metafunction), Conjunction (ideational/logical), Identification (textual), Periodicity (textual), Appraisal (interpersonal) and Negotiation (interpersonal). In the Sydney School approach, the ideational, interpersonal and textual metafunctions are lexicogrammatical systems which in combination realize the register variables of, respectively, Field, Tenor and Mode.

Thus, the Sydney School approach to analysing texts and genres typically uses both the clause-based lexicogrammar of SFL (Halliday & Matthiessen, 2004) and SFL-based discourse semantic analysis developed by Martin (1992; Martin & Rose, 2007). The involvement of staging schemes and register variables in genre descriptions reflect how, in the Martinian interpretation of SFL (Martin, 1992; Martin & Rose, 2007), the context of a text is stratified into

the layers of register (the context of situation) and genre (the context of culture). It is noted that Martin's approach to register is different from that of Halliday, Hasan, Williams and others, for whom register is a situation-typical selection of language features that instantiates aspects of the wider meaning-making potential of language in social context (e.g., Halliday & Matthiessen, 2004); the latter, Hallidayan, approach is taken in the present study.

Compared to the ESP and rhetorical approaches to genre, the Sydney School approach "is perhaps the most clearly articulated and pedagogically successful of the three orientations" (Hyland, 2004, p. 25). SFL genre pedagogy is advanced through a "teaching-learning cycle" developed from the Vygotskian notions of ZPD and semiotic mediation. It involves instructor-led modelling of the genre, joint negotiation of a text involving the teacher scaffolding of the task with the learner, and independent construction of text by the student in activities such as drafting, conferencing and editing (Macken-Horarik, 2002). The pedagogy appears to have yielded positive literacy results in primary and secondary schools (e.g., Christie, 2002; Coffin, 1997; Veel, 1997). The results in university programs are also positive (e.g., Byrnes, Maxim & Norris, 2010; Yasuda, 2011).

Along with academic literacies and academic discourse socialization research, Sydney School research espouses the Vygotskian concept of semiotic mediation. In the literacies and socialization approaches, semiotic mediation is a social phenomenon that is richly instantiated in the use of language and other semiotic modalities, as well as related features of discursive context such as genre, register, discourse orders, subjective social identities and institutional roles, which are understood as both means and products of literacy and socialization. A difference between these approaches to researching semiotic mediation in academic writing and the Sydney School is that the latter focuses on linguistic data analyzed through a theory of language extended to a theory of discourse (Martin & Rose, 2008). In this regard, the Sydney School research produces empirical results and also has the potential for feeding back to the theory of language and discourse. As noted above, academic literacy and language socialization and other socially engaged theories used in L2 academic writing research develop from their empirical bases, but the theoretical contributions of these studies are not typically oriented towards linguistic theory (noting that outside the domain of L2 writing, second-language LS research has such an orientation, such as Yoshimi (1999)). Sydney School theorists, as linguists, seek to refine their theoretical understanding of the complex role of language in context to high

levels of generality (or better, systematicity) and delicacy; as such, "SFL has been described as an 'extravagant' theory; its extravagance has evolved to manage the complexity of the phenomenon it describes" (Martin & Rose, 2007, p. 3). In this aspect, SFL-based understanding of semiotic mediation is developed both through empirical study and continual updating of the linguistic theory.

The Sydney School research has generated a number of theoretical off-shoots, including in the association between SFL and Bernstein's sociology of education (notably through developments in Legitimation Code Theory (Maton, 2016)), Vygotsky's educational psychology (notably, the Genre Pedagogy (Martin & Rose, 2005)), and in discourse semantics, notably Appraisal Theory (Martin & White, 2005).

With this profile, Sydney School research makes many points of contact with the concept of semiotic mediation as elaborated by Hasan in the transdisciplinary sociological (Bernstein), psychological (Vygotsky) and linguistic (Halliday) framework but is not co-extensive with it. As noted below, the present study adopts Halliday's approach in SFL (often referred to as the IFG approach, after Halliday's (1985) seminal work *Introduction to Functional Grammar*, now in its fourth edition (Halliday & Matthiessen, 2014)). The differences between Halliday's and Martin's approaches are sufficiently large, especially in the modelling of context (see Hasan, 1995), for the notion of genre to be avoided in the present study. This study adopts the related concept of register, which is a context-specific variation of the meaning potential of language in social life (see Section 2.5.6).

2.5.4 Genre-based approaches: English for specific purposes

In Swales' English for specific purposes (ESP) approach to genre-based pedagogy (e.g., Swales & Feak, 2004), genres are also defined by their communicative purpose (Swales, 1990). For Swales (1990, pp. 33-61), genre is a communicative event, enacted centrally through language, that shares communicative purposes with similar events. Despite this similarity with the Sydney School approach, the ESP approach takes a more eclectic and pragmatic direction in describing genres for the purposes of academic writing instruction as well as research in L2 writing. Swales (1990) reasons that "it may be objected that purpose is a somewhat less overt and demonstrable feature than, say, form and therefore serves less well as a primary criterion. However, the fact that purposes of some genres may be hard to get at is itself of considerable

heuristic value" (Swales, 1990, p. 46). Developed as a way of understanding academic genres in order to teach writing to L2 users of English, the ESP approach describes genre moves using a rhetorical-linguistic framework that coordinates the author's purpose, disciplinary conventions, and rhetorical and functional linguistic structures (Hyland, 2004; Swales, 1990). However, in relation to genre, this approach is distinct from the Sydney School, which distinguishes genres by traceable discourse semantic and lexicogrammatical features organized formally and metafunctionally in accordance with discourse semantic and SFL theory. The best-known genre description to emerge from the ESP tradition is the Create a Research Space (CARS) model for research paper introductions (Swales, 2004; Swales & Feak, 2004). The pragmatism of the ESP approach has been implicated in critiques of the validity of its genre descriptions: that, for example, the CARS model does not provide a valid generalization of the scope of research report introductions (e.g., Sawaki, 2014).

The intellectual roots of the ESP approach to genre are varied. They include principally ethnographic and sociolinguistic research on speech/discourse communities (e.g., Bizzell, 1992), rhetorical genre studies (e.g., Bazerman, 1988), the concept of dialogism, and functional linguistic tools (including SFL) for understanding text organization (Hyland, 2004; Swales, 1990). Discourse communities are an especially salient construct for Swales (1990); they are "sociorhetorical networks that form in order to work towards sets of common goals" (p. 9). Given the orientation to community practices, there is little enthusiasm in ESP for approaches that emphasize the writer's internal processes, in which the relationship between the writing and the writer's cognition are thought to be overemphasized (Swales, 1990). In its pedagogy, the ESP approach also does not espouse investing significantly in linguistic metalanguage to set up systematic linguistic links between textual and community practices in relation to genre; for example, Swales (1990) insists that genre is "valuable because it is clarificatory, not because it is classificatory" (p. 37). This dialogic, rhetorical approach to text-context relations is complemented by a pragmatic lexicogrammatical analysis of some specific features of academic writing such as use of verb tenses and articles, and a suite of resources concerning "formal grammar style" including contractions, negative forms, "run on" expression such as "so forth", reader address, and adverb placement (Swales & Feak, 2004, pp. 22-23).

Explicit instruction in salient aspects of disciplinary writing is strongly encouraged. For example, Swales (2004) challenges arguments from rhetorical genre scholars on the benefits of

immersion over explicit instruction. In his arguments for explicit instruction, Swales (2004) subtly critiques the links between rhetorical genre studies and activity theory, specifically the concern for the diffusion of situated meaning across forms of mediation. Swales (2004) asks whether "going beyond what is discoursally salient is really worth the effort" (p. 98).

For its focus on directing learners to the conventions of disciplinary writing, the ESP genre approach has been labelled "pragmatic and accommodationist" (Casanave, 2004, p. 205), meaning that it risks perpetuating hegemonies of scholarly discourse and associated social orders. However, there are strong counter-arguments to this claim. Swales (1997) does not regard English for academic purposes (EAP) as a "culturally and politically neutral enterprise" (p. 37). Also, while his very popular textbooks (e.g., Swales & Feak, 2000, 2004) explicitly teach conventions of writing, they also include pedagogical tasks that support awareness of the hegemony of English, its position as a "Tyrannosaurus Rex" (Swales, 1997) relative to less-diffused languages and local cultural practices in global scholarship.

As instantiated in the textbooks (e.g., Swales & Feak, 2000, 2004), the pedagogy is organized by genres. Thus, the ESP genre approach, even as a language-centric enterprise, would appear to conceptualize semiotic mediation as a widely diffused process guided by foundational academic genres such as extended definitions, data commentaries, and problem-solution texts. Indeed, it is the writing by EAP students of precisely these three text-types that is analyzed in the present study, since the syllabus of the introductory academic writing course under investigation adopted Swales and Feak's (2004) most popular textbook for early graduate students. Other pedagogical works based in ESP address canonical genres of scholarship such as the four sections of the Introduction-Methods-Results-Discussion (IMRD) report. These are achieved by means of a variety of mediating tools recontextualized from linguistics with what in ESP is considered just enough technicality to enable focused analysis, reflection and practice. However, the trend in ESP publications has been towards slightly elevated levels of technicality; for example, new editions of the textbooks include appreciably detailed instruction on the notion of Given-New information structure (Swales & Feak, 2011). However, with genre being the guiding concept of the pedagogy, the tools and tasks vary considerably in their functional linguistic footing. In this way, ESP genre pedagogy and research positions genres as central mediating tools in learners' apprenticeship as academic writers.

2.5.5 Activity theory

As indicated by the above discussions of academic discourse socialization, rhetorical genres studies, and the ESP genre approach, sociocultural activity theory provides a framework for understanding mediation in many studies of L2 academic writing. Activity theory was first developed by Leont'ev (1978), one of Vygotsky's students and collaborators. He reformulated Vygotsky's (1978) conceptualizations of human cognition through semiotic mediation to cognition mediated by socioculturally motivated activities. Thus, the key psychological construct in sociocultural theory remains mediation. The activity theory perspective is well diffused in applied linguistics, where meaning-making systems such as language are often understood to arise from a complex of meaning-making activity involving many material and semiotic elements. Such a perspective is provided very clearly by Kramsch (2002), who, though not considered an activity theorist, is a central figure in applied linguistics:

> meaning lies in relationships between artifacts, persons, and events, not in the objects themselves; language, as one of the many semiotic systems, emerges from semiotic activity through affordances brought forth by active engagement with material, social, and discourse processes… ecological models of language development see it as an open process mediated by various semiotic tools in various activities (pp. 20-21).

While Vygotsky (1978, 1997) divided mediation into tool-based mediation, directed externally to control of objects, and sign-based mediation, which is directed internally to regulate oneself, in activity systems, these two forms of mediation are recognized but conflated in their functions in mediating microsystems of culture. Activity theory (and the wider sociocultural theory from which it emerges) is concerned with human development at the levels of culture (phylogenesis), the individual (ontogenesis), and shorter-term mental functions and processes (microgenesis) (Lantolf & Thorne, 2006). Applied linguistic research has tended to focus on microgenesis of L2 learners' cultural and linguistic experiences and development (Lantolf & Thorne, 2006).

Leont'ev (1978) defined activity as comprising the three layers of motive, action, and condition. This triad of layers assists researchers to hold in view multiple aspects of human cultural endeavour while at the same time helping researchers avoid dichotomies such as individual-society, past-present, and cause-effect. This interest in understanding human goal-

oriented behaviour in its multiple culturally-mediated aspects subsequently prompted Engeström (1999) to significantly expand Leont'ev's three-part model of activity. Contemporary activity theory is widely used in social research, especially in interdisciplinary frameworks involving case-study and ethnography, where the notion that humans mediate their endeavours in cultural micro-systems has been productive (Swain, Kinnear & Steinman, 2011). Unsurprisingly, these perspectives from contemporary activity theory have also been applied to research on L2 academic writing (Cumming, 2006).

The complementarities between activity theory and academic discourse socialization are noted by Duff (2010a). One complementary aspect is cultural indexicality, or the ways linguistic and other meaningful cues in context index particular (sets of) cultural meanings, such as membership categories and sociocultural knowledge: "Learners, like their mentors or interlocutors, must become very good at interpreting and using such cues appropriately" (Duff, 2007, p. 313). This focus has the potential to draw out the details of felicitous (or otherwise) discursive indexes involved in L2 academic writing and connect these to cultural meanings in play in the activity system.

2.5.6 Systemic functional linguistics

The concept of sign-based or semiotic mediation as Vygotsky (1978) originally proposed resonates strongly in Halliday's systemic functional linguistics, which conceptualizes language as a semiotic resource with mediating roles in both interpersonal and intrapersonal contexts (Halliday, 1978). It is important to distinguish the nature of mediation that is modelled in SFL: language is not understood to be a lexicogrammatical construct whose role is to index phenomena in social context, because this formulation appears to posit a two-stage shift linking a pre-verbal conception of context to a verbal sign, which is not formally possible in a language-as-social-semiotic interpretation of semiotic mediation. This perspective is illustrated in a discussion of early literacy by Williams (2005a):

> [Vygotsky] considered 'words' to be the primary means through which children's attention is directed to entities. This view, I believe, can be readily re-expressed from a semiotic perspective as thought being primarily formed by language in use (p. 288).

Rather than an index, language is understood as a resource for *construing* and *enacting* context. As such, it is a complex semiotic system that provides the basis for activating semantic features in the context in coordination with lexicogrammatical choices made by interacting participants. The nature of the co-genesis of text and context is that the semantic systems in play in context probabilistically constrain the lexicogrammatical choices in texts, and lexicogrammatical choices in text realize the semantic systems in context (Halliday & Matthiessen, 1999, 2004). The notion of construal accommodates the fact of a text not *constructing* the context into some inevitable form, but rather of the text skewing the construction of the situational context towards a particular semantic profile (Halliday & Matthiessen, 1999).

With the central concept of register, SFL theorizes three different but coordinated lexicogrammatical systems that are co-genetic with three aspects of the semantics in situated contexts (Halliday & Matthiessen, 1999; 2004). These co-genetic relationships are understood to be activated with every instance of language use, that is, in every text: ideational lexicogrammatical systems are co-genetic with the experiential domain of semantics, which realizes the contextual variable Field (what is going on); interpersonal lexicogrammatical systems are co-genetic with interpersonal domain of semantics, which realizes the contextual variable Tenor (how interactants relate socially); and textual systems are co-genetic with Mode (what channels and linguistic mediums are used). These three sets of systems work simultaneously and in an integrated way to realize situation-specific discourse – an instance of a register – in the context of situation (Halliday & Matthiessen, 2004). As a situation-specific language practice mediated by social subjects, registers can be understood as being co-extensive with the notion of literacies, situated academically or otherwise (G. Williams, personal communication, July 12, 2013).

Language development from the view of semiotic mediation, as this is understood in SFL, is a sociogenic process (Vygotsky, 1978, 1986; Halliday, 1975, 1991; Hasan, 2005, 2011b). That is, the human capacity to use language and other semiotic modalities to mediate social and mental life starts in the social world, where subjects appropriate and eventually internalize the language that they come into contact with in interpersonal interaction (Vygotsky, 1981). Herein is the theoretical basis for language as the central means of semiotic mediation and the development of socio-semantic dispositions. However, according to SFL-informed theorists of literacy, the implications of semiotic mediation have been underemphasized in literacy research,

especially relative to the far more specific Vygotskian concept of ZPD: "The selective use of the [Vygotskian] theory exacerbates the problem of limited theorising of 'context'" (Williams, 1994, p. 30). Accordingly, in parallel with ADS research, SFL-informed research on semiotic mediation draws attention to the relatively large socializing and developmental implications of sustained, informal and unself-conscious interaction (Hasan, 2005/1992). Such interactions are considered an important basis of subjects' robust socio-semantic dispositions or semantic orientations (Bernstein, 1990, 1999).

Instances of language use in the social world are systematized internally as they self-organize (i.e., emerge unconsciously) into multiple, parallel functional potentials for making meaning (Halliday, 1975, 1993a). These systems are employed, in turn, in the internalization of further functional systems. It is in this light that the functional linguistic grammar is understood to be a complex meaning-making system with the capacity for exponentially expanding the human potential to make meaning. Correspondingly, language learning is understood as the expansion of the individual's meaning-making system toward greater scope for subjective engagement in society. This development is typically tracked in close relation to the scope of the subject's registerial repertoire (Halliday, 1975, 1993a); that is, the subject's semiotic preparation to interact interpersonally and intrapersonally in self-directed and satisfying ways across social contexts. The expanding SFL model of language as a system of systems of meaning potential offers a scrutable framework from which to observe developments in individuals' and groups' meaning-making practices.

The concept of semiotic mediation highlights transdisciplinary links that emanate from SFL theory. The links to Vygotsky's psychology and Bernstein's sociology have been indicated; another valuable link is to the anthropological linguistics of Whorf (1956/1939), which posits that social subjects construe and enact sociocultural reality as organized by the grammatical systems they unconsciously use. Like registers but on a massive scale, languages are resources for meaning that are co-genetic with the contexts and cultures in which they are used. Whorf – whose work predates the distinction between register and dialect – posited that the co-genetic (i.e., dialectic) relation between language and culture results in enculturated individuals developing linguistically- and culturally-specific mental maps of their world (Whorf, 1956/1939). Enculturated individuals are largely unconscious of the preferred lexicogrammatical configurations and shared basis for 'common sense' that are engendered by these mental maps:

> We cut nature up – organise it into concepts and ascribe significances as we do, largely because we are parties to an agreement to organise it this way – an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and unstated one, but its terms are absolutely obligatory; we cannot talk at all except by subscribing to the organisation and classification of data which the agreement decrees (Whorf, 1956, p. 213).

As Hasan (2005) noted for semantic dispositions that arise with this process of semiotic mediation, it is difficult to account for the "implicit" process; however, the general variation in groups' "systems of agreement" is quite traceable (as per phylogenesis), as is variation between individuals at the more delicate levels of the language system (as per ontogenesis) and between textual instances of interaction (as per logogenesis).

It follows that variation in cultural "fashions of speaking" (Whorf, 1956/1939) can be observed among subcultures. Academic sub-cultures, to take a relevant example, engender particular fashions of speaking and "mental habits" with corresponding lexicogrammatical realizations that, to initiated individuals or "old timers" (Lave & Wenger 1991), are commonsensical but to newcomers may well be inaccessible without appropriate support or extensive exposure. In this relation, Whorf (1956/1939) provides a simple yet sophisticated insight. According to Whorf, the newcomer's disposition will also include "patterned resistances" to the unfamiliar dispositions and discourse: "Every language and every well-knit technical sublanguage incorporates certain points of view and certain patterned resistances to widely divergent points of view" (Whorf, 1956 [1939], p. 247). This insight indicates that, from Whorf's view, the dispositions and discourses of disciplinary sub-cultures are self-reinforcing semantic *systems* whereby positive dispositions to particular semantic and lexicogrammatical options imply dispreference for other sets of options, other subcultural dispositions. Accordingly, although Whorf's ideas predate the differentiation between dialect and register, he was thinking not only functionally but also systematically about the dialectic relation between language and culture. Whorf offers an example from disciplinary use of lexis:

> What we call "scientific thought" is a specialization of the western Indo-European type of language, which has developed not only a set of different dialectics, but actually a set of different dialects. THESE DIALECTS ARE NOW BECOMING MUTUALLY UNINTELLIGIBLE. The term 'space,' for instance, does not and CANNOT mean the same thing to a psychologist as to a physicist (Whorf, 1956/1939, p. 246; emphasis in original).

The paradox here is that while psychologists and physicists may not speak the same professional dialect, they also must have much in common given that they speak the same language. The semantic domains they share are mainly the domains of everyday life. In this way, Whorf's notion of fashions of speaking accords with what is known about how schooled and disciplinary ways of knowing, which are intimately related with writing (Coffin, 2001; Halliday, 1993a; Moore, 2006; Ortega, 2015), emerge from commonsense ways of knowing. Halliday has shown that the written registers of science in English evolved with grammatical metaphor from the kinds of knowledge construals associated with informal registers (Halliday, 1993b). Ontogenetically, as noted at the beginning of this chapter, a similar process was found by Halliday (1993a) to occur in a shorter timescale, with grammatical metaphor and abstract knowledge developing (in favourable social and pedagogical contexts) on the basis of the children's semiotic mediation of their everyday experiences, knowledge and interactions. Whorf arrived at a related finding.

> Whorf also made an important and systematic distinction between commonsense and uncommonsense knowledge, showing how the vicissitudes of the evolution of the latter are related to commonsense knowledge constructed by everyday fashions of speaking wherein the lexicogrammatical patterns of a language assume a background status, making certain concepts of reality appear inevitably real (Hasan, 2005, p. 271).

Whorf's (1956/1939) anthropological linguistic research reaffirms the robustness of commonsense construals of the world as a basis for the development of esoteric knowledge. As noted above, SFL provides tools for observing the role of grammatical metaphor in this cryptic process at the logogenetic, ontogenetic and phylogenetic scales of development (Halliday & Matthiessen, 1999).

In the discussion of semiotic mediation in SFL it remains to address more specifically the focus on language in SFL rather than all semiotic modalities. First, in the context of researching writing, the pragmatic question asked by Swales applies here, whether "going beyond what is discoursally salient is really worth the effort" (Swales, 2004, p. 98). However, the focus on language of course reflects more than a methodological choice associated with research in the language-rich activity of writing. In SFL, language is the "prototypical form of human semiotic" (Halliday, 1993, p. 93). Specifically, subjects' use of language to participate in contexts of situation can self-organize as register use – registers being understood as situation-typical variations of language use that at once realize the context of situation and are constrained by it (Halliday & Matthiessen, 2004). Learning in this view is the process of learning the context both interpersonally and intrapersonally by means of language:

> In the development of the child as a social being, language has the central role. Language is the main channel through which the patterns of living are transmitted to him, through which he learns to act as a member of a "society" – in and through the various social groups, the family, the neighborhood, and so on – and to adopt its "culture," its modes of thought and action, its beliefs and its values. This … happens indirectly, through the accumulated experience of numerous small events, insignificant in themselves, in which his behavior is guided and controlled, and in the course of which he constructs and develops personal relationships of all kinds. All this takes place through the medium of language (Halliday, 1978, p. 9).

Hasan (2004) extends the argument for the focus on language in studies of semiotic mediation by citing cognitive research into the co-genetic relation between language and the brain that demonstrates how language has a central role in the development of the brain (Deacon, 1997; Greenfield, 1997). She also notes that the focus on language "is in keeping with the dominant Vygotskian practice"; indeed, Vygotsky (1997, chapter 2) maintained the separation of sign- and artefact-mediated activity and critiqued their conflation. Finally, in keeping with the focus of this study on the role of grammatical metaphor in learners' academic writing, the study focuses on language because language provides a well-theorized basis for empirically investigating the construction and development of esoteric knowledge and associated disciplinary dispositions

(Halliday & Matthiessen, 1999). The details of these processes are explained and the relevant empirical literature in L2 academic writing is reviewed in the following chapter.

2.6 Distillation

This chapter has reviewed some key theoretical dimensions of L2 academic writing. These include academic writing as situated literacy practice and as a resource for content and language learning. These aspects draw attention to writing as a tool for mediating academic meanings in social context. As an act of meaning-making, academic writing has been conceived in this review as a nexus of practice in which apprentice L2 academic writers bridge established and new dispositions to meaning-making as they participate in the knowledge construction practices of their respective academic communities. The concept of semiotic mediation is found to be a rich source of dialogue between research approaches in the field, highlighting areas of commonality, as just noted, as well as differences in emphasis. One difference is the well-known variation in the treatment of mediation as either diffused across multisemiotic systems of activity involved in writing or as a linguistic phenomenon. A second, related difference is in the conception of the relationship between language use (and possibly other meaning-making systems) and situated context, with two key options being the concepts of indexicality and realization.

The present study opts for a focus on language as the central semiotic involved in mediating L2 academic writing practices and the development of textual and disciplinary dispositions through these practices. And, adopting SFL, the study opts for the conception of text-context relations as realizational, whereby linguistic choices are understood, via theorization of language as a system of meaning potentials, to realize meanings in types of contexts of situation. The value of these choices for the study of grammatical metaphor, in particular, should become clearer in the following chapters.

Several related claims emerged in this review that help to focus the investigation. If it is the case that everyday fashions of speaking provide the implicit epistemological base for specialized understandings of reality, as Whorf (1956/1939) claims, and these specialized ways of knowing are indeed largely achieved by the development of abstract, language-mediated concepts, as Vygotsky (1978) claims, and that the realization of these concepts within their disciplinary epistemologies is achieved in large part through metaphorical construals of

experience and reasoning in writing, as claimed by Halliday (1993a, 1998), then an opportunity at hand for L2 academic writing research is to clarify the roles of grammatical metaphor in the writing of apprentice L2 academic scholars and its development. Chapter 3 reviews the research in the area of grammatical metaphor and closes with the specific research questions pursued in this study.

Chapter 3: Grammatical Metaphor and its Role in L2 Academic Writing

> Models are built on metaphors, often unconsciously… but sometimes with conscious human design. Evolved systems – in particular those expressing human purposes but which incorporate material and biological levels as instruments of those purposes – rarely appear elegant or minimal (from the perspective of 'design'). Yet these 'messy' accretions of levels, layers and redundancies persist…
>
> David Butt (2008, p. 63)

3.1 Introduction

This chapter is concerned with grammatical metaphor (GM) as a linguistic phenomenon that has evolved in the course of human activity and experience as a resource for constructing academic knowledge. As Butt suggests, the apparently messy systems that express human purpose – systems such as GM – have evolved as robust systems in human activity. In reviewing the research literature on GM in L2 academic writing, the chapter emphasizes the relation between social linguistic complexity of GM in context and its robust role in the mediation of academic knowledge and gradual development of subjects' socio-semantic dispositions towards the construal of such knowledge (Hasan, 2005/1992; 2011b).

As GM is a theoretical development of SFL that has only relatively recently begun to gain traction in the literature beyond SFL, much of the review focuses on SFL-informed studies. However, the interest in L2 academic writing, particularly in nominalization – the main type of GM – makes relevant the wider literature in L2 writing from areas such as second language acquisition (SLA). As with the previous chapter, this chapter also shows the complementarities between approaches and the fuzziness of their boundaries.

This review of studies of nominalization and other types of GMs in academic writing addresses key interests and questions relevant to the study of GM in L2 academic writing in tertiary contexts: the use of GM in academic writing in L2 and other contexts; the rationale for particularly focusing on nominalization in GM studies; the nature of ideational GM in its experiential and logical sub-functions; the still-important role of interpersonal GM and the continuities within GM between interpersonal and ideational metaphor in academic writing; the developmental implications of GM in language and literacy learning; and the role of GM in the construal of commonsense and disciplinary kinds of knowing. By these means, the chapter sets out the foundations for the analysis of GM in the writing of apprentice L2 scholars. The typology

of GMs is presented in full in the next chapter, where the technical details are especially relevant to the operationalization of GM in the present study.

As reviewed below, the implications of GM in scholarly writing are significant (Byrnes, 2013; Halliday, 1998; Halliday & Martin, 1993; Halliday & Matthiessen, 1999; Martin, 2008; Ortega, 2015; Schleppegrell, 2004a). GM is a key resource for generating disciplinary abstraction (Klein & Unsworth, 2014; Martin, 1991) as well as abstractions that help manage text coherence (Ravelli, 2004). It is largely through experiential GMs and operations of logical GM that information comes to have a high functional load in academic writing, and the text becomes informationally dense (Halliday, 1993b, 1998). Logical GMs are also deeply implicated in the arguments, explanations and other forms of reasoning that are recognized as claims, observations, rhetorical patterns, and theories (Martin, 1992; Ryshina-Pankova, 2010). Additionally, with the expectation in academic writing that claims are to be negotiated, interpersonal GM is implicated in realizing a distanced, objective stance that enacts typically valued kinds of interpersonal relations between writer and reader (Schleppegrell, 2004b).

While many scholars writing in their second language use GM as an unproblematic resource for academic engagement, apprentice L2 scholars commonly have difficulty with GM: "Often, learners' early attempts at non-congruent [metaphorical] forms such as nominalization are clumsy and awkward" (Mohan & Beckett, 2001, p. 142). The problems are often not due to apprentice L2 (and L1) writers' insufficient use of GM; it happens that

> bundling of nominalizations… within the clause at times is so heavy as to approach unintelligibility or, at least, to conjure up a bureaucratic, clumsy writing style – the 'profundity to bullshit' continuum (Byrnes, 2009, p. 63).

Byrnes (2009) dispels here any notion that more GM is necessarily better. L2 writing students' misuse of GM, as with other kinds of errors and infelicities in the writing, are understood from the view of language as a social semiotic as contingent on the context-specific construal of meaning; a suggested response is contextually- and developmentally-relevant instruction focused not on error correction but rather on building the learner's capacity to mean (Achugar, Schleppegrell & Oteíza, 2007). In relation to GM itself, the key point here is that *GM is a resource for L2 academic writers' self-directed regulation of abstraction in context*.

Schleppegrell (2004b) identifies significant difficulties with GM in L2 science students' writing in all the major functional areas referred to above – the ideational (including experiential and logical functions), textual, and interpersonal functions. Collectively, the issues potentially degrade the effectiveness of the students' texts in their rhetorical contexts. The key linguistic features associated with mature use of GM that are known to develop relatively late and thus to challenge even advanced L2 learners have been listed by Ortega (2015). These include command of derivational morphology; large vocabulary, including simple agnation (*suspect-suspicious*) and agnation using different lemmas, i.e., with lexical reformulation (e.g., *far-distance*), and collocation (e.g., "to offer instruction" (Byrnes, 2009, p. 63)); and cohesive links (e.g., involved in identifying arguments and previewing and reviewing discourse (e.g., Ravelli, 2004)). The notion of agnation as it is used here reflects the paradigmatic perspective on meaning-making:

> grammatical metaphor forms a paradigm of alternative realisations for given meanings. Thus any one realisation ought to have an agnate form, which would be of a different word class or of a different rank (Ravelli, 1985/1999, p. 65; emphasis in original).

This range of resources helps with mapping especially advanced L2 language learning, in which the more fundamental strata of language resources are understood to become automated, and development shifts to the more "delicate" areas of meaningful choices (Matthiessen, 2006, p. 34). However, the developmental process is recursive as L2 academic writers tend to be active across academic contexts; new contexts put pressure on "lower-stratal patterns of new registers (including, almost certainly, grammatical metaphor)", which continue to be an area of challenge and growth (Matthiessen, 2006, p. 34). The evidence, then, is that GM can challenge apprentice L1 and L2 academic writers in virtually every aspect of their writing.

With this understanding of the challenges in place, it is important for researchers to prioritize these learners' interest in, and contributions to, meaning in context, including in the felicitous – academically sensible – creativity that takes place in the use of GM by apprentice L2 academic writers (Byrnes, 2009). Though the potential of this area of GM studies in L2 academic writing has been indicated and illustrated with an example by Byrnes (2009), to my knowledge it has not been formally pursued. Second-language users bring a multitude of semantic dispositions and other cultural resources to interaction. Matthiessen (2009) cites Ortega and Byrnes (2008) in

suggesting that longitudinal studies of additional language learning will clarify how "multilingual meaning potentials are developed as aggregates of registerial subpotentials" (p. 223).

The potential for understanding logo- and ontogenetic processes therefore extends to cultural development, including in academic contexts. The localization of English in Japan, for example, has been associated with "a use of the language which does not conform to orthodox interpretation of the implications of English as a Global Language" (Seargeant, 2005, p. 309). One feature in this process is the clipped compound nominal group – involving GM (see Chapter 5) – formed from everyday loanwords, one of which, *mekatoro,* was borrowed back into English in the 1970s as the name of what is now one of the main subdisciplines of engineering, *mechatronics* (e.g., Bolton, 2011). The example highlights the valuable and implicit role of GM as a resource of textual, ontogenetic and cultural development that emerges from acts of meaning in the interstice of lexicogrammar and semantics.

Research on GM and nominalization is pursued across various contexts and languages in a range of frameworks. As indicated by Ortega's (2015) study, two areas in applied linguistics that have recently found common ground with systemic functional insights on language are SLA (Ortega, 2009, 2011, 2012, 2015) and L2 writing research (Byrnes, 2013; Manchón, 2009, 2011, 2012; Ryshina-Pankova & Byrnes, 2013; Woodward-Kron, 2008). The developing complementarity between SLA and L2 writing research accords with Harklau's (2002) early advocacy for greater consideration of writing in SLA research. For example, in a study of language complexity in L2 writing, Ortega (2012) called for serious consideration in SLA research of the functional variation of language, writing, and grammatical metaphor.

Ortega (2012) re-assessed the conventional approach to complexity – "a 'more is more complex' approach" (p. 10) – as reductionist. For a more contextualized understanding of second language development in contexts of writing, Ortega (2012) drew on the general distinction in discourse styles that Halliday calls *dynamic* and *synoptic* (Halliday, 1985a; 1993c; Halliday & Matthiessen, 1999). Halliday was familiar with Rulon Wells' (1960) related notion of verbal and nominal styles, which Halliday (1993c) refines in accordance with the nuclear role of the process (realized by a verb) in selecting clause arguments (i.e., participants, typically realized by a noun): "the distinction is really that of nominal and clausal" (p. 129). The dynamic style is prototypically oral, syntactically complex, low in formality, and event-oriented, while the

synoptic style is prototypically written, syntactically simple, high in formality, and entity-oriented. “The complexity of written language is its density of substance… By contrast, the complexity of spoken language is its intricacy of movement” (Halliday 1985a, p. 87). To wit: understanding writing development requires understanding the processes through which writing itself develops. This early insight underlies SFL-based research in writing (e.g., Byrnes, 2009; Ryshina-Pankova, 2010; Schleppegrell, 2004a, 2004b). The insight also informs the widely influential work in English for academic purposes (EAP) and L2 academic writing of Hyland (2005, 2006) and Biber and colleagues (Biber & Gray, 2010, 2013; Biber, Gray & Poonpon, 2011). Ortega (2012) singles out nominalization, which she theorizes in SFL terms as GM, as centrally relevant in a contextualized understanding of advanced SLA.

In SFL, the concept of complexity as used in SLA (Ortega, 2012, 2015) is typically referred to as grammatical intricacy (Halliday, 1985a). As indicated by the above discussion, relative to conversational speech, the grammatical intricacy of academic writing is low, while its lexical density is relatively high (Halliday, 1985a). These two measures are very often used as proxy indices for the use of GM in L2 academic writing research (e.g., Byrnes, 2009; Halliday, 1985a). Grammatical intricacy and lexical density are considered in more detail in the operationalization of GM in the following chapter.

3.2 Grammatical metaphor in first-language development

The central role accorded to grammatical metaphor in the construction of specialized knowledge reflects, among other things, the understanding of GM as a key achievement in the meaning potential of adult language (Halliday, 1993a). Working from a Vygotskian perspective (1978, 1981), Wells (2004) pointed out that, in the transition to schooling, children begin to learn to “reconstruct their grammars to cope with the abstractions involved in the use of grammatical metaphor and to recognize and exploit the synoptic/dynamic complementarity” (p. 32). In SFL, language is understood as a complex multifunctional resource – and not merely a referential system – that develops from infancy through the “interpersonal gateway” (Halliday, 1993a, p. 103) towards, among other things, increasing capacity for specialist ways of knowing and engaging with the world:

We thus have to postulate a three-step model of human semiotic development:

(protolanguage →) generalization →abstractness → metaphor

> with a 3- to 5-year gap between the three postinfancy steps. As grammatical generalization is the key for entering into language, and to systematic common-sense knowledge, and grammatical abstractness is the key for entering into literacy, and to primary educational knowledge, so grammatical metaphor is the key for entering into the next level, that of secondary education, and of knowledge that is discipline-based and technical (Halliday, 1993a, p. 111).

The research on the development of GM indicates the span between several years before puberty and secondary school (Derewianka, 2003) to early secondary school (Halliday, 1993a) as the time when a marked increase is typically observed in the use of GM. However, as Derewianka (2003) noted, the relatively early development of GM observed in her single case (who was also her son) should be read in light of his relatively privileged middle-class status.

In L2 development studies, Halliday's (1975; 1993a) model of language development is widely used in the growing body of applied linguistic literature on the role of GM. Predictably, the kind of GM that receives the most attention is nominalization. As "the single most powerful resource for creating grammatical metaphor" (Halliday, 1994, p. 352), nominalization – especially morphologically derived de-verbal and de-adjectival nouns – is a relatively visible aspect of the largely cryptic semiotic resource of GM. This point is developed in Section 3.4, following an introduction to grammatical metaphor in the language system.

3.3 An outline of grammatical metaphor in the language system

Before proceeding with the review of nominalization and GM in L2 academic writing literature, an initial outline of how GM works in the language system is provided here (Halliday & Matthiessen, 2004). This is extended in Chapter 5 to Halliday's (1998) typology of GMs, which demonstrates how ideational GMs collectively contribute to the nominalization of discourse. The concept of GM arises from a stratal model of language whereby the most general distinction is between the strata of content and expression (the latter comprising phonology and phonetics in speech and graphology and graphetics in writing). The content stratum comprises semantics and lexicogrammar, which are in a realizational relation whereby lexicogrammatical

choices realize the semantics, understood as meaning in context of use (Halliday & Matthiessen, 2004).

The stratal nature of language also means that a semantic choice does not necessarily operate in a direct, one-to-one relation with its typical, or 'natural' lexicogrammatical encoding. As shown in Figure 3.1, the natural semantic resonance of a structure (e.g., the process meaning of a verb) can be dislocated from its natural lexicogrammatical realization and applied to the realization of an entity within a noun:

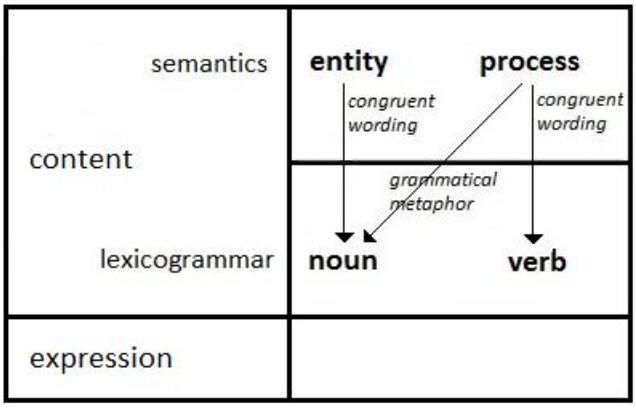


Figure 3.1. Grammatical metaphor in the stratal model (adapted from Halliday, 2004/1999)

As illustrated in Figure 3.1, because the stratal character of language keeps lexicogrammar and semantics *apart*, the natural semantic resonance of a language structure – such as the process meaning of a verb – becomes available as a mobile semiotic resource.

The determination of a natural, or congruent, lexicogrammatical choice for realizing a semantic configuration is made based on the concept of *semogenic priority* (Halliday & Matthiessen, 1999), which is the theory that congruent realizational relations "evolved earlier in the language (phylogenesis); it is learnt earlier by children (ontogenesis); and it typically comes earlier in the text (logogenesis)" (p. 235). Thus, for example, a pre-school aged child, having developed post-infancy language, is more likely to use the verb *remember* to encode the experience of recalling an event than the noun *memory* (Derewianka, 2003). Additional support for a natural relation emerges from research in the history of scholarly discourse, in which, for

example, the structure of causal logic in a configuration such as "*a happened; **so** x happened"* precedes its realization as "*the **cause** of happening x"* (Halliday, 1998, p. 111). The explanation for this is that the conjunction *so* naturally realizes the semantics of a logical relator; the metaphorical realization of logical relations by a verb, adverb or, as in the above case, the noun *cause* occurs later in the history of science discourse, phylogenetically.

However, congruence and metaphoricity "are not simply alternative wordings" (Halliday (2004/1999, p. 107). Rather, in GM,

> there is a junction of two meanings: the category meaning of the congruent form [of a verb] ('process') clashes with the category meaning of a noun ('entity'), and the impact generates a new meaning, 'process as (virtual) entity' (Halliday, 2004/1999, p. 107).

In this view, GM brings together two ways of mediating experience dialectically in a single wording choice. Semantic junctions, the "clash" of meanings and reverberating tension associated with GM, are the source of semiotic power in GMs to generate new meanings. A semantic junction in the grammatical metaphor *evolution* is illustrated diagrammatically in Figure 3.2.

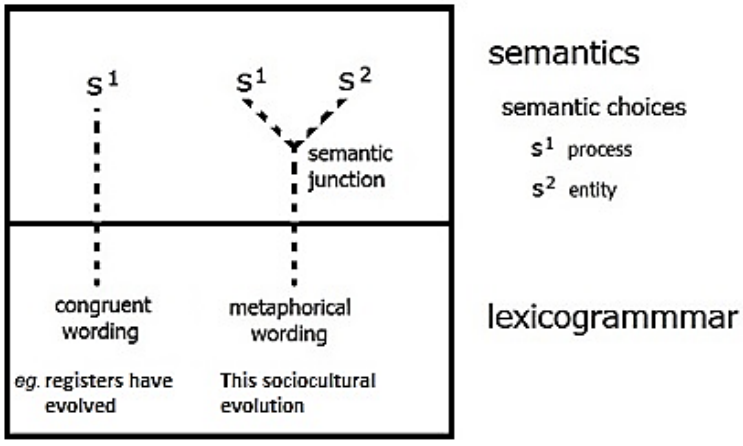


Figure 3.2. Semantic junction in grammatical metaphor (adapted from Ravelli, 2003)

According to Halliday (1998), "there would be no metaphor without stratification" (p. 192). The stratification of lexicogrammar and semantics is an affordance of language that, like other systemic features of language, provides at once a stable basis for the exchange of meaning and a platform from which to re-construe experience and expand meaning potential. Specifically, the stratification of language allows enculturated practice to emerge from 'playing with' the 'play' in the natural relationship between wording and meaning. The lexical metaphor of 'play' draws attention to two important details in considering the choice of congruent and metaphorical wording. The first is that metaphoricity, once engaged, is engaged on a gradient from very mild to a theoretical infinity of abstraction. This feature of the system is implicit in Halliday's model (1998; Halliday & Matthiessen, 1999), as well as related claims such as the continuum between spoken and written kinds of language (Halliday, 1985a). This scope, which is discussed in detail in Chapter 5, indeed allows for play.

The second detail is a proviso. From the perspective of meaning in context, the continuum between congruent and metaphorical discourse is not merely a variation of dialect, whose variation is largely in the expression rather than the content stratum of language or different ways of saying just about the same thing (see, for example, Hasan's (2009/1989) critique of Labov's sociolinguistics). Rather, text-wide variation in metaphoricity implies changes of register – the choice changes the nature of situational context ideationally and interpersonally, implying fundamentally different "fashions of speaking" (Whorf, 1956/1939; noting again that Whorf's term can refer to register and dialectic variation). It follows then from these two claims that while the choice of a few mild nominalizations may not significantly shift the context, accumulations of GMs at the level of text do. So 'play' in the choice of metaphoricity is perhaps best understood as play in negotiating contexts. It must be added that, for apprentice L2 writers, the negotiation of contexts associated with choices of metaphoricity does not always feel like play (e.g., Ivanič, 1998).

As noted above, ideationally, much GM in academic discourse is a reactance to contextual pressure towards the synoptic, nominal style that is typical of the written mode (Halliday, 1985a). What are the affordances of the nominal group that enable this? In English, nouns are capable of encoding not only the semantic entities with which they are naturally associated, but also processes (naturally realized by verbs), circumstances (adverbs and preposition phrases), and logical relations (conjunctions). "Nominality means freedom of

movement. When processes, qualities, states, relations, or attributes are 'objectified', they take on potentialities otherwise reserved for persons and objects" (Halliday, 1967, p. 24).

The adaptability of the nominal group is also a result of it being expandable through recursive pre- and post-modification (Halliday & Matthiessen, 2004). The expandability of the nominal group contrasts with the comparatively limited expandability of the verb group. Although the verb functions crucially as the nucleus of transitivity in the clause, the verb group is itself much more limited than the noun in its capacity to expand ideationally (Halliday & Matthiessen, 2004). This observation is the basis of Moore's (2006) critique of academic English writing instruction that focuses on verb tenses, in which an advanced level of language use is understood to be achieved with felicitous use of the most exotic conditional tenses, which, of course, are rare except in highly constrained circumstances. In contrast to the limited structural (versus lexical) capacity of the verb for ideation, the verb group is especially suited to managing interpersonal relations in academic writing, for example, in modal and semi-modal auxiliary verbs such as *would* and *need to* (Halliday & Matthiessen, 2004).

In summary, the relation between wording and meaning in SFL is understood not as indexical or causal but rather as realizational. The lexicogrammar that provides us with the choices of wording-meaning relations has co-evolved with knowledge practices into particular systemic configurations for realizing knowledge in communities of specialists. Within these configurations, GM is a meaning-making resource with which users construe knowledge, not through the language of direct experience of the world but indirectly through the meaning-making affordances of language – the functional structures – evolved from that experience. The linguistic features that are identified as common to various registers and genres of academic writing across modern history and contexts (Banks, 2008; Halliday & Martin, 1993; MacDonald, 1994) – such as tendencies to high information density and objective stance – can be attributed to the emergence and robustness of GM as a means of realizing specialized knowledge. As such, GM is a fitting focus for efforts to understand language development and knowledge construction in contexts of L2 academic writing.

3.4 Nominalization and grammatical metaphor in second-language writing research

Predictably, nominalization has received considerable attention in second language (L2) writing research both within and outside of SFL. While a wide margin of overlap exists between SFL-based writing research and research using other approaches, due to the close affiliation of the more general category of grammatical metaphor and SFL, the review is organized around research conducted within and outside of SFL. However, an attempt has been made to identify the overlaps where they arise in the literature.

3.4.1 Nominalization in L2 writing research

In much of the research carried out outside of the theoretical context of SFL, nominalization is not theorized as a type of GM – although changes are apparent through the work of such influential applied linguists as Ortega, Manchón, Byrnes and Flowerdew. Conventionally, nominalizations are characterized as morphologically-derived nouns typical of specialist discourse, as reflected in the statement: "Nominalizations of verbs and adjectives are ubiquitous in academic and professional discourse" (Hinkel, 2002, p. 93). Nominalization is operationalized in Hinkel's study in a way that is typical in L2 writing research, as "all nouns ending in *-s/tion, -ment, -ness, -ure*, and *-ity*" (p. 93). The distinction is also made between nominalizations and gerunds, which are "deverbal nouns that are less gradiently nominal than… nominalizations" (p. 94). From the examples she provides, Hinkel identifies gerunds relatively broadly (as compared, for example, to the commonly used reference grammar of Quirk, Greenbaum, Leech and Svartvik (1985)). She identifies gerunds as de-verbal *–ing* forms serving as Subjects, Objects, elements in nominal group post-modifiers, in addition to the more restrictive operationalization as the de-verbal noun with a genitive and a bare object (e.g., The students' *contemplating* the passage), which is the restricted approach to gerunds of Quirk et al. (1985). Hinkel's account of gerunds relative to (other) nominalizations raises the question of gradients in the nominalizing profile of structures, an important topic to which I will return in Chapter 5.

In social research in applied linguistics, the emphasis has generally shifted in L2 writing studies of nominalization from a contrastive rhetoric focus and interest in variation between native speaker (NS) and non-native speakers (NNSs) of English writers to nominalization as a feature of discourse which can help legitimate, in one way or another, learners' academic writing

in social context. These studies are more likely to evaluate learners' use of nominalization against holistic writing scores or learners' general skills measures. The general finding from cross-sectional studies is that greater use of nominalization is associated with higher-rated writing (e.g., Ferris, 1994). Nominalization was found to be a leading factor in distinguishing higher- and lower-rated L2 writing (Jarvis, Grant, Bikowski & Ferris, 2003). Also, more skilled writers were found to use nominalization more frequently than less skilled writers (Grant & Ginther, 2000).

As for studies comparing NSs and NNSs of English, Carlson (1988) found no significant differences in the use of nominalizations by the two groups writing academic essays. Hinkel's (2002) study of NNSs of comparable educational levels from China, Japan, Korea, Vietnam, Indonesia and Arabic countries and NSs found that the NSs of English and the Vietnamese and Indonesian writers used nominalization significantly less frequently than the NNSs from the other countries. This finding accords with that of Byrnes (2009) of the potential for L2 writers' over-use of nominalization. As for the frequency rates for the use of gerunds, NNSs from China, Japan, Korea, Vietnam, and Indonesia were found to use gerunds significantly less than NSs and the NNSs from Arabic countries. This result for gerunds differs to some extent from that of Flowerdew (2008; reviewed in more detail below), which reports that, in writing problem-solution patterned texts, NNS writing students used gerunds more often than professional writers but used nominalizations (as with suffixes ~tion, ~icity) less often.

Another strand of research focuses on nominalization not as a general index of language development relative to decontextualized skills but rather in its role in mediating specific academic contexts. A study of nominalization in the writing of six undergraduates (unreported first-language status but likely L1 English users) across a 3-year Language, Literacy and Communication program in the UK showed no significant change in the use of nominalization (Baratta, 2010). This result is explained by the students' relatively proficient use of nominalization in their first year and the humanities orientation of the program in which much of the assigned writing had a personal focus, where less nominalization would be expected. Thus, the implication, as Baratta (2010) pointed out, is that "discipline-specific writing conventions are an integral aspect of determining writing proficiency" (p. 1035). Furthermore, these results imply that nominalization can serve as a reliable indicator of proficiency in specific academic writing registers and tasks (see also Byrnes, 2009).

Nominalization has been investigated from learners' perspectives of its role in their positioning in academic contexts. In a well-known UK-based study of academic writing and identity using an academic literacies approach, Ivanič (1998) found that the choices of nominalization made by mature-age English L2 undergraduate students were integral to these writers' positioning in their respective academic discourse communities. Reflecting on their academic literacy practices, the students attributed their personal sense of academic engagement directly to their use of specific discursive and lexicogrammatical resources, including nominalization; for example,

> Frances identifies herself as writing within the academic community by using a citation, and by the metaphorical use of material processes. However, her clauses are not lexically dense, her nominal groups are not long and she does not use a lot of typically academic lexis in this extract (p. 273).

In discussing these results, Ivanič (1998) highlighted the role of learners' critical reflections on their linguistic and other choices in order to gain control of their positioning relative to dominant practices in their academic contexts, and thus to avoid "willingly or unintentionally becoming party to these interests, values, beliefs and practices" (p. 273). Considering ways to encourage critical reflection on the motivations of teaching and learning, Ivanič (2004) identified explicit, SFL-informed instruction of nominalization as an area of potential for developing such writing practice. Focusing on the concern in the approach for appropriateness, she asks the question (after Fairclough, 1992) "appropriate, according to whom?" (Ivanič, 2004, p. 234). A recommendation that emerges from this study is for critical reflective practice in explicit learning and teaching of academic writing.

The role of instruction in enabling critical reflection on language in classroom discussion is highlighted in a study of minority language speakers learning science through the medium of English in South Africa (Probyn, 2015). The main finding is that a teacher shifted between English and the learners' first language deliberately and fluidly rather than, as in some instructor codeswitching, reluctantly and reactively. This *translanguaging* (Garcia & Li, 2014) was an important means of scaffolding unfamiliar concepts and practices, including especially nominalization.

Nominalization is also studied as an aspect of science discourse that extends literacy practices multimodally. In an argument for what Lemke (1998) understands as the multiplicative function of multimodality in meaning-making, Archer (2006) warned against isolating meaning by semiotic mode in multimodal texts. His study of student-made posters in first-year engineering in a South African university found that the insufficiently nominalized writing in the students' posters introduced an inappropriate mix of everyday and academic domains to the discourse. However, this gap in subject-specific knowledge in the linguistic text was satisfyingly bridged when the meanings of the images were read in coordination with the writing.

Before proceeding to studies of nominalization and other forms of grammatical metaphor conducted using SFL-guided frameworks, one last study is notable for its finding as well as its approach. Flowerdew (2008) is a corpus-based analysis of various corpora of texts instantiating the problem-solution rhetorical pattern. Her primary focus is on key word analysis of signals of the problem and solution moves (such as the adjunct *however*, the describer *problematic* and noun *response*) in this seminal text-type in academic discourse (Hoey, 2001). Though nominalization is not a focus, she finds that the L2 student corpus presents a lesser degree of nominalization in the signals than do the professional corpora, specifically, a greater use of gerunds and not as much use of grammatical metaphor. This finding accords with those of SFL-based studies reviewed below involving L2 academic writers, such as Schleppegrell (2004b) and Liardét (2013). The finding is also especially relevant to the present study because the final writing assignment that students in this case study undertook was a problem-solution text.

3.4.2 SFL-based studies of grammatical metaphor in L2 academic writing

Despite its relatively short history, the SFL-based research in nominalization and GM in academic writing has provided useful insights. As indicated by Byrnes' (2009) report of both under- and over-use of GM in L2 academic writing, instruction and research tends to focus on students' regulation of degrees of ideational abstraction, how much or how little nominalization to apply given a register profile, including of course the writer's subjective interests (e.g., Byrnes, 2009; Schleppegrell, 2004b). The research by Ivanič (1998) suggested that some of the over-use of nominalization can be attributed to well-intentioned efforts by apprentice L2 writers to construe more academically valued ideas as well as a personally more satisfying profile for themselves as scholars. As Schleppegrell (2004b) noted, however, the general tendency in L2

academic writing is towards the under-use of GM, which, predictably, is associated with students' preference for speech-like language to mediate knowledge building.

Schleppegrell's (2004b) study of the chemistry reports of L2 undergraduate writers showed that these "second language writers of English may lack the resources for drawing on the options for meaning-making that grammatical metaphor enables" (p. 174). Through a contrastive approach with the writing of an L1 user of English and in consultation with undergraduate course instructors, she identified weaknesses in L2 writers' GM-enabled practices of organizing texts, positioning authoritatively, conceptualizing using technical concepts, and reasoning in compact ways, as through nominalizations of logical reasoning in such structures as verbs (e.g. to contrast) and nouns (e.g., the correlation).

Similar results are reported for L1 undergraduate students in Klein and Unsworth (2014). Investigating the process of writing-to-learn, they analyze Canadian undergraduate *non-science* students' written explanations of physics concepts after instruction in these concepts. The researchers found several important properties of expert science texts in the students' texts, such as information density and traceable logic; however, the students' texts tend to realize these meanings "dynamically and instantially" (p. 1), as is typical of speech, rather than "synoptically and systematically," (p. 1) as in professional scientific texts. In relation to logical meanings, some logical GM is reported in the students' reasoning. For example, they use logical GM in what Halliday (1998) called a "favourite" clause type in science, involving a causal (circumstantial) relational process, as in "Rapid changes in the rate of evolution are caused by external events" (p. 59). However, experiential GM is reported to be used very little to construe technicality; instead, students tend to use what Klein and Unsworth identified as "dead" grammatical metaphors from everyday use such as "weight" rather than construct original technical concepts such as "horizontal velocity".

While Klein and Unsworth's (2014) study is technically sophisticated and valuable, some problems may be identified. One is with the subtle dismissal of everyday abstraction as an indicator of writing-to-learn. This evaluation is surprising given that, in an earlier analysis of the technical discourse of sound waves in school science textbooks, Unsworth (2000) clearly recognized the positive developmental affordances of such abstractions:

> The linguistic construction of technicality in these explanations is achieved through a *series* of reconstruals. *Initially*, the phenomenon of sound waves is realized using grammatical metaphors which are fairly familiar in everyday language use, for example: Figure 15.1 shows a vibrating object [[producing sound waves]] (Text 11.1) (Unsworth, 2000, p. 260; italics mine)

Also, while this study's findings for the use of GM in L1 undergraduate writing appear consistent with the literature on GM in L2 academic writing – for example, the results corroborate Schleppegrell's (2004b) findings for L2 students writing chemistry reports – there is a surprising lack of reflection in the report on the context as one of recontextualization, that is, of writing-to-learn across disciplinary cultures. Thus, this study of writing-to-learn would ideally also take into account that non-science students would not necessarily learn to write *like a scientist* after brief instruction in physics concepts. It is interesting to observe in this regard that the researchers' focus in the sample selection and control of variables was on what this particular group *did not know* about the focal physics content, with only general consideration given to orientation to knowledge they *would bring* to the physics concepts and reasoning. It would seem predictable, then, that their writing would reflect writing-to-learn like humanities students.

In their hypotheses, Klein and Unsworth (2014) may have also over-estimated the likely benefit of a short instance of instruction. The problem with this possible assumption may be explained as an overemphasis on the effects of brief instruction and insufficient attention to the more fundamental process identified by Vygotsky (1978) as semiotic mediation, i.e., the longer-term formation of sociocultural dispositions that occurs with language use (for a parallel argument in contexts of early literacy, see Williams (1994)). Greater consideration of the role of semiotic mediation would possibly have led to different – and more positive – findings for writing-to-learn, along with insights about these writers' ascribed disciplinary affiliations, that is, their sense of academic identity as Ivanič (1998) described it, and how this sense plays out in their language choices.

The development of experiential GM by Chinese learners of English as a foreign language (EFL) was investigated by Liardét (2013) in the context of a four-year undergraduate program in China. She found that while students progressed noticeably in their overall capacity to use GM to reconstrue experience metaphorically in their academic writing (such as through

the use of deverbal nominalizations), "their potential for organizing the text and building the arguments through anaphor [as in the use of Theme] and elaborated nominal groups remains to be reached" (p. 176). Also examining Chinese college students' use of GM, Wang (2010) reported on these learners' English translations of Chinese texts. The translations were written after 16 hours of instruction specifically in the functions of GM in professional and academic writing. However, the instruction was not grounded in a discipline or field. The main finding was that the learners' use of nominalization and other GMs in the translations was not satisfactory. Again, this result may be at least partially explained by the brevity of the instructional intervention. It also reinforces the recommendation for systematic content progression to be planned into second language curricula (Byrnes, 2008; Mohan, 1986). As observed for the Klein and Unsworth (2014) study, this research may have benefitted from a more moderate hypothesis about the effects on GM and rhetorical effectiveness from short-term instructional intervention.

The value of instructed writing and GM development associated with clear task and genre progression is shown in Ryshina-Pankova and Byrnes' (2013) study of knowledge construction and GM use. This study was conducted in the context of a US undergraduate L2 German program involving a significant portion of the curriculum given to GM-related instruction. They found that "high-rated texts are indeed related to knowledge construction through nominalization" (p. 195). In Byrnes (2009), the writing of students in the same SFL-based L2 language program was studied longitudinally across three terms specifically to investigate the development of GM. The quantitative and qualitative analyses show parallel improvements in the ideational complexity and context-appropriateness of students' written texts, the use of GM, and associated level of proficiency in German.

The same context is the site of Ryshina-Pankova's (2010) study of logical reasoning in book reviews written by L2 German learners at three different advanced levels. She found that use of GM to compact reasoning from its congruent realization between clauses (as with the use of conjunctions) to a metaphoric one within clauses (as with adverbial circumstantial phrases, and causal verbs and nouns such as *result*) increased along with the rhetorical success of the texts and overall L2 proficiency in German. Another study that focuses on reasoning, but in spoken discourse, is Mohan and Beckett (2001), which explored logical GM in undergraduate L2 students' spoken causal explanations in a context of teacher recasts that incorporated more or less logical GM. The study found that students demonstrably checked their meaning and

elaborated their ideas and reasoning based on the recasts as well as their own judgements. The study indicates the potential parallel benefits to students' written explanations of raising their awareness of linguistic choices for reasoning through developmentally and contextually appropriate instructional interventions.

Grammatical metaphor has also been studied in L2 contexts metafunctionally, a framework that highlights the role of GM as a phenomenon that has direct implications in the major semantic subdomains of register. The writing and presentations of students in a one-year Spanish for Native Speakers program was investigated by Colombi (2006) for the three major types of grammatical metaphor: experiential, logical and interpersonal. She found that students developed noticeably in all three areas across both written and oral modes, with mode-appropriate variation also noted. As an example of mode-appropriate variation in interpersonal GM, students who developed in their use of objective stance in their writing shifted the strategy to a more subjective stance in their oral presentations. Another important finding from this study is that logical GM was observed to develop more slowly and later than experiential GM. This result can be predicted by studies of disciplinary discourse which show that the core of disciplinary knowing rests less in the relatively visible and discrete representations of knowledge such as technical terms than in the logical links that underlie and connect claims; these logical links are often compacted through logical GM (Halliday & Matthiessen, 1999; Martin, 1992). As such, logical reasoning is often embedded cryptically within clauses in, for example, causal processes or participants such as *lead to* and *result*, as well as adverbials realizing circumstantial information such as *by these means*.

Two studies draw special attention to GM as a factor of disciplinary variation in university student writing. Gardner's (2008) corpus-based study of ideational meaning in student writing across undergraduate programs in various faculties found nominalization and grammatical metaphor to be important factors in disciplinary variation. The findings show the science discipline of Biology to be markedly different from the others, while similarities emerged in the pairs English and History, Philosophy and Psychology, and Economics and Business. In another study of disciplinary variation, Woodward-Kron (2008) investigated the role of specialist language in Education students' learning of disciplinary knowledge. She found an important role for GM as "learning specialist knowledge in pre-service teacher education involves adopting technical terms as well as coming to terms with the abstract dimensions of discourse" (p. 234).

In one of the earliest studies of GM in L2 writing, Jones (1991) studied the use of GM by five graduate students in Educational Psychology in an Australian university. The subject sample included four L2 users and one L1 user of English, all of whom entered the program with teaching experience. The results show disciplinarily more developed use of GM for the L1 user than for the L2 users, who tended to maintain their focus on their own immediate and past experiences as educators. Jones' (1991) final recommendation is worth setting out in full:

> What they [L2 students] need therefore is an understanding of how their experiences are translated in academic discourse into a culturally based system of knowledge which is both highly technical and highly abstract. Thus the overseas student in an Australian academic and cultural context may not be simply learning a new field and its technicality but also a new cultural base to that knowledge which involves considerable knowledge of the linguistic potential needed to write technical and abstract discourse. The overseas student here may have a distinct disadvantage (p. 194).

This group of L2 learners had difficulties linguistically reconciling their first-hand professional experiences as teachers – along with the durable semiotic dispositions formed around those experiences – with disciplinary ways of knowing and with the broader cultural frames of reference.

These results can be explained with reference to semiotic mediation in students' L2 academic literacy practices whereby the L2 learners had robustly-developed semantic dispositions towards the field of education as teachers, mediated largely by congruent construals of their actual classroom experiences. When faced with a context that called for the reconstrual of these experiences in technical and abstract terms, the learners may or may not have sensed this contextual pressure towards abstraction but, in any case, were not semiotically predisposed to that form of construal. A parallel explanation was offered by Schleppegrell (2004b) for apprentice L2 academic writers' over-reliance on congruent, speech-like construals in their disciplinary writing.

L2 academic writers who over-use GM (Byrnes, 2009) or whose ideas become confounded and lost in the packing (Mohan & Beckett, 2001) present a different issue. It may be the case that the ideas are not clear for the writers to begin with; however, as Ivanič's (1998)

research suggests, the disjunction between disciplinary expectations for well-balanced construals and the learner's over-dense writing may be in learners' efforts at stylizing new academic identities for themselves through their writing. From the SFL perspective, this can be seen as an over-generalization of a new functional-grammatical feature; while it can be frustrating for readers (Byrnes, 2009) and costly to the writers, it would also appear to have important developmental value.

Legitimate participation in any disciplinary community is rarely a straightforward process (Duff, 2010a; Ivanič, 1998; Moore, 2006). The additional challenges faced by L2 academic writers in such contexts, notably the under-, over- and mis-use of GM, can be usefully grasped as issues in the development of language as a dynamic system of meaning-making and GM as a semiotic sub-system that emerges from this system (Halliday & Matthiessen, 1999; Lemke, 2002). As set forth in Halliday's (1993a) model of first language development and the associated concept of semogenic priority, GM develops on the basis of a congruent wording-meaning mapping in the adult language system that has been internalized. That is, GM is understood to develop in adult language and on the basis of a congruent wording-meaning mapping in the adult language system.

Difficulties with GM experienced by L2 academic writers can be at least partially explained by the reliance of metaphoric construals on this stable, congruent wording-meaning mapping (Matthiessen, 2006). As indicated by Ortega's (2015) notes on the known grammatical challenges in SLA associated with felicitous GM use, small gaps in the foundational functions of language find expression and are potentially amplified in the more delicate, advanced functions associated with the construction of specialized knowledge. It follows from the role of GM in significantly leveraging the potential of language for construing abstract knowledge, mis-steps in GM use can result not only in interpersonal awkwardness and ideational clumsiness (Mohan & Beckett, 2001) but also in potentially unfair accusations – as above, from Byrnes (2009, p. 63) – of serious transgression.

Collectively, the studies reviewed draw attention to the specific challenges and opportunities GM presents to L1 and L2 academic writers as a feature of disciplinary discourse. These studies also indicate the enormous functional scope of GM in academic writing, implicating as it does issues as wide as disciplinary variation, interdisciplinary practice, context of instruction and wider discourse socialization, and variable rates of progress across the various

functions of academic writing and associated types of GM. The growing literature on GM confirms Halliday's early findings about the relevance of this resource for a range of functions in constructing specialized knowledge, including text structuring, stance-taking, reasoning, and representing the experiential world (Halliday, 1998). Also indicated is the potential value of well-planned, content-linked instruction to L2 academic writing development, including specifically the development of GM.

Notwithstanding these valuable contributions, there remains much to learn about GM as a cultural resource, and perhaps most pressingly as resource of academic literacy and specifically L2 academic writing (Schleppegrell, 2004b; Ortega, 2012). As GM is a relatively new theoretical development, this would seem predictable. Several years ago, Byrnes (2009) assessed the state of affairs in GM research in L2 academic writing as "thoroughly under-researched" (p. 60). Her description of the domain within which GM research in L2 studies is severally lacking is as follows:

> the systemically embedded dynamic place of all linguistic meaning-making resources, most particularly GM, coupled with options that are probabilistically circumscribed through registers and genres (p. 60).

While some developments in GM research have taken place since this urgent call, Byrnes' assessment largely still holds.

3.5 Interpersonal grammatical metaphor in academic writing: Metaphors of modality

While the focus of this study is GM in the ideational metafunction in academic writing, that is, on the role of GM in construing experience and logical reasoning, research in GM in academic writing is by no means limited to the nominalization of ideational meanings. Halliday (1985b) also identified grammatical metaphor in the interpersonal metafunction. This discussion focuses on interpersonal GMs that are associated with the nominal style of academic writing.

A key functional area of the interpersonal lexicogrammar is modality. Modalization or epistemic modality realizes the semantics of probability and usuality while modulation or deontic modality realizes obligation and inclination. Interpersonal GM of epistemic modality can be illustrated with a shift from the congruent form of the verb group '*can* expand' to the

experientialization of the modal semantics to a part of the nominal group, as in '*ability* to expand' or 'expand*ability*'. As illustrated by this example, interpersonal metaphors of modality imply nominalization and ideational metaphor. In academic writing, this overlap serves to enact an objective modality by drawing interpersonal meaning towards the nominal group realizing an entity (Halliday, 1998). In order to soften their claims, L2 academic writers tend to over-rely on the subjective epistemic modality realized by mental projections such as *I believe* and *I think,* a strategy that is counter-productive in realizing an objective stance (Schleppegrell, 2004a). In making this claim associated with the authorial "I", it is recognized that disciplinary conventions and epistemologies in the humanities in particular are known to thematize the individual writer's processes, in addition to making more explicit than in other general fields the dialogical and polemical nature of disciplinary knowledge construction (e.g., Wignell, 2007).

Two other operations that implicate GM in enacting the typically distanced interpersonal profile of academic writing are abstract Subjects and Subjects in anticipatory *it* clauses (Hewings & Hewings, 2002, 2006). Abstract entities are often construed through ideational GM but the choice is also interpersonally relevant. When clause Subjects are abstract concepts or technical terms, the discourse tends to enact a distanced relation between the reader and writer by orienting the reader away from types of entity in the reader's immediate material setting to types of entity that are heavily re-mediated linguistically and thus abstracted in space and time.

To inform this discussion, the clause-initial structures of Subject, Theme and Given are briefly described and differentiated here (Halliday & Matthiessen, 2004). This section closes with brief comments on the relationship between these clause-initial functions and GM. As a key resource of interpersonal meaning, the Subject realizes what can be affirmed or denied by an interlocutor in discourse; as such, it is the element that can be identified by a subject-testing question tag, as shown in Figure 3.3 for two successive declarative clauses (unmarked in academic writing) from Unsworth (2000, p. 260). As can be seen, the Subjects of the two clauses are both deeply metaphorical abstract entities; thus, to confirm the veracity of the claim (i.e., replying to the question tag), the reader is obligated to undertake a kind of backwards semantic engineering of the Subject, a complexly recursive cognitive and discursive process.

Theme and Given are structural (versus cohesive) resources of text organization. Theme is a text-organizing resource that construes the point of departure for the message, identified as the first transitive element in the clause (i.e., either a participant (unmarked topical Theme),

process, or circumstance). In clause 1 the Theme is unmarked, a participant (head noun "construction"), which is the Goal of a material process in the passive voice. In clause 2, the circumstance "Initially" was fronted from its unmarked mid-clause position, producing a marked Theme. Interpersonally, this marked Theme choice makes visible the writer's intervention in re-framing the point of departure from the participant and Subject ("the phenomenon of sound waves") to circumstantial information about the order of events. The non-thematic domain of the clause is called the Rheme.

Another structural resource associated with text organization is Given+New information order, which derives not from clause structure but another grammatical unit called the information unit (originally identified in spoken tone groups), which in the unmarked case nonetheless overlaps with the clause. "Information… is the tension between what is already

Clause 1 / **Functions**		The linguistic construction of technicality in these explanations	is	achieved through a series of reconstruals.	[isn't *it*?]
Interpersonal Function		Subject	Finite	Residue	[*Subject* test]
Textual Function: Theme		Theme	Rheme		
Textual Function: G+N		Given	New		

Clause 2 / **Functions**	Initially,	the phenomenon of sound waves	is	realized using grammatical metaphors […]	[isn't *it*?]
Interpersonal Function		Subject	Finite	Residue	[*Subject* test]
Textual Function: Theme	Marked Theme	Rheme			
Textual Function: G+N	Given		New		

Figure 3.3. Correspondences between Subject, Theme and Given in written discourse

known or predictable and what is new or unpredictable" (Halliday & Matthiessen, 2004, p. 89), hence the two kinds of information units, Given and New. In information units, while the Given is optional, the New, as the site of the typically clause-final tonic prominence and information

focus, is obligatory. Typically, what is Given is anaphorically and/or deictically recoverable from context. The close, unmarked semantic relationship between the systems of Information Focus and Theme/Rheme inform the statement that "the ordering of Given ^ New… means that the Theme falls within the Given, while the New falls within the Rheme" (Halliday & Matthiessen, 2004, p. 93). However, while both are selected by the writer, they have their respective functions, with Theme being what the *writer* takes as a point of departure and Given being the information that the (writer construes as what the) *reader* knows or can access.

Correspondingly, in the extract from Unsworth's text, "the phenomenon of sound waves" in clause 2 is Given information, being recoverable from clause 1 as an element in metonymic (part/whole) relation with "these explanations". Interpersonally, the reader is positioned to check the veracity of the claim about the Head noun "phenomenon" in "the phenomenon of sound waves". This check would be undertaken against a post-modifier "these explanations" in the nominal group forming the previous Subject and with earlier textual instances of the "phenomenon". What of the other Given information in clause 2, "Initially"? The status of this as Given *information* may seem vague. Although "Initially" is circumstantial information, semogenically, it derives from the semantics of logic rather than of experience. "Initially" is a textual Theme, recoverable as the initial instance in the ordered "series" introduced in the previous clause. The analysis highlights the complex complementarities that arise between Subject, Theme and Given in producing the networked meanings operating in the context of this short text.

In the present study, some notes are useful about the central role of grammatical metaphor in these cross-functional networks that help realize the register of the text. For example, "Initially" is a logical grammatical metaphor which reconstrues the congruent logical order realized by conjunctions, such as '***first*** *x happens',* as a circumstance. This represents a relatively mild case of the experientialization of logical reasoning that occurs in academic discourse from its congruent role as inter-clausal reasoning to a metaphoric one involving intra-clausal reasoning (Martin, 1992). The complete logical ordering, as in '***first*** *x happens* ***then*** *y happens* ***and then*** *z happens'* is construed metaphorically as, of course, the previously mentioned "series", which has become an entity by means of a more radically nominalizing logical metaphor than "Initially", involving reconstrual not merely to a circumstance or process

but to an entity. (Details on such variation in the scope of metaphorical shifts are a focus of Chapter 5.)

As noted above, "Initially" is metonymic with "series", the latter serving as a key element in the discourse previewing function of clause 1, which is a topic sentence or hyper-Theme. The larger organizing scope of "series" (as hyper-Theme) relative to "Initially" (Theme) helps explain the functionality of its more radical nominalization. In as much as Subjects and Given information are construed metaphorically, in order to identify the Subject, verify associated claims, and recover the presumably known information, the reader is implicitly tasked with retracing the paths of metaphorical construals. As with the task of re-coding semantics metaphorically, success in the task of decoding meanings depends on the L2 learner having in place congruent systems of meaning on which the metaphorical construals are based (Matthiessen, 2006). While the links between Theme, Subject and nominalized discourse have been made (e.g., Fries, 1995), the research has not significantly extended to L2 writing (occasional focus, such as by Flowerdew (2008), notwithstanding).

However, studies of Subject, Theme and information structure have been undertaken in L2 writing. Research by Mauranen (1993) and Lorenz (1998) found that, relative to L1 writers, non-native writers of English tend to over-exploit the marked choice of New information in the Theme position in order to emphasize their claims. Schleppegrell (2004b) found that apprentice L2 science writers tend to have difficulty exploiting thematic patterns in ways that achieve patterns of information flow that are expected by more senior scholars. These studies indicate that L2 writers may not have difficulties with abstract entities as clause Subjects *per se*, that is, in enacting an objective stance through selection of abstract Subjects, but rather with the textual function of abstract Subjects in the thematic progression and information flow of their texts.

Another means of enacting a typically valued objective stance in academic writing is in clauses with postposed Subject or anticipatory *it*, as in *It is possible that (+ embedded clause)*. "Being facts, they [postposed Subjects] typically occur in clauses where the proposition has an interpersonal loading" (Halliday & Matthiessen, 2004, p. 157), as indicated in the example with the quality "possible" (which itself is a nominalization of the modalized verb group *can occur*). This kind of clause occludes the writer as the source of the modal assessment (Halliday & Matthiessen, 2004); as such, it is a GM of modality. In this capacity, it also functions as a factual alternative to an explicitly projecting mental clause nexus such as *I predict // this can occur*. This

clause type also uses nominalization in the downranked, embedded clause that completes the postposed Subject.

These anticipatory *it* clauses were shown by Hewings and Hewings (2002, 2006) to be relevant across disciplines and disciplinary enculturation. In their 2002 paper, they compared the use of these clauses by L2 writing students and professionals in business studies. The clauses were found to function interpersonally in hedging, attitudinal marking, emphasizing and attribution. L2 student writers were found to use these clauses to realize more forceful propositions and overt efforts at persuasion than did the professional writers. In Hewings and Hewings (2006), these clauses were analyzed in papers from astrophysics/ astronomy, business, geography/environmental sciences, and history. The range of disciplines covers sciences, social sciences, and humanities. The lowest frequencies of anticipatory *it* clauses were found in the sampled social sciences (business, geography/environmental sciences) and the highest in the sciences and humanities. The authors explained this interesting finding by pointing to the common challenge in the fields of astrophysics/ astronomy and history of acquiring evidence and "their particular epistemic concern for the intrinsically provisional nature of their findings" (Hewings & Hewings, 2006, p. 213). As discussed by Thompson (2013), these types of clauses illustrate the experientialization of interpersonal meaning that occurs at the fuzzy boundary between ideational and interpersonal GM. A final reflection on the Hewings' study is that while interpersonal and ideational GMs are deeply implicated in these kinds of clauses, GM was not mentioned as an enabling semiotic resource. It appears that GM is a cryptic resource of mediation even among functional linguists.

3.6 Continuity between grammatical and lexical metaphor

A question arises about the classification of GM as metaphor and the commonalities between the two major types, grammatical and lexical metaphor. According to Halliday and Matthiessen (1999), the shift of the semantics of one structure to that of another (such as of a process/verb to an entity/noun) is metaphorical in a way similar to the transference of meanings that occurs in generally more familiar lexical metaphors. Lexical metaphor occurs when a mobile semantic element or *vehicle* is exported from its usual field to cast a new semantic light on a focal topic (e.g., Cameron, 2003). For example, when language is referred to in linguistics or psychology as a tool, the semantic field of manual labour is brought to bear on the semantic field

of scholarship. In mainstream cognitive studies of lexical metaphor (e.g., Lakoff & Johnson, 1980), the semantic fields are theorized as *schema*. In GM, the new meaning produced is the semantic junction that results from the co-realization of two functional structures in one choice of wording.

An important but rarely discussed assumption operating in the above view of lexical metaphor is that the lexical vehicle carries with it the semantics of the lexeme's natural structure (i.e., "tool" is a noun, which naturally construes an entity). Another assumption is that while schema are culturally derived, there is little account of the registers and genres involved in their linguistic instantiation (Holme, 2003). Clear evidence of the transfer of structural semantics in lexical metaphor is demonstrated in comments in the applied linguistics literature about the tool metaphor for language and its sub-systems. "The notion of 'tool' [for metaphor, in the larger "toolkit" of language (Wertsch, 1991)] suggests something more static and fixed than metaphor turns out to be in discourse" (Cameron, 2003, p. 26). In this example, "something more static and fixed" describes the semantics of entity realized by the lexical metaphor. The case shows that research in metaphor can benefit from exploring the continuum in the meaning-making potential of lexis and grammar (Halliday, 1961; Hasan, 1987).

In this relation, the cognitive research on lexical metaphor in L2 studies, typically adopting Conceptual Metaphor Theory (Lakoff & Johnson, 1980), has been quite extensive (Hoang, 2014). While attention has been given in this literature to lexical metaphors in disciplinary knowledge (e.g., in economics, Wang, Runtsova & Chen, 2013) and metaphoric processing and competence in L2 writing (Littlemore, Krennmayr, Turner & Turner, 2014) resulting in valuable insights, the research tends to cast grammatical functions as the formal site for slotting in conceptual and lexical content. The potential for cognitive-oriented research from both the lexical and lexicogrammatical perspectives is significant, especially in the areas of conceptual blends (e.g., Fauconnier & Turner, 2003, 2008), as recommended by Matthiessen, Teruya and Lam (2010).

A long-term advocate for the continuum view of lexical and grammatical metaphor, Thompson (2013) provides an insightful analysis of the shift in the verb "show" from its use as a material process to its most common use in academic discourse as a relational process; the example shows that a metaphor can be at once lexical and grammatical. Another rich area of overlap is in lexical reformulation that occurs through GM, as when a process such as study is

subsequently worded as the entity research. Lexical reformulation is discussed further in the next chapter. These examples concern the overlap between lexical and grammatical metaphor in the ideational function; the case for a continuum between lexical and grammatical metaphor in the interpersonal metafunction is made by Simon-Vandenbergen (2003).

3.7 Grammatical metaphor and variation in commonsense and specialized ways of knowing

The natural uses of grammatical structures tend to realize direct experience of, and dynamic reasoning about, the world in a dynamic style that is associated with commonsense or folk theoretic worldviews (Halliday & Martin, 1993; Halliday & Matthiessen, 1999). It follows that the development of GM in English was led by communities of specialists, drawing the discourse towards specialist ways of knowing. It will be clear to readers that the assumptions in play are theoretically remote from those of Generative Grammar, which connects derived nominals and associated verbs (i.e., metaphorical and congruent construals of experience) by "assuming… that it is the grammatical relations in the deep structure that determine meaning" (Chomsky, 1970, p. 189). In the present paradigm, grammar is understood as a metatheory of human experience and social action which mediates social subjectivities across cultural, human, and textual histories (Halliday & Matthiessen, 1999). As developed by Halliday (1998), the typology of GM involves various structural-semantic shifts that work together to generate the information-dense, noun-centred registers that are associated with writing in general but especially with academic writing:

> So the structure of the modern world and the structure of the language combine together to make the written language what it is: a language with a high lexical density… and a strong tendency to encode this lexical content in a nominal form: in head nouns, other items (nouns and adjectives) in the nominal group, and nominalised clauses (Halliday, 1985a, p. 75).

From this view, the general distinction between casual oral registers and written academic registers can be perceived. Whereas dynamic, verb-centred, casual oral communication tends to fulfill pragmatic purposes of sharing common and commonsense experiences (as demonstrated for example by the abundance of personal pronouns, deictic markers, short clauses, low lexical

density and high grammatical intricacy (Halliday, 1985a), GM-rich academic writing tends to draw focus from situations in which interlocutors share space and time to "more distal language-and experience (an issue of field) and language-and-others (an issue of tenor) relations" (Ortega, 2015, p. 86).

This claim is not to suggest that the discursive construction of commonsense, folk worldviews does not involve generalization and abstraction of experiences. As shown by Halliday's (1993a) model of language development, generalization is an affordance of non-metaphorical language. For example, the capacity for generalization (such as from *robin* and *seagull* to *bird*) is achieved in pre-school years. This typically occurs even before the child's ability to differentiate experiential and interpersonal functions in their language use (Halliday, 1993). Neither does the claim suggest that folk knowledge cannot be taxonomic or that a perfect distinction can be drawn between folk and specialized knowledge. Anthropological study of taxonomies of folk knowledge has shown that "taxa change rank with variation of expertise or culturally inspired attention" (MacLaury, 2009, p. 252). Furthermore, academic disciplines build taxonomies using terms either drawn from vernacular forms or developed autogenously (pejoratively, as jargon). The terms may be explicitly defined or their meanings may be more diffusely distributed (Halliday, 1998; Wignell, 2007).

The difference between the specialized and folk taxonomies is therefore not strictly in the terms but more identifiably in the nature of the logical relationships that obtain between them (Matthiessen, 1998; Wignell, Martin & Eggins, 1993). As an example, consider the potentially distinct ways that the marine animals sharks and dolphins are likely to be related in folk and scientific taxonomies. In biology, GMs such as *reproduction*, *respiration* and especially *skeletal composition* contribute to the classification of these animals as belonging to fundamentally different taxonomic lines among marine vertebrates (Morrissey & Sumich, 2012). It would be unlikely that everyday experience of these creatures would result in a classification in which how they breathe and reproduce or the kinds of skeletons they have would emerge as fundamental classifying criteria. And it would perhaps be even less likely that the animals' similar outward appearance would be explained by *convergent evolution* (Morrissey & Sumich, 2012), a scientific concept which involves many layers of implicit, un-commonsense causal logic.

Disciplinary writing involves language-enabled generalization and abstraction through un-commonsense logic-deductive practices that are field-specific (e.g., in cognitive science:

Matthiessen, 1998; in social science: Wignell, 2007; in mathematics: Bussi & Mariotti, 2008). As illustrated in the pairs of everyday/congruent and specialized/metaphorical terms *reproduce-reproduction* and *breathe-respiration*, GM is central in this language-infused process of developing and using tractable, expandable networks of specialized knowledge. These logic-deductive schemas are understood, after Vygotsky (1978), to operate interpersonally and intrapersonally. It is worth noting that, with the concept of semiotic mediation, the sociocultural theory of Vygotsky and the SFL approach to cognition (Halliday & Matthiessen, 1999) do not tend to engage with what Ortega (2012) called a conundrum in SLA about whether linguistic behaviors arise from explicit or implicit knowledge.

It will help to draw specific parallels between the linguistic and cognitive processes involved in GM. In positing a natural relation between lexicogrammar and semantics, Halliday (1998) advanced the view that natural language embodies, in its grammar, a theory of human experience. This is a commonsense theory evolving in daily life, and usually remains below the level of attention (p. 194).

Thus, intrapersonally, congruent realization is associated with primary socialization and the knowledge that this typically implies – knowledge of the world as it is experienced directly. Neither the primary socialization nor the commonsense knowledge is simple; rather, they are elemental (Halliday, 1993a). GM may be understood as "a new culturally-elaborated organization of [human] behaviour" (Vygotsky, 1978, p. 39) that develops out of the foundational "elementary functions" of language that are involved in the construal of commonsense knowledge:

> The central characteristic of elementary functions is that they are totally and directly determined by stimulation from the environment. For higher functions, the central feature is self-generated stimulation, that is, the creation and use of artificial stimuli which become the immediate cause of behaviour (Vygotsky, 1978, p. 39).

The role of GM in developing these "higher functions" can be distilled from this description. The "artificial stimuli" are understood as "self-generated" "culturally-elaborated organization of [human] behaviour" (Vygotsky, 1978, p. 39) because they can be internally activated by the social subject with only indirect reference to the immediate environment for its ideational

content. (Of course, the immediate environment – the context of situation – is involved in motivating a metaphoric construal because it activates the linguistic register in play.) In writing, it is the experiential and logical meanings represented in the metaphoric construal that are exceptionally mobile and correspondingly free of the immediate material context, which Hasan (2005/1973) helpfully distinguished as *the material situational setting*. Thus, the "stimuli" in metaphoric construals are provided by the internally-construed grammatical systems; these resources are "artificial" because, as a metatheory of human experience rather than the experience itself, the grammar is culturally-derived and semiotic.

In these ways, GM is considered highly influential in academic literacy, which, in its ideational aspects, is understood as a dynamic state of text- and context-specific congruent and metaphoric construals of experience and reasoning. Such construals in the activities of reading and writing are associated with changes in cognition. As reported by Luria (1976):

> our investigation… showed that as the basic forms of activity change, as literacy is mastered, and a new stage of social and historical practice is reached, major shifts occur in human mental activity. These… involve the creation of new motives for action and radically affect the structure of cognitive processes (p. 161).

The recognition that specialist written discourse is achieved by emergent logico-deductive schemas complements the understanding that specialist discourse is accomplished by more than what is often criticized as jargon (Halliday, 1998). The research in GM informs us that the mental dispositions associated with the use of GM overlap with the development of discipline-specific ways of knowing (Martin, 1991). As indicated above, the disciplinary ways of knowing are distinguished by their concepts and by the ways the concepts are related to each other; GM is centrally involved in both of these aspects. It follows that "[i]deational grammatical metaphor will be central to many of the registers advanced learners engage with, as it is in the registers of science" (Matthiessen, 2006, p. 47).

The role of grammatical categories in mental processing is now accepted in sociocultural psychology and much related applied linguistics (Ryshina-Pankova & Byrnes, 2013). This claim can be approached individually or collectively from Vygotsky's (1978) and Slobin's (1996) psychology, Whorf's (1956/1939) cultural linguistics, and Halliday's systemic functional

linguistics (Halliday & Matthiessen, 1999). The clear relation of this claim to the processes of academic writing and GM has been summarized by Ryshina-Pankova and Byrnes (2013), who invoke a concept that has gained considerable support in sociocultural literature on L2 development (Lantolf & Thorne, 2006), Slobin's (1996) concept of *thinking for speaking*:

> When the kinds of extended thought processes which the act of composing occasions are realized as the reconfiguration of local knowledge into conceptual knowledge and as the configuration of that knowledge across an entire text, we have evidence for knowledge creation as the academy values it, a kind of "thinking for writing" facilitated by GM (Ryshina-Pankova & Byrnes, 2013, p. 195).

This statement succinctly describes the task of shunting intrapersonally between commonsense and specialized ways of knowing that is involved in writing academically writing. As described by Coffin and Donahue (2014), this process is especially relevant in tertiary study.

> Using language to configure (or reconfigure) relationships between abstract general phenomena and concrete specific phenomena, as well as between abstract entities, is central to the learning and meaning-making processes that students are expected to engage with in tertiary study (p. 22).

Among other things, these statements help to explain the opportunities and difficulties L2 academic writers experience in the task of generating valued knowledge, as for example in the opportunities and challenge of Jones' (1991) subjects in bridging their personal experiences of teaching and the required abstraction of educational psychology. The next section considers the nature of the waves of concreteness and abstraction involved in construing disciplinary knowledge.

3.8 Grammatical metaphor in disciplinary practice

The purpose of this section is to clarify the roles of GM in the discursive practices of scholarly cultures. To this aim, it is useful to distinguish – very generally and cautiously – the humanities, natural sciences (henceforth, the sciences), and social sciences, and also how GM

figures in the distinctions. The discussion begins with the recognition that valued scholarship is achieved by discursive means that are not strictly abstract and/or technical. While scholars and scholarly communities are entrained towards greater capacity for abstraction in conjunction with the specialized interests and semiotic tools such as nominalizing metaphors, their discourse rarely if ever abandons concreteness, specificity, and associated linguistic construals of immediate human experience. In support of this view, commenting on the history of science writing, Halliday stated:

> Every scientific text, however specialized and technical, contains a mixture of levels of wording, from most congruent to most metaphorical, right up to the end. All scientific registers, likewise however specialized and technical, construe the full metaphoric range of semantic space opened up by their own histories, right up to the present (Halliday, 2004/1999, p. 121).

Accordingly, and contrary to many descriptions, scholarly "fashions of speaking" reflect gradations of specialized and folk ways of knowing.

> As designed semiotic systems emerge, both the registers of everyday language and the original specialist registers continue to exist and to develop; folk models of the world will co-exist alongside the scientific ones (Halliday & Matthiessen, 1999, p. 572).

The ebb and flow of abstraction in constructing scholarly knowledge is natural, purposeful and functional. It would seem sensible that L2 writers' challenges with the use of GM are with exploiting the knowledge-making potentials of the ebb and flow in abstraction. Accordingly, when Schleppegrell (2004b) described the logical reasoning that L2 writers carry out in their chemistry reports as construing contexts of everyday conversation, and when Byrnes (2009) identified cases of L2 writers over-bundling nominalizations to the extent of writing nonsense, they were identifying the GM-related issues that arise within the mix of the everyday and specialized ways of construing the world.

The general point here is that, from the view of a theory of language as meaning-making resource, if GM is a linguistic resource for construing abstraction, it is also a resource that helps

to map choices of metaphoricity. As a resource for construing and describing variation in degrees of nominality and abstraction, GM analysis can, in turn, help identify and support the functionality of congruent realizations. Indeed, a situationally functional mix of abstraction and congruency would appear to be a sensible literacy aim for using GM. This claim casts the earlier claim about semiotic mediation to the level of text: situated contexts of academic writing challenge L2 users to construe knowledge using new textual patterns of variation in abstraction; as noted in the previous chapter on semiotic mediation, subjects may or may not be well-oriented to specific contexts and/or the linguistic patterns that construe meanings relevant to those contexts.

3.8.1 Congruency as a feature of scholarly culture

Just as scholarly cultures can be identified by the specialized forms of abstraction, they can also be identified by specialized forms of *congruency*. While scholarly practice is likely to be realized by a higher proportion of metaphorical choices of wording than is, for example, casual conversation, some specialized scholarly discourses, or sections thereof, tend to stay close to what is theorized as the natural relation between meaning and grammar. This occurs for instance in ethnographic case study research in applied linguistics (Duff, 2008, 2010a). Among the triangulated sources of ethnographic data, research subjects' emic accounts (e.g., what they say, feel, think) of their lifeworlds (e.g., what they experience) are valued as evidence.

Another example of congruent construal is from science scholarship integrating mathematical methods. This example is perhaps a less intuitive one because it concerns not the congruent construal of *experience* but rather the function of *logical reasoning*. Some linguistic sections of mathematical discourse call for the logical dependencies between claims to be made explicit; the most explicit construal of logical reasoning that is linguistically possible is achieved by the use of logical conjunctions (e.g., *if* X, *then* Y) (Halliday & Matthiessen, 2004). Such congruent construals of logical reasoning in language often occur before an intersemiotic shift to construal of logical reasoning by mathematical symbolism, which realizes mathematical logic through the use of highly formalized mathematical axioms and theorems (O'Halloran, 2004). Thus, in multisemiotic mathematical discourse, logical reasoning is often construed congruently to the extent possible in language before being extended mathematically, a semiotic which also affords great variation in degrees of metaphoricity, especially of logical reasoning. (Expanding

on Halliday's notion of grammatical metaphor, O'Halloran (2004) labelled the latter practice *semiotic metaphor;* semiotic metaphor occurs when a function – such as the choice of a logical relation – is reconstrued across semiotic systems such as language and mathematics, implying a metaphorical reconstrual of meaning across structures of the respective semiotic systems.)

These examples help us appreciate the functional scope of congruent construal in scholarly discourse. The examples indicate, furthermore, that scholarly sub-cultures can be identified by patterns of metaphoricity and congruency; this recognition draws attention once again to the value of patterns of variation in GM. It follows that the capacity to encode and decode across congruent and metaphorical meaning in academic writing, that is to pack congruent meaning and unpack metaphorical meaning, is also developed through disciplinary enculturation:

> The complete activities, and thus the complete meanings, are recoverable by readers familiar with the thematic formations by which the activities would be explicitly described. In the wider social context, discourse types that rely heavily on [nominalization] divide the world of potential readers into initiates and the uninitiated to a much greater degree than do other kinds of texts (Lemke, 1990a, p. 440).

As described here by Lemke with reference to scholarship, GM and nominalization have important parallel roles in disciplinary enculturation and the maintenance of disciplinary boundaries.

3.8.2 Internal variation in disciplinary sub-cultures

Section 3.8 on GM in disciplinary culture began rather counter-intuitively by pointing to the value of congruency, which is too often missed. The presentation of GM in disciplinary culture is delayed again here for a related observation: disciplinary sub-cultures vary internally in their use of GM. That is, the variation in use of GM does not stop, of course, at the (fuzzy) boundary of a discipline. While academic sub-cultures can generally be identified by their shared technical and abstract terms, taxonomies, and logico-deductive patterns, these shared patterns of knowing are uniquely instantiated by exemplification, augmentation, contestation, and so on, in texts. Thus, while the terms 'taxonomies' and 'forms of reasoning' may be similar within

scholarly subcultures, these "[c]ommunities, like other ecosystems, are not defined by what their participants have in common, but by how their interdependence on one another articulates across differences of viewpoints, beliefs, values, and practices" (Lemke, 2002, p. 72). In short, scholarly subcultures are internally complex and differentiated. In relation to GM, this claim from the perspective of eco-social semiotics is buttressed by Halliday's repeated reference that the default manner of construal in adult discourse, including in the most technical of texts, involves a mix of congruency and metaphor (2004/1999; 1993a). An important contribution of this dissertation is to identify this manner of variation.

Thus, while disciplinary sub-cultures will share fashions of speaking and corresponding mental maps of reality (Whorf, 1956/1939) in their construals of disciplinary knowledge, individual texts will vary in the balance struck between congruent and metaphorical wording. It would appear to follow that the unique ebb and flow in abstraction of individual texts is a good place to find the "viewpoints, beliefs, values, and practices" that distinguish a scholarly text from other scholarly texts within the same disciplinary subculture. For Lemke (2002), disciplinary sub-cultures are shaped by heteroglossia, a term originally proposed by Bakhtin (1981) for the ways cultural practices (notably the novel) are achieved intertextually through dialogue with other practices across space and time. Lemke (1990b, 2002), citing Bakhtin (1981), shows keen awareness of the role of language in heteroglossia. Lemke (1990a, 1990b) identified GM as particularly important in generating intellectual resources such as abstractions and technical terms that serve the field locally and also become available for (trans)disciplinary application. This set of claims helps us appreciate the role of GM in understanding how disciplinary sub-cultures manage both to retain identity while also adapting and merging with other sub-cultures. As such, GM is a key resource in the "ordered heterogeneity" (Wallace, 1970) of scholarly practice.

The above discussion presents a strong argument against any naïve notion that the more GM is used, the merrier the scholarship. While the semogenic priority of congruent construal draws GM research predictably towards the *expanded* use of GM in learners' repertoires, and the generally highly-valued discourses of academia are marked by a relatively high incidence of GM, felicitous engagement in scholarly practice entails the capacity to construe experience at various levels of abstraction. The eco-social view of scholarly communities as sub-cultures with "ordered heterogeneity" encompasses the view of advanced literacy as the achievement of

intersubjectivity – ideationally, interpersonally, and textually – in a broad range of situated contexts (Halliday & Matthiessen, 2004). The aims for such intersubjectivity, defined by register, would tend to preclude the gratuitous use of GM. Unsurprisingly, few readers enjoy over-dense academic prose (my apologies for any transgressions). Furthermore, the gratuitous use of abstraction is identified not only as potentially nonsensical in texts (Byrnes, 2009), but also, when systematically applied, as potentially damaging to the field and its contributions to society (see, for example, McCloskey's (1994) critique of the rhetoric of mainstream economics). A practice considered problematic on more specifically ethical grounds is obscurantism enabled by GM, such as when "liberalization of trade" is experienced as economic constraint (Hasan, 2011/2003, p. 213), and the killing of civilians in war is construed metaphorically as "collateral damage" (Butt, Lukin & Matthiessen, 2004; Lukin, Butt & Matthiessen, 2004). These critical arguments are supported by the view of language as a social semiotic, of language as a resource for making meaning in context.

With these cautions about inter- and intra-disciplinary variation in relation to metaphoricity in place, the discussion now proceeds to the role of GM in distinguishing disciplinary practice. The first step is to gain a clearer understanding of the distinction between technical and abstract terms. Relative to technical abstractions, abstractions are unstable in terms of metaphoricity; that is, the knowledge they construe is likely to be variously interpreted in a text. As they serve such functions as previewing and summarizing discourse (Ravelli, 2004), the meanings they realize recur across various degrees of metaphoricity (for such reformulation in cancer research writing see, e.g., Gledhill, 1995, 2000). This understanding coincides with the textual function of these abstractions in organizing discourse through clause-level choices of Theme and Given-New information order (Halliday, 1998), discourse organization in hyper-Theme and hyper-New structures (Ravelli, 2004). While generic and semi-technical lexis are used across disciplines, an extensive study by Hyland and Tse (2007) based on Coxhead's (2000) academic word list, shows that between the humanities, social sciences, and sciences, abstractions have variable frequencies, collocations, and meanings. From the view of GM, this result is predictable, given that these abstractions are likely to serve textual and experiential functions which are themselves discipline-specific (Ravelli, 2004).

In the humanities, generic abstractions tend to predominate among GMs (Wignell, 2007). This has also been found to be the case in the social sciences, though with considerable

variability given the highly variable role of technicality among the social sciences (Wignell, 2007). Thus, while projects in the humanities disciplines tend to share general disciplinary aims and practices, humanities knowledge is advanced through locally bounded frameworks and concepts that, by discursive means such as GM, are distinctively generated and activated in each project. In this way, knowledge in the humanities is understood to develop *horizontally*, through projects that are epistemologically distinctive and parallel with other projects in the field.

Technical terms are the most semiotically stable abstractions across academic registers (Biber et al., 1999; Halliday, 1993b, 1998). Technical terms (such as *grammatical metaphor*) are abstractions construed for semantic durability across contexts, ostensibly to ensure that the scholars engaged in related fields use them to construe the same entity across research sites and thereby expedite clarity and enable generalizability (Halliday, 1993b; Martin, 1992; Wignell, 1998). Stable technical taxonomies are well-known in the social sciences but are most closely identified with the sciences. According to Bernstein (1999), scientific fields develop through *hierarchical* knowledge structures, which

> attempt to create very general propositions and theories, which integrate knowledge at lower levels, and in this way shows underlying uniformities across an expanding range of apparently different phenomena (pp. 161-162).

The strongly integrative orientation to the development of knowledge in the sciences aims for linear, hierarchical lines of knowledge development with an explicit aim of advancing the field. In contrast, according to Bernstein (1999), humanities knowledge is developed through *horizontal knowledge structures,* that is, in parallel projects with "a series of specialised languages with specialised modes of interrogation and criteria for the construction and circulation of texts" (p. 161).

Knowledge in the social sciences is construed across the spectrum between the horizontal knowledge structures of the humanities and the hierarchical knowledge structures of science (Wignell, 2007). The range of mediating tools in social science between, for example, heuristic and taxonomic systems, can be observed in the subtle variation in technical taxonomies in applied linguistic research on abstract lexis. Taxonomies of abstract nouns have been proposed by Martin and Rose (2007) and Biber (2006) with varying scope for interpretation. The approach

from Martin and Rose is presented as more taxonomic and scientific, while Biber's framework is offered as heuristic. In the classification of abstract nouns in Martin and Rose, the categories of abstractions are: technical (e.g., *inflation, metafunction),* institutional (e.g., *offence, amnesty*), semiotic (e.g., *question, proposal*), and generic (e.g., *manner, cause*) (p. 114). In Biber's classification of semantic categories of abstract nouns are: cognitive noun (e.g., *knowledge, understanding*), quantity noun (e.g., *energy, minute*), group/institution noun (e.g., *committee, congress*), and abstract/process nouns (e.g., *potential, density*) (p. 244). According to Biber, the abstract/process nouns are "intangible, abstract concepts or processes" (2006, p. 250), a category that encompasses generic abstractions not captured by the other categories and abstract technical terms. Two key differences emerge from comparison of these two systems. The first one is that Biber conflated what Martin and Rose call technical abstractions and generic abstractions as the category abstract/process nouns (a point that is further discussed below). Importantly, Biber's classification was offered with a rider that the categories tend to overlap, a condition that was not mentioned in Martin and Rose (2007) but which has subsequently been reported for their system (Hao, 2015). This example indicates one way that the respective "objective" and "interpretive" orientations of science and humanities (Coffin et al., 2003) emerge within social science.

While technical and abstract terms can in many cases be distinguished intuitively (e.g., *nominalization* is specific and technical; *analysis* is general and widely interpretable), the distinctions frequently grey out in analysis, even in the analysis of technical science writing (Hao, 2015). SFL-informed studies of technical discourse, such as Unsworth's (2000) investigation of technicality in textbooks, typically identify technical terms by their definition, which involves the to-be-defined term in the Token and the congruent form in the Value, its definition. However, technical terms are frequently not defined in texts, so identifying the congruent form of a technical term takes a messy path similar to that involved in identifying the congruent form of an abstract term, which is typically complexly and diffusely distributed within a text or disciplinary discourse. Conversely, abstract terms can be said to take on a technical character. For example, the grammatical metaphor *discourse* in sociocultural approaches to L2 academic writing can be seen to operate technically as it unpacks to a specific set of claims in the Vygotskian and neo-Vygotskian literatures; however, these literatures also exploit the many fuzzy edges associated with *discourse* as an abstraction. These challenges of analysis are predictable considering the complexity of GM in construing disciplinary knowledge.

The grey zone between technical and abstract terms presents a challenge to the formal approach to the metaphoricity of technical terms as proposed by Halliday and Martin (1993). They claim that a nominalized structure that defines a technical term "[rids] the discourse of the grammatical metaphors which were essential to the process of constructing a scientific reading of reality in the first place" (p. 261). From this view, technical terms construed through GM are not to be counted as metaphors because the semantic tension in its social semiotic history (e.g., of when the technical entity was a verb) is erased (e.g., Martin & Rose, 2007; Devrim, 2015). However, as indicated above, various studies of GM specifically target technical terms (e.g., Unsworth, 2000). However, recent empirical studies have questioned the strong abstract-technical dichotomy and the treatment of defined technical terms as dead metaphors (Ferreira, 2013; Hao, 2015). Halliday has also considered (2004/1999, p. 128). He recognizes that disciplinary experts regularly unpack the specificities of the technical terms they use, indicating that semantic junctions operate in technical terms even in contexts of high specialization. As this issue of the metaphoricity of technical terms is specifically relevant to the operationalization of GMs, it is elaborated further in the research methods chapter that follows.

3.8.3 Summary of the role of grammatical metaphor in disciplinary variation

This section closes with a brief summary of the role of GM in disciplinary variation. The general contextual features of knowledge in the disciplines are relatively well-known. A description that has been adopted in English for academic purposes (EAP) (Hyland, 2006) is offered by Coffin et al. (2003), who adopt an analysis of disciplinary discourse broadly based in SFL and Bernstein's (1996) sociology of education. Their description, shown below in Figure 3.4, presents a continuum of academic knowledge between the sciences and humanities, with the social sciences in-between. The first, more general point of distinction between the "linear" growth of knowledge of the sciences and the "dispersed" knowledge of the humanities has been discussed, as noted above, in Bernstein's (1999) terms of hierarchical and horizontal knowledge structures. Humanities knowledge is construed in a horizontal discourse that tends to rely on generic abstractions used in project-specific ways with meanings built up through metaphorical packings and unpackings of experiential and logical meanings.

Sciences	**Social Sciences**	**Humanities**
←		→
Linear and cumulative growth of knowledge		Dispersed knowledge
Empirical and objective		Explicitly interpretive
Experimental methods		Discursive argument
Quantitative		Qualitative
More concentrated readership		More varied audience
Highly structured genres		More fluid discourses

Figure 3.4. The academic knowledge continuum (Coffin et al., 2003, p. 48)

As noted above, technical terms have a key role in construing scientific knowledge which, proceeding on a cumulative basis, calls for terms to be stable across projects. Technical terms typically imply many layers of embedded logical reasoning and densely packed experiential meanings. (In relation to logical reasoning, as has been noted, mathematical science discourse in particular often calls for explicit logic in coordination with construals involving mathematical symbolism.) Technical terms are often used without definition on the assumption that the audience is able to unpack those implied meanings; this helps explain the "more concentrated readership" of science discourse. The cumulative nature of science also explains the use of experimental and quantitative methods, both of which rely significantly on technicality (Halliday, 1993b; Wignell, 1998). Together these features help explain the characterization of science discourse and its contrast with humanities, as shown in Figure 3.4.

The cline between "objective" and "interpretive" frameworks shown in Figure 3.4 is managed largely through choices in the interpersonal metafunction realizing tenor. This chapter has shown evidence that interpersonal metaphor is exploited across the spectrum of disciplines in order to negotiate claims. The tendency, however, is for humanities writers to be more explicitly subjective in the stance they take; for example, the use of explicitly evaluative lexis is more common in the humanities and social science writing tending towards the humanities (Hood, 2010). The phenomenon of nominalized evaluation shows the tendency in academic writing towards experientializing interpersonal positioning, that is, of evaluation re-construed as experiential knowledge.

3.9 Distillation

In reviewing the relevancies of GM in L2 academic writing research, this chapter has highlighted the challenges and affordances of GM for apprentice L2 academic writers. The review identifies the usefulness of the concept of semiotic mediation for explaining these challenges and affordances in relation to the enduring, discursively enculturated dispositions of L2 academic writers, including the importance of extended engagement in academic cultures and the value of a well-automated congruent grammar available as a platform for felicitous play with metaphoric construals and scholarly abstraction.

The review also identifies findings on the variability of abstraction, that valued meanings are realized through the ebb and flow of abstraction across the scales of text, individual human cognition and disciplinary culture. Abstraction also ebbs and flows in discourse with changes in the role of GM across experiential, logical and interpersonal functions. GM has an important textual function; for example, it is observed in the metaphorically-construed signposts that preview ideas that are subsequently unpacked in congruent construals (e.g., Ravelli, 2004). Experientially, the variation is seen for instance in definitions, whereby, classically, a Token, the defined term, is related to a defining Value, which often involves classification and shifts in grammatical rank. For example, "*An ecosystem* [Token] is *that home or place in which a community or group of interacting plants and animals lives* [Value]" (Wignell, Martin & Eggins, 1993, p. 149; for the link between GM, definitions and child language development, see Painter, 1996). Shifts in the construals of logic are also identified, with congruent construals of logic using conjunctions often later distilled in texts as clause-internal reasoning realized by logical GMs (Martin, 1992; Ryshina-Pankova, 2010). Such insights have advanced our understanding of the functionally differentiated nature of GM in academic texts.

The functionally differentiated ebb and flow of abstraction in L2 academic writing is relevant to the understanding of GM as a *unified* multifunctional resource. This understanding of GM as a resource with register-wide implications would seem to be useful for investigating GM as a robust resource in the discursive construction of socio-psychological dispositions, that is, as a resource of semiotic mediation. As mentioned in this chapter, researchers typically investigate abstraction in writing using the instruments of lexical density and grammatical intricacy (e.g., Byrnes, 2009). While these instruments provide valuable measures of abstraction in discourse,

when the interest is in investigating GM-enabled abstraction and/or its use in L2 academic writing, they are of course proxy measures. The next chapter addresses these issues by operationalizing GM use in an instrument that is called nominal density.

Chapter 4: Research Setting and Methodology

4.1 Introduction

Chapter 4 reports on the study's methodology, namely the cultural-historical and pedagogical setting, researcher positioning, data collection, and the participants. The primary data analyzed is student writing; the primary method for analysing GM in the writing is nominal density (ND) analysis. As ND is a novel instrument, the details of its development, relationship with related measures such as lexical density (LD), and use in the study are provided in Chapter 5. The study is of the writing of four L2 users of English enrolled in an English for Academic Purposes (EAP) writing course in a small, selective Japanese university. The four students are first language users of Japanese. The focus is on the ways these students exploited the scope of abstraction available in English language through the linguistic resource of GM, how patterns in the use of GM changed over the course of the three-month university term, and the implications of these patterns for the learners' construals of academic knowledge in their enculturation as scholars. Although the links between academic knowledge, writing and nominalizing GMs are recognized in applied linguistics, the specific explanatory links between nominalization and construals of disciplinary knowledge in writing and other aspects of context are made using SFL, which affords insights into text-context relations by theorizing language as a resource for making meaning in context.

4.1.1 The role of the setting in the methodology

A key methodological decision was to focus the analysis of students' use of GM on their course writing. In considering the potential methodological contributions of the study, the decision to focus on the writing itself has the benefit of highlighting the potential utility of the ND instrument for understanding how students use GM and exploit their options for abstraction. However, the focus on functional linguistic analysis of the students' texts does not of course preclude other points of reference in this context. The insights into text-context relations afforded by SFL-based discourse analysis of student writing are investigated within and against the exposition of the setting as informed by supplementary data.

The supplementary data (summarized in Table 4.3) includes material from and about the classroom, writing instruction, curriculum, department, and university, as well as students' needs

analysis, their comments on their drafts and reflections on their writing, and comments on the final drafts of key assignments of each focal student from expert readers in the students' respective disciplines. In relation to the experts' readings, it is important to appreciate that this is not a study of the construal of disciplinary knowledge *within* streams of economics, philosophy and ethics. Comparative ND analysis of expert writing in these disciplines was not undertaken, although, as noted in Chapter 3, the spectrum between congruent and abstract construals are reported for social science and humanities (e.g., Wignell, 2007) and assessments by experienced disciplinary readers of the final drafts of the four students' main course assignments are reported. While a bespoke GM analysis, especially of the disciplinary texts referenced by students in their course writings, would doubtless be beneficial, this would significantly expand the scope of the study beyond what is needed to address the research questions. This arrangement of course puts additional contextual pressure on the analysis of students' texts in addressing the research questions; as such, the methodology is additionally apposite for assessing the value of ND analysis as a research instrument.

The supplementary data was not subject to formal linguistic analysis but rather was examined for relevancies to the academic enculturation, such as the institutional and pedagogical context and the interests and behaviours of students in the course. In accordance with SFL practice, this empirically focused but informal discourse constitutes a "running commentary" (Halliday, 1994: xvi) on the supplementary data and context. As such, this part of the analysis is a feature of the setting and provides a background for discussing the formal analytic results.

Within this arrangement, the chapter reports on data collection and also draws on the insights from the supplementary data in the service of understanding the setting; hence the emphasis in the chapter title on setting. This choice accords with the relationship between much of the supplementary data on the context and the core data on GM use in students' writing. Both as the instructor and researcher, I was aware of many of the features of the students' writing and the setting before undertaking, after the data were collected, the formal analysis of GM in students' texts. However, while I was generally aware of some patterns in GM use during the course both in the target writing practices and the students' writing (as demonstrated in instructional presentations and my feedback on student writing), I did not formally or comprehensively analyze GM use in students' texts during the data collection period.

It would be possible to refrain from using information from supplementary data in describing the setting, leaving that data to highlight and interpret findings in the discussion. However, if it were to be delayed and introduced only in the discussion of findings for GM, this arrangement would risk implicitly attributing what is known from the context about the students' writing to the analysis of students' texts.

4.1.2 Classification of the study

The research questions, analytic methods and focus, number of subjects, range of data and sampling period qualify this as a theory-driven, short-term (three-month) longitudinal case study. The study seeks to help explain the role of GM in the writing and academic enculturation of small group of apprentice scholars but is undertaken in recognition of its limitations in doing so; as such, while providing a tool and insights that potentially contribute to explanations of GM use and L2 academic writing, the study is also exploratory. In this respect, the inferential statistical analyses carried out on ND and other measures of abstraction are singled out as especially exploratory; they offer potential directions for investigating GM use in discourse as well as testing the validity and reliability of ND.

Additionally, the study qualifies as a case study (Duff, 2008). The focal subjects, as a group, are collectively positioned in society as successful late undergraduate- and early graduate-level Japanese L1 users who attend a highly selective, internationalized university and intend to become professional scholars. Methodologically, this case study of L2 academic writing stands out chiefly because of its focus on the resource of GM, which is theorized as a central resource for mediating the construal of academic knowledge – that is, mediating knowledge construal experientially, logically, textually and to some extent interpersonally. This scope implies that central, context-relevant features of writing through which apprentice academic writing achieves its success (or not) can be described to a significant extent in terms of the use of GM (Colombi, 2006; Schleppegrell, 2004b).

This profile of the research indicates a design that bridges the divide between exploratory, longitudinal qualitative case study research and explanatory, quantitative research. Such studies have been called longitudinal mixed-method designs. According to Dörnyei (2007), mixed-method designs typically integrate extensive and intensive components in which the extensive component involves quantitative study and the intensive component involves

qualitative methods. An important study of GM use in L2 writing that uses mixed-methods is Byrnes' (2009) investigation of the development of GM among L2 German writers. This study involves quantitative analysis of GM in a corpus of learner writing using lexical density and other methods, and focused qualitative analysis of GM itself in select samples of the writing.

The mixed-method design of this study presents an opportunity for introducing ND in GM and discourse studies. By linking nominality in discourse quantitatively and qualitatively with the choices of grammatical metaphor proper, ND offers greater theoretical integration of fine-grained qualitative and extensive quantitative research in the study of discursively-mediated abstraction (for details, please refer to Chapter 5). It is worth noting that in SFL's probabilistic model for linking lexicogrammatical choices in texts through the semantics to context, the integration of quantitative and qualitative analyses is possible for any formal feature of the language system; however, ND analysis extends the available descriptive tools for more direct, systematic, and fine-grained quantitative and qualitative observation of nominality and abstraction. As detailed in Chapter 5, ND analysis affords a single quantitative measure for the multifunctional realization of abstraction in corpora, individual texts, sections of texts, clauses, and clause phases such as Theme and Rheme.

This chapter is organized as follows. The next section, 4.2, describes the cultural and historical aspects of the instructional and institutional setting. While the information in the section serves to contextualize the study, some of the information emerges from and informs data collection procedures such as the recruitment of subjects. The description of the data collection procedure itself follows that of the general setting. The data collection procedure is framed by a discussion of my positioning as researcher and writing course instructor. This section details participant recruitment, the selection of and introduction to focal participants, and the data used in the study. The two sections that follow present salient aspects of the EAP instruction, including the Writing I syllabus and the nature of instruction on aspects of language especially relevant to GM use. The section on the pedagogical context closes with details about the four writing course assignments, which constitute the very specific context of the students' writing analyzed in Chapters 6 and 7.

4.2 Setting

The aspect of the setting discussed in this section is the institutional, political, economic and historical context of the academic writing course. The data for this research were collected in an EAP writing course titled 'Research-based Academic Writing I' (henceforth Writing I) in a university in Tokyo in the winter term of 2010. According to the syllabus outline, the aim of the course was "to prepare new scholars to write academic research in English at a graduate level" by "increasing [students'] understanding of the qualities and purposes of writing in the academic world" as they "carry out a range of short, practical writing tasks and produce three academic texts". This was a short, 20-hour, credit-bearing course meeting for 90 minutes a week for a single, 3-month term.

This course was part of a two-course EAP writing curriculum in which the second course focused on the application of the foundations of academic writing learned in the first course to the writing of a report on a small research project, typically part of the students' (BA) graduating project or graduate research towards an MA or PhD. Both courses in the EAP writing curriculum were optional. However, according to the informal testimony from several students and faculty, graduate students from the Graduate School of Economics who were planning to write their reports in English were often strongly encouraged by their supervisors to take the course.

Focusing this discussion of the setting on students' motivations for taking the course, supervisor pressure was not mentioned by students as a motivator in the written, pre-course needs analysis survey. For example, Taka (pseudonym, as with all student names reported), an MA student in development economics and one of the focal subjects, indicated he was independently motivated:

> In due course, I would like to acquire a doctoral degree at a graduate school in a foreign country. So I would like to write an english version of the master's thesis for an entrance examination. I would like to obtain a job at a government organization or an international organization one of these days.

Like his peers, Taka tended to present himself as highly self-motivated. However, the results of the needs analysis survey should be read with caution as the task served several functions, one of them potentially contributing to the tendency for students to represent themselves as especially

self-motivated, as Taka did. This is because the pre-course needs survey also served as part of the students' application to take the course. From the institution's perspective, the results of the survey were to provide a means of selecting which students would be admitted to the over-subscribed course. The multiple purposes of the survey make this a useful initial reference in describing the general setting.

In contrast with the other English academic writing courses available across faculties at the relatively small university, Writing I focused on research-based rather than skills and essay-based English language writing. As the course instructor and a faculty member, I became aware of this difference in the process of my hiring, as well as in the informal classroom discussion with students who had taken the other English language courses and from faculty teaching those other courses. Under these circumstances, the Writing I course was regularly over-subscribed, a circumstance that meant students competed for the 15 spaces available each term. Also, while the other English writing courses were offered in the Faculty of Languages and Culture, which included the university's main English language instruction unit, Writing I was offered by the Graduate School of Economics, in which I was adjunct faculty. This arrangement meant that the procedures for enrolling in this class were very particular to the context, as described below in the sections on participant recruitment and focal case selection.

4.2.1 The nationalization and marketization of government universities

The institutional context of the study is a university that is considered among the highest-ranked social science research institutions in Japan. Evidence for this claim are the two large and highly competitive Global Centers of Excellence (COE) Program grants awarded to the university by the Japanese central government (the Ministry of Education, Culture, Sports, Science and Technology (MEXT)), both in social science and both involving the Graduate School of Economics. In the words of the Ministry:

> The [COE] program will provide funding support for establishing education and research centers that perform at the apex of global excellence to elevate the international competitiveness of the Japanese universities (Japan Society for the Promotion of Science, 2010).

The focal institution is also considered one of Japan's most prestigious national government universities. The fact that it is relatively little known outside of Japan is very likely due to its small size (approximately 6,500 students, including about 700 international students) as well as its specialization in social science.

Historically not one of the original Imperial universities, the university grew in status over the course of the Meiji Restoration (1868 to 1912) as a school of commerce through close links between the school's administrators and faculty and the increasingly influential mercantilists in Tokyo. Since the school's establishment in 1875, its growth to the status of a national centre for social science research coincided with Japan's movement in the Meiji Era from a feudal society to an international market economy ([Citation withheld for confidentiality][1], 2000). The process was not without considerable tension with the government and "public disdain for business education" ([Confidential], 2000, p. 47). The subjects first taught were "book-keeping, English penmanship, conversation, grammar, Japanese and Western mathematics, and geography" (p. 27).

Before the advent of World War II, the theoretical and empiricist strength in economics of the, by then, university helped the state find a "'rational' management of the war-time economic systems" that was neither Marxist nor "Imperial Way" economics. The former approach implied a critique of Japanese social systems and the latter did not account for economic rationality in accordance with contemporary economic theory ([Confidential], 2000, p. 126). In such ways, the university came to be integrated into the Japanese political and economic establishment. In this arrangement, the university had high visibility and status but not unique status: collectively, national universities have a historical – but certainly not fixed or absolute – role in advancing the central government's national and economic policies (Kaneko, 2004).

More recent socio-economic changes affecting higher education in Japan can be linked through the university's Graduate School of Economics directly to the Writing I course. My employment began in 2005 but the EAP position in the Graduate School of Economics itself

[1] This citation is for a book on the history of the university that was the site of the study. For confidentiality, the reference has been withheld except from my doctoral research committee. The title is not shown in the references list and subsequent citations will appear as ([Confidential], 2000).

emerged with the major restructuring of this unit from 1998-2004 in accordance with policy reforms to the university system that had major administrative and financial consequences for national government universities. The universities would subsequently be managed under the pro-competition Toyama Plan as semi-autonomous institutions (Goodman, 2005; [Confidential], 2000). The reforms are generally understood to be guided by a neoliberal political and economic ethos that favours minimized government, reduced spending on social services, privatization, free trade, and privatization (Itoh, 2005; Kaneko, 2004). The Japanese version of internationalization, *kokusaika*, emphasizes the export of Japanese culture to the world (Yoshino, 1995) "based on Japan's economic success and the unique qualities of Japanese ways" (Hashimoto, 2007, p. 27).

In accordance with these changes and associated global developments in technology and knowledge-based economies, the main national universities would become "Graduate School-centred", producing "highly creative and flexible educated people who are better able to adapt to the changing environment" in which Japan would be expected to "make larger contributions to the world in terms of promoting creative and pioneering academic research" ([Confidential], 2000, p. 242-243; for an overview of neoliberalism in Japan, see Itoh, 2005). In conjunction with this role, like Tokyo University (considered the highest-ranking national university), the institution in focus "was, and is, a well established sorting and screening institution for future state officials, as well as other types of elites" (McVeigh, 2005, p. 82). Economics graduates from the university, such as Yoshi (4th year BA), one of the focal participants, tended to move into the private sector, quite regularly to the high-end consulting firms and investment banks such as McKinsey, Price-Waterhouse Coopers, Nomura Holdings, and Goldman Sachs.

The policy reforms implied much more than budget cuts. They were intended as a new beginning, a "big bang" (Royama, 1999, p. 22), "where market forces are expected to determine the future of both individual institutions and the sector as a whole" (Goodman, 2005, p. 2). At the university in focus, "The Graduate School of Economics was the pioneer [faculty] in making the changes" ([Confidential], 2000, p. 243). The rationale for these changes was framed in terms of market competition at various scales: "top-class European and American universities usually place a higher emphasis on graduate teaching" ([Confidential], 2000, p. 244). Market competition plays an equally strong role locally:

> In Japan, the Faculty of Economics of Tokyo University shifted to a Graduate School-centred faculty in 1993, followed by Kyoto University's Faculty of Economics in 1996-7. There were worries that [name withheld] University would now lag behind in research facilities and budget, and its relationship with first-class universities overseas would be undermined ([Confidential], 2000, p. 244).

Correspondingly, comparisons between the focal university and other elite institutions were common. Two examples emerge from the supplementary data. During a group task in the Writing I class, Bachi, an MA student in economics, mentioned that one of his professors in another class had said the following:

> The advantages of studying economics at [focal] University rather than Tokyo University are two: some lectures in mathematics are taught by mathematicians and not economists and the English writing classes. Tokyo University doesn't have these.

While instantiating the discourse of institutional competitiveness, this remark also provides initial testament to the role of EAP in the Graduate School's internationalization and marketization. (It also evidences care in the spoken presentation of information – such as by previewing the point – which was not atypical among students in this context). The comment is also interesting for its assumption about the role of mathematics in economics, reflecting the hegemony of neoclassical (i.e., mathematical) economics in economics departments world-wide (Lapavitsas, 2005).

Studying economics in the focal institution was also understood to have a downside compared to studying at other high-ranking economics schools in Japan such as at Waseda University, Keiyo University, Kyoto University, and The University of Tokyo. In classroom discussion comparing the role of economics in society with that of other social sciences such as political science, an economics student explained that the graduate students in economics at this institution had a reputation for "*dokuji no shinka o togeta garapagosu*", which is understood to mean that the students in the department are considered 'to evolve in isolation as on the Galapagos Islands'. The ethos of an increasingly interconnected global economy and associated policies was clearly operating in that discussion; although the expression appears to be facetious,

in context of the Graduate School and *kokusaika*, the accusation of insularity is potentially damaging to the reputation of the institution.

In accordance with its base in neoclassical economics, the Graduate School promoted the theoretical rigour of its programs, which is in important ways synonymous with mathematical rigour. However, in the prevailing ethos of a notably struggling national economy, this strength alone was clearly understood to be insufficient:

> In this manner, empirical research of the Japanese economy came to constitute the main pillar of research at [the university]. Thus, the common image of [the university] as being strong in theoretical, mathematical economic research is not completely accurate ([Confidential], 2000, p. 125).

More generally, the traditional competitiveness between these schools served the new marketization policies well. In this context, the focal university's historical position among the elite schools as the underdog without Imperial support would appear to serve its narrative of innovation and entrepreneurship ([Confidential], 2000). The university's 19th century motto refers to the role of business leaders who, through their personal wealth, leadership and ingenuity, contribute to a nation's development.

Also associated with the reforms were efforts to induce University-Industry Collaborations (UICs). In 2005, the Ministry of Economy, Trade and Industry (METI) achieved its aim of fostering 1,000 spin-off businesses from collaborations with academia. The contribution to UICs from national universities were achieved by loosening, from 2000, the constraints on faculty to work for private firms (Hemmert, Okamuro & Bstieler, 2014).

The links between research practice, internationalization, and the EAP writing course were sometimes drawn by students. An example arises anonymously in the comments section of the formal, university-administered student evaluations of the Writing I course: "I think learning "Academic Writing" skill in graduate school it is very meaningful for internationalization of research. I have learned about a lot of academic writing skills in this class". It would appear that Writing I contributed in some ways to the founding mandate of the university as well as the interests of its more recent reformers.

In the international scholarly market, publications "function as the primary ''currency'' of academia, playing a key role in building scholars' reputations and in institutional decisions to hire, promote, and tenure scholars as well as for research funding" (Curry & Lillis, 2013, p. 10). These circumstances accord with my experiences in the Graduate School. As emphasized to me in an interview for the position, the writing courses would support quality English-language scholarship in the university. For the better-prepared graduate students, this should lead to publication.

In the same meeting, my attention was directed to language-related challenges for Japanese scholars in economics. The search chair produced the following unfortunate opening guideline (removed in 2010) in the instructions to authors from *The Journal of International Economics,* a key journal in the field and for the Graduate School:

INSTRUCTIONS TO AUTHORS

(1) Papers must be in English. **Authors in Japan please note:** Upon request, Elsevier Japan will provide authors with a list of people who can check and improve the English of their paper (*before submission*).

I was told that this guideline indicates the scope of the difficulties faced by many Japanese scholars in relation to publishing in English. In this exchange, it would be reasonable to assume that the search chair referenced not only these scholars' challenges with English but also the associated very public loss of face that such discourse might entail for Japanese economists. This instruction was also a direct threat to the *kokusaika* ethos. At the meeting, the chair expressed hope that such attitudes to Japanese scholars' writing in English would gradually change as Japanese scholars learned to write better in English "on their own" rather than through the hiring of professional writers.

My hiring as an instructor would appear to link in other ways to general globalizing and market-driven trends. In hiring me, the committee noted the relevance to the position of my MA thesis in English for Specific Purposes (ESP) in context of Japanese universities' embrace of *kokusaika* or internationalization (Ferreira, 2007), as well as my earlier work as an ESP tutor at several high-end international consulting and investment firms. Also relevant is that the head of the hiring committee and my immediate superior (who alerted me to the 'Instructions to Authors') was one of the country's leading scholars of international economics, with a strong record of publishing alone and collaboratively in quality international journals in English within

the paradigm of neo-classical economics. Interpretations emerging from neoclassical economics also undergird much neoliberal economic policy (Lapavitsas, 2005), including the various pro-competition policies affecting the Graduate School of Economics.

There is, in short, a relatively direct explanatory line between the aims of the Research-based Writing I course and the historical processes of globalization as these have played out in Japanese history. Furthermore, this relationship is strongly mediated by the department, university, and central government policy in which the course was situated, in accordance with the historical role of the government of Japan in integrating national universities in state-economic projects. The particular form of integration in this case involved the marketization of tertiary institutions under a national, neoliberally-framed policy of *kokusaika* (Kaneko, 2004). This context provides an important general backdrop for students' practices and enculturation as L2 academic writers. In the next sub-section, the focus draws the discussion of the setting closer to the socio-cultural trajectories of the students, processes in which university entrance exams have a particularly important role.

4.2.2 The stakes in university entrance exams

One aspect of post-reform higher-education in Japan that would be familiar to Japanese university students is competitiveness, in particular from their experience of high-stakes university entrance exams. Higher education in Japan and other East Asian countries is well-known for regulating access to sites of social and economic power by the ostensibly meritocratic means of entrance exams, which are closely linked to hierarchically-ranked tertiary institutions (Ishida, 2007). Students and their families in Japan planning for the conventional trajectory towards the professional class must face

> the segregation between the educational system and the labor market. It is difficult for those who entered the labor market to return to the formal and full-time educational system. Entrance examinations to competitive universities are too demanding for those who have full-time work. Moreover, Japanese companies do not hire university and junior college graduates who are older than the normal age of graduating students (Ishida, 2007, p. 67).

Under this arrangement, the high-school student has one, perhaps two, chances at sitting for annual university entrance exams, the results of which will significantly determine future professional opportunities.

Successful examinees are likely to enter private universities. Japan's tertiary education sector is 90% private (Ishida, 2007). Important advantages of national public universities are their prestige (although some private universities are also well-ranked nationally) and the relatively low cost of tuition, which is typically half that of private universities. A brief informal exchange with another of the focal subjects in this study, Haru (first-year MA, Philosophy), is illustrative of the link between the focal institution and its entrance exams. When I asked her in conversation after writing class how the entrance exam process had been for her, then a high school student with ambitious plans for working internationally yet living on the relatively provincial island of Shikoku, she replied emphatically, "I worked really, really hard."

In these circumstances, the exam appears to take on a new meaning as a tool for understanding and organizing access to the desired social sites and positions. For example, Taka, in the testimonial quoted above, construes the application for an overseas' doctoral program as an "entrance exam" for which he must prepare. It is understandable that the cultural practice of high-stakes examining has special utility for Taka in his long-term plans not only as a culturally-shaped tool for negotiating social positions, but also one in which he has well-proven advantages.

Those high-school students who challenge and pass the entrance exams for the highly ranked national government universities enjoy the advantages of a well-known area of cooperation between educational system and the labour market: an assurance that graduates from high-ranked universities are very well-positioned for employment in the private and public sectors in Japan (Ishida, 2007; Kaneko, 2004). Haru's experience is again illustrative. Before completing her Philosophy MA specializing in Augustine Studies, Haru had already been hired by Japan's international economic development body, the Japan International Cooperation Agency (JICA).

Taka also stood a very good chance of achieving his aim – noted in his needs analysis survey – of "a job at a government organization or an international organization one of these days". Taka's intention was to work first after completing his MA and, "in due course", enter a doctoral program. Since completing an undergraduate degree at the national university in focus,

relative to graduates from most other universities, Taka had good alternatives for where and when he would enter the labour market.

The question arises about the professional lives of the two other focal subjects, Sotty (first year MA, Bioethics) and Yoshi (fourth year BA, International Economics). Sotty was immersed in academia itself: a paper proposal of Sotty's had been accepted for presentation at the annual meeting of the Asian Bioethics Association. For him, a specific aim for Writing I was to improve his chances of publishing the paper. Like Haru, Yoshi had also arranged employment before graduating, in his case as a junior consultant with a major international investment bank. In these ways, competition is observed to have an established role in maintaining Japanese social, economic and political order through university entrance exams. This phenomenon is combined in the present research setting with the national policy-led role of competition playing out in the new economics of Japanese higher education.

The data for the focal participants do not encompass socio-economic background; such data would likely have provided insights into the mechanisms of social stratification associated with this higher education context (Ishida, 2007; Bernstein, 1990). While this is not the focus of the study, it does bear relevance for the context. Notably, the questions raised by socio-economic background are useful here as a caution against an idealized understanding of entrance exams in the hierarchical organization of the higher education system in Japan as tools of some kind of just meritocracy.

The focal subjects selected for this study are Japanese (for details of participant recruitment see Section 4.3.2); however, international students represented a significant portion of the students in the Writing I class, at 35%, which was typical. While a few of the international students were self-supporting in their undergraduate or graduate studies, the large majority at the focal institution were recipients of Japanese government scholarships, which are offered to promising students most often from 'emerging' economies. As such the scholarship program accords with the tenets of *kokusaika* (also, it was not unusual and seemed *de rigueur* for international graduates to conduct comparative social research between their countries and Japan). These students typically arrive in Japan with some Japanese language ability, and are enrolled in rigorous studies of Japanese language for up to one year. Before the end of the first year in Japan, they must take a Japanese language exam. The basic arrangement is that the higher their score in the Japanese language exam, the wider their choice of university to which they can

apply the scholarship. Thus, these exams limit access to the highest-ranking universities in a similar way to the university entrance exam, but with a focus on Japanese language. The international students who arrive for orientation in Writing I, were, like their Japanese peers, highly successful students, but with the additional distinction of meeting requirements for tertiary study in two additional languages, English and Japanese.

This context raises the question of quality of tertiary learning in view of what Kitamura (1979) calls the "iron law of educational growth" (p. 68), which states that as certification standards rise in the market, the value of successive levels of secondary and tertiary education decreases. McVeigh (2005) asserts that, as a result of this relationship, "schooling, especially at the institutional apex of higher education, loses its character of learning" (p. 90) and becomes "credentialing" (Dore, 1976, p. 8, quoted in McVeigh, 2005). It seems fair to consider the possibility of this sequence of implications operating in the focal university. As indicated above, in Japan, a degree from the focal university implies a great deal more than the attainment of specialized knowledge. Furthermore, it might almost seem as if the knowledge itself is secondary, especially in view of the common statement about tertiary education in Japan that while getting into university may be difficult, graduating is easy (McVeigh, 2002).

However, the evidence for this context presents a far more complex picture. Evidence from students' needs analysis – including intuitive understanding of the demands of the social roles to which they aspire as cosmopolitan professionals in, for example, international financial and development organizations – indicates socio-semantic dispositions integrating high levels of credential-supported positioning *and* keen interest in furthering already specialized understandings of the social world. This claim is also borne out in my experience as an instructor for four and half years at the same institution before the data collection period. The students generally managed large, sometimes enormous, course loads in their respective programs. Many also held part-time jobs. My experience also predicted that the students would generally be dedicated to their studies, including to Writing I, despite its brevity and correspondingly low relative credit value.

4.3 Data collection

This section presents the data collection process, beginning with a report on my positioning as researcher and instructor. My positioning is centrally relevant to participant

recruitment, case study selection and data collection. The description of my positioning is followed by a report on the kinds of data that were collected and how they were collected. At the end of this section is a more detailed description of the four focal participants. The chapter returns to the writing course in the final section to describe the syllabus and the especially salient aspects of writing instruction in this context.

4.3.1 Researcher positioning

As noted above, I had a dual role in this study as the researcher and the instructor whose writing course was under investigation. This dual positioning brings advantages and challenges to the study. Before discussing these, I would like to present key aspects of my motivation for choosing this site and the early history of the study. My experiences as an EAP writing instructor and my reviews of the research led to a strong interest in GM; this was long before the development of the nominal density instrument, which arose in the course of the study. As a researcher, I came to appreciate the value of GM for understanding knowledge construction and the challenges faced by L2 writers in its use. As an EAP instructor, I informally observed the value of GM study in supporting learners' scholarly interests and their writing; in the same capacity, I found a severe lack of instructional resources on GM use. Part of these experiences included a growing appreciation of the role of GM in clarifying underlying gaps in students' mediating resources for writing academically. These observations accord with the finding from the literature review of a lack of research in this area.

I resolved to research how L2 apprentice scholars use GM in their academic writing. For personal and scholarly reasons, the preferred context for a study of GM would be the writing of apprentice Japanese L2 scholars in a research university in Japan. In this I sought some continuity with the research conducted for my MA thesis, which concerned English for Specific Purposes (ESP) in a Japanese university. Another aspect of the continuity with my MA thesis is the use of social semiotics, the wider theory in which SFL is situated. My MA thesis concerned Japanese students' use of visual semiotic resources in tourism brochures produced in an ESP course, English for Tourism Professionals (Ferreira, 2007). While I wanted to continue within social semiotics, I was interested in expanding my use of the *linguistic* theory in teaching and

research. This focus was also encouraged by my primary academic supervisor, Dr. Geoff Williams.

I spent three months looking for a suitable instructional context in the Tokyo area, that is, a research-based academic writing course in a research university. Efforts included postings on websites of The Japan Association for Language Teaching (JALT) special interest groups (SIGs), conference networking, and contacting individual instructors who I had learned from the literature might be involved in such institutional and curricular contexts. At the time I sought to collect data both on the students' writing and the writing instruction, including instructor feedback. For the two potential instructors who expressed initial interest, the latter proved to be an obstacle. However, an additional hurdle for one of them was his discomfort with the potentially unfamiliar process of seeking ethical approval for data collection in his institution where he was a part-time instructor. With deadlines looming for a research proposal, I eventually settled on a convenience sample, electing to carry out the research in my own instructional context.

The main advantage of my dual positioning as the researcher and instructor is that it reasserts the dialectic relationship between theory and practice, and thus between research and teaching. As Widdowson (1990) points out, the traditional separation of research and teaching positions language teachers as "consumers of findings" and this "denies the nature of teaching as a domain of theory and research in its own right" (p. 47). Conversely, we are also increasingly sensitive to the benefits of treating the research site as more than an instrument of the research, and recognizing the research site and research work as sites of social practice (e.g., Gibbons, 2006; Talmy, 2011).

The research benefitted from my familiarity with the setting as the course instructor. As indicated above, I brought to the research site almost five years of teaching and curriculum development experience in the context of the study. Conversely, my instruction benefitted from the extended understanding of the links between language, writing, learning and context that comes with a project such as this. It is my strong hope, furthermore, that the contextualizing, theorizing and detailing of students' writing practices in this study will contribute to improving instruction in EAP writing and beyond.

A well-recognized potential problem in participant-observer research is that observation can take precedence over participation in any number of ways (e.g., Denzin, 1997; Freebody,

2003). However, appropriate cautions (detailed below) were taken not to allow my research activities to compromise my teaching or the experiences of the students in the course. These steps contributed to the approval of data collection by the university ethics board with only minor changes to the initial application. The research was carried out in accordance with the approved ethics application. The exception to this was the planned preliminary member check of initial findings that was to occur several months after the initial data analysis. Shortly after the writing course ended and all primary data had been collected, successive large-scale disasters (earthquake, tsunami and radiation leaks from damaged nuclear reactors) struck Japan, disrupting priorities in much of the country.

The crucial feature in the recruitment of student participants, especially in relation to my position as both instructor and researcher, was that I had no knowledge until well after the end of the course about which students had or had not agreed to participate (or indeed whether any students had agreed to do so). The students who attended the orientation for the Writing I course were informed of the research project, including these data collection procedures. Within the first week of classes, the registered students decided whether or not to participate in the study, submitting their consent forms to a locked box at the Graduate School of Economics office in an administrative building distant from my office and classrooms. Administrative staff gave me the consent forms signed by students after I had submitted the grades, two weeks following the end of the course. As noted below, at that time, I learned that 17 registered students filled out consent forms. Of these, 15 students had consented to participate. (It was common practice to allow two additional students to register, given that this was the average number of students who dropped the course early.)

Other important measures were taken to ensure that the research would not interfere with instruction or the students' experiences in the course. Specifically, steps were taken to ensure that my power as instructor would not be abused for the purposes of the research. As the research would focus on text analysis of the students' writing itself, the study was designed not to rely on research-focused interviews of the focal subjects. Although the use of interview data was considered, for this research assistants would have been the appropriate methodological choice. However, there was a risk that research assistants would be perceived by students as proxies to the instructor and thus potentially threaten my relationship with the students as their instructor. The fact that I did not know which, if any, students were going to participate also

precluded conducting interviews. My goal was to conduct the course in the same general manner as I had in the previous iterations, engaging in what had become for me familiar forms of social and instructional interactions in this course, including the dialogic practices and footings of an engaged and reflective EAP instructor who gathers information about instruction and student practice (Coffin & Donahue, 2014).

4.3.2 Participant recruitment in the Writing I course

In Section 4.2, competition was identified as operating at various levels in this context. Competition is also relevant for subject recruitment due to the limited number of spaces available in the Writing I course, a matter which is also relevant to my roles as instructor and researcher. The immediate setting of the research is a foundational, one-term, multidisciplinary EAP writing course that was cross-listed by the Graduate School of Economics for senior undergraduate and graduate students in the social sciences and humanities (that is, for all the university's faculties; the university has no science faculty). As indicated above, the aims of the course were to support students' writing and scholarship in their respective fields. Due to the large workload for writing instructors, particularly the workload involved in providing individualized feedback, the class size was limited to approximately 15 students. With this being the single research-based, English language writing course available in the university, only one instructor to teach the course, and only a single section available each term (twice a year), the demand for the course was high such that every term there were more applicants than spaces. The students' general interest in gaining research-based writing experience can be appreciated in a statement made by Haru, the philosophy student. She wrote in her pre-course needs analysis survey of the difficult circumstance of wanting to undertake doctoral studies abroad but not finding the English language support to prepare her for this: "Unfortunately, since I have been here at [university], I have had almost no opportunity to develop my English writing". Haru's experience of wanting but not finding institutional support for L2 academic English writing development is unfortunately common among Japanese university students (Yasuda, 2014).

The first function of the needs analysis survey, which was collected from all students who wanted to register after they attended the first day orientation class, was for me to select the students who would be invited (by administrative staff of the Graduate School of Economics) to register. It was for this reason that the needs analysis survey is to be read with some care

especially in relation to social positioning. With this caution in place, it must also be said that I never found reason to suspect that any students misrepresented themselves; many, in fact, were very frank about their limitations: "I intend to do job-hunting… so I might not be able to attend class" (Taka); "…although my thesis will be in Japanese" (Naz). Still, as academic writing, these texts – as demonstrated by these very brief samples – do nonetheless tend to show some personalization relative to the in-course assignments that the students wrote.

When I first began teaching Writing I at the Graduate School, I was provided with a single criterion for selecting which students from among the applicants would be invited to register: graduate students in Economics were to be given priority. However, with the direction and advice of other faculty, I soon developed this criterion into a somewhat more formal list. English language proficiency was not to be accounted for as all students were deemed by the Graduate School to have the minimum required proficiency to undertake the course. Although some admitted students clearly needed much better preparation to benefit from the course (and others were already highly proficient), the general direction I received was to support all students' academic language needs at the level appropriate for their proficiency and discipline, including to the level of publication. At the time of data collection, the general order of priority for placement in Writing I was as follows:

1. PhD Candidates, Economics
2. 5-year MA, Economics
3. Other graduate students, Economics
4. 5-year MA, other faculties
5. PhD Candidates, other faculties
6. Honors BA students, Economics
7. Other graduate students, other faculties
8. 4th-year BA students, Economics
9. 3rd-year BA students, Economics
10. Honors & 4th-year BA students, other faculties

In this list, one group stands out as having a relative advantage in the placement: the 5-year MA students (ranked second in the list above). These were students in a faster-track program in which both BA and MA could be completed within 5 years. I was (gently) encouraged to accommodate these students by my immediate superior, the international economics professor.

The Graduate School aimed to attract and accommodate 5-year MAs in accordance with the national and international promotion of this new program by the Graduate School and the university. The program especially targeted international students, who, as noted, comprised about one-third of the Writing I classes. As it happened, because the program was very new, few 5-year MAs applied for the course and none in the data collection period. The special attention given to this MA program in the EAP courses shows, from another perspective, the role of EAP programming in the Graduate School of Economics' programs of internationalization and marketization. Another aspect of English language associated with the university's marketization that was becoming increasingly common at the university and especially in the Graduate School of Economics was English language-medium content instruction, including by Japanese faculty. Although the percentage of courses offered in English was low (about 5%), this was considered (and feared by some faculty) as a growing trend. (Especially in the locally dominant paradigm of mathematical economics, much of the research is published in English, and, according to students, even in courses held in Japanese, English language was used in interaction about the more mathematical sections of papers, presentations and discussions.)

It is typical in Japanese universities for the first day of optional courses to be given to orientation. In high-demand courses such as Writing I, this orientation class was typically broken up into two halves so that two orientations could be provided for the large number of students attending. Approximately 36 students, mostly undergraduate, applied for the course in the data collection term. All 17 of the students who were invited to register registered. Table 4.1 shows a list of the 15 students who (I learned after the data collection period had ended) had agreed to participate in the study. The basic description includes pseudonym (self-selected, with short names requested), academic discipline, academic program and year, country of origin, and career goal. The order is the order in which their applications/needs analyses were received; the pseudonyms of the four focal students are shown in bold italics.

As can be seen, among the eligible focal subjects for the research, there is roughly an even division between undergraduate and graduate students, with just over a third of the students in economics, and the others from other social sciences and humanities fields. Just over a third of the students were international. Additionally, just over half the students expressed the intention of pursuing a career in research/teaching, with the remainder mainly distributed between working in business and government. According to my past experience teaching this course, this

distribution was typical except for the absence of any economics PhD students and students from Eastern Europe or Central Asia (besides Mongolia). Also, it was novel for me to work with humanities students.

Table 4.1. Basic profile of students registered in Writing I

	Students of Writing I	Discipline	Program/ Year	Country of origin	Career Goal
1	***Taka***	***Development Economics***	***MA/1***	***Japan***	***Research***
2	***Yoshi***	***International Economics***	***BA/4***	***Japan***	***Research***
3	Naz	Law	BA/4	*Japan*	Business
4	Bachi	International Economics	MA/1	Mongolia	*Research*
5	Ant	Commerce/Marketing	PhD/2	Taiwan	*Research*
6	Mokoto	Sociology	MA/1	*Japan*	*Research*
7	***Haru***	***Philosophy/Augustine Studies***	***MA/1***	***Japan***	***Research***
8	Akomi	Law	BA/3	*Japan*	Govern't
9	Zaki	International Economics	BA/4	*Japan*	Govern't
10	Dheera	Public Policy	MA/2	Thailand	Govern't
11	Kim Li	Economics	MA/2	Korea	Business
12	Sunny	Journalism	BA/4	China	*Research*
13	***Sotty***	***Bioethics***	***MA/1***	***Japan***	***Research***
14	Suki	Economics	BA/3	*Japan*	Business
15	Chanman	Commerce	BA/4	Mongolia	Not sure

4.3.3 Selection of focal participants

To investigate the use of GM by apprentice L2 academic writers, I sought four participants. The number was kept low in order to allow for comprehensive analysis of GM across drafts of the students' writing assignments. The process of their selection from the above 15 potential participants shown in Table 4.1 is described in this section. The study's focus on one resource for mediating meaning in academic writing, GM, presented an opportunity for some grouping of the subjects by controlling for variables in their selection. These variables are students' long-term career goal, first language, and discipline.

The primary criterion for selecting cases for the study of the use of GM in the writing was the students' commitment to academic research in their field. This information was available

in students' response to the needs analysis question about their career plans: "What is your career preference, if any? e.g.: research/teach; business; government; not sure; other/describe". Because of the particular relevance of GM in research writing, those students planning academic careers as researchers were considered the preferred subjects. When this criterion is applied to the list of students in Table 4.1, the list of possible subjects is narrowed from fifteen to eight.

Another criterion was first language. In order to focus the study, I sought participants with the same first language. The theories of language, mind and culture in play (Halliday & Matthiessen, 1999; Hasan, 2005/1995; Vygotsky, 1978) would predict that L2 writers with the same L1 are more likely to use GM in similar ways to each other than L2 writers with different L1s. Also, given the make-up of the Writing I class as well as my past research commitment to L1 Japanese learners of English for specific purposes (Ferreira, 2007), the focal group would ideally be Japanese L1 users. Of those eight eligible students planning careers as researchers, five are Japanese L1 speakers.

A final criterion was the academic discipline of the focal apprentice scholars. This criterion is explained by what is known about the relationship between disciplinary discourse and profiles of GM use. The disciplinary discourses are understood in the context of the EAP course to be recontextualized for non-expert readers (mainly myself, as the writing course instructor); rather than posit the writing as in some way 'less than' or inauthentic in its disciplinarity, this aspect of the context adds interest by presenting disciplinary discourses in a context in which the regulation of GM and abstraction in context is well tested. Of the five remaining eligible students registered in Writing I, two were in economics, while sociology, philosophy and bioethics were represented by one student each.

From the eligible students, two groups emerged: the two economics students, Yoshi and Taka, formed one group of apprentice mathematical economists; and the philosophy and bioethics students, Haru and Sotty, formed a group of apprentice humanities scholars. This selection has the benefit of including two broad disciplinary fields that occupy roughly separate locations on the continuum of academic knowledge (as shown in Figure 3.4). The selection makes it possible to predict roles for GM in construing what is typically more dispersed, argumentative, explicitly interpretive and epistemologically fluid knowledge in the humanities and, on the other hand, more cumulative, objectivist, quantitative, and procedural knowledge in economics. By these means, the four focal subjects were selected. This does result in some

unevenness in the selection of cases with respect to educational attainment (three first-year MAs and one fourth-year BA (but see below)), gender (one female and three males), and end-of-course grade (one A, two A-s, and a B, which is higher than the class average of between B and B+). Of course these differences hardly begin to account for the uniqueness of these students and their experiences in the course, even as they collectively fulfill some general criteria in focusing the study of GM use in L2 academic writing. The four focal subjects are introduced in greater detail after the presentation of the data collected.

4.4 Focal participants and data collected

This section aims to provide additional background and contextual information about the

Table 4.2. Academic writing profiles of focal participants from needs analysis

Name	Discipline	Biggest Achievement in Writing	Challenge Writing in English	Other Reason for Taking Writing I	TOEFL/ IELTS
Taka	Development Economics	Graduating BA "thesis" in development economics in Japanese	"writing English version of MA thesis"; "planning for PhD overseas"	To get specific feedback on writing; "attracted to the feedback system of this course"	[None noted]
	Mathematical Economics				
Yoshi	International Economics	[None noted]	"Due to poor word choice, writing is confusing to readers"	To help convey opinions; "apply knowledge of writing in English to writing in my first language"	[None noted]
Haru	Philosophy	BA graduating paper on Character Education in Japan; wrote philosophy papers on music, Kant, in L1; wrote paper in English on Shakespeare (read in the original)	Understand & use "delicate academic terms, incl Latin/ Greek meanings"; "keep logic, coherency and elaborateness in long papers"	Planning for PhD in the US; applying for Fulbright Scholarship	TOEFL IBT 79; "not a good score; no time to prepare"
	Humanities				
Sotty	Bioethics	"It would be a notable achievement if my research paper written in English is published in prestigious journal…"	"The writing style in English is completely different from that in Japanese. Hence, I, as a researcher, need to learn how to write & organize a paper systematically in English."	Hope to work for UNESCO; presenting at a conference; "I'm going to write a paper on AID, Artificial Insemination by Donor, which will be published next year"	TOEFL IBT 78

focal participants as well as the data collected from them and the context. The four focal students' responses to questions in key areas of the survey are presented schematically in Table 4.2. Most of the information is summarized but some direct quotes are kept; the relative space and number of words used in each participant's row in the table reflects the relative amount of information given by the student in the survey. As can be seen, the humanities students provided more information than their peers in economics. The needs survey itself is available in Appendix 2.

The introduction to each participant combines information from Table 4.2 with other background and contextual information that emerges from the supplementary data. The aim of these descriptions is to provide a background for the focus of the study, the four students' use of GM.

4.4.1 Sotty

As indicated in Table 4.2, Sotty apparently misunderstood the needs survey question about students' highest achievements in writing in any language as a question about his future achievement. Sotty's answer is telling nonetheless about where he was in his trajectory as a junior bioethics scholar at the beginning of the writing course. His wish to write for a prestigious journal was reasonable given that his proposal to present a paper on the ethics of artificial insemination by donor (AID) in Japan had recently been accepted by a major regional bioethics conference taking place in Taiwan. During the Writing I course he was also preparing the paper for the proceedings. AID is thus a main topic in his course writing assignments. This immediate need may be related to the fact that Sotty was the only student who attended office hours with me, which he did three times, at which time we focused on the writing in his presentation slides and a paper for the proceedings. This degree of engagement and productivity in the core professional research activities of his field is unique among participants. The needs analysis indicated that Sotty, like the other three participants, was managing a full course load while taking Writing I.

Given Sotty's activities, it is somewhat paradoxical that he was also the only student among the study participants who received a B grade (B+) in the Writing I course (the others received A's). His writing showed commitment to his apprenticeship and contributions in

bioethics but the weaker aspects of his writing improved relatively little during the course. There was confused exposition, and more often, a lack of support in his arguments, a point also made by the reader in ethics (discussed below). An example emerges from a discrepancy noted between arguments for his position provided in his course writings and the needs analysis survey. Sotty's course writings in bioethics did not include, or left highly implicit, a key aspect of the rationale for the ethical positions he takes, that his research sought to develop and disseminate bioethical arguments based on cultural values that he identified as specifically Japanese; however, this clarification of his arguments emerged clearly from the needs survey, in his response to questions about disciplinary interests. Thus, a problem emerges in how explicitly Sotty sets up his arguments for readers. This observation accords with the challenge he identifies in English writing, as shown in Table 4.2, that academic writing in English and Japanese differs, especially in terms of organization and clarity of exposition. The fact that he identified challenges negotiating academic rhetoric interculturally suggests the potential for longer-term development.

The concern for these contrasting rhetorics has parallels with Sotty's interest in contributing to a Japanese bioethics. In this aspect, his work is in alignment with a tenet of the culturally dichotomizing discourse of *kokusaika,* that the internationalized Japanese scholar should export cultural practices identified as uniquely Japanese. In describing his past research experience in the needs analysis, Sotty "concluded that American-born bioethical approach based on a principle like autonomy would not be applied to Japanese society."

The final drafts of two of Sotty's main writing assignments were read by an experienced reader, a senior PhD Candidate in philosophy with knowledge of ethics (the same reader provided an assessment of the writing of Haru, the apprentice philosopher). The reader assessed the level of apprenticeship in bioethics shown in Sotty's final drafts as being at an early undergraduate level. Two comments on Sotty's final drafts of the extended definition text and problem-solution text are telling:

> This immediately comes across as un-apprenticed. What is or is not a main principle is, in many ways, contextually determined. Also the "is considered" without saying "by whom" is a flag for me.

> The very first sentence identifies this person as a disciplinary outsider. An insider would make the thesis statement more precise by explaining, up front, why it plays the role. (eg., "by making the wishes of a patient known, a living will represents the voice of the patient in bioethical decision making".)

An interesting link arises from the reader's correction of what is missing in Sotty's draft, especially "a living will represents the voice of the patient in bioethical decision making". Here the reader appears to pick up on how Sotty wants to position himself and his work; this information is provided by Sotty, but, again, in his *needs analysis*: "My job, as a researcher, is to listen to the disadvantaged, to raise those people's voice and to verbalize it to the public". The reader also identifies problems with referencing and potential "filler" (i.e., lack of focus, coherence). As flagged by both Sotty and the reader, organization is a problem.

However, the reader does identify some improvement in Sotty's argumentation in the later text, although the arguments remain at times "thin". The reader acknowledges also that the short length of the text significantly limits the depth of argumentation. These observations about Sotty's apprenticeship in his writing naturally also raise questions about the instruction – my instruction – that Sotty received in the course. For example, had I better linked the information Sotty had provided in his needs analysis with the challenges observed in his course writing, I could have provided more effective instruction in these areas.

4.4.2 Haru

The other focal writing student in the humanities is Haru, a 1st year MA student in philosophy who had a range of intersecting interests in philosophy, religious studies, sociology of religion, and literary and music studies. Like Sotty, she expressed interest in applying herself professionally to social welfare; as noted above, she realized this interest by getting a job in international development. Among the four focal subjects, Haru was the only one who had studied English abroad before taking Writing I. She brought to class one day the syllabus of a rigorous, ESP-based, research-based academic writing course she had taken in a New Zealand college. During the Writing I course, she showed adeptness in applying functional linguistic tools and metalanguage to her writing; for example, in a note on her third revision of the

extended definition text, she wrote: “About the whole text, I reviewed the Theme-New connection and considered thematic patterns much carefully than in Def 2”.

Generally, Haru demonstrated confidence, ambitiousness, and a diplomatic, critical stance in her classroom interactions; for example, in discussing some feedback I had given on her writing in class, she said, “I understood what you mean and it’ll help but… I felt your comments could be more encouraging”. In these ways, Haru demonstrated a refreshing degree of assertiveness and critical engagement in the Writing I course classroom.

These observations indicate Haru’s intellectual commitment and sophistication. She wrote on such topics as Augustine’s illumination epistemology and the populist Christian evangelical movement in the U.S. For her work in the course she received an A. Her writing – already relatively strong at the beginning – showed improvement as the course progressed. This assessment accords with that of the philosophy reader, who assessed the first, extended definition text as follows:

> Good. This is a well-apprenticed bit of writing. It is a bit abrupt in beginning and end, I am assuming because of space considerations…. I'd guess this is a 4th year philosophy major, and is compatible with someone who could go to grad school (I'd need a larger sample to say with more certainty).

About the second and final text, the philosophy reader wrote, “This strikes me as a first year grad in philosophy paper, perhaps near the end of term”. Haru’s writing, according to the reader, shows improvement; it also shows that she understands what is expected in philosophical arguments. As such, the writing indicates that she is well advanced in the process of academic enculturation. A weakness identified by the reader, and this also resonated with me when I read his comment, is presented as follows:

> But seems more focused on sounding smart than making clear arguments. Here, the main problem is one of vagueness – sweeping claims with ambiguous meaning that is not clarified. There is some sophistication here with language, but used in a way that philosophy actually tries to train people against – making vague arguments whose

strength is in the confidence in the way they are voiced, rather than the structure and appeals to solid evidence or rationale.

As with Sotty, Haru appeared to understand key aspects of her challenges, as she wrote in her needs analysis survey of the challenge she experiences to "keep logic, coherency and elaborateness in long papers". However, Haru did not list difficulties with argumentation (noted by the reader) as a challenge. A different challenge she identified was to "understand philosophical terms in English more precisely (or Latin/Greek ↔ English), to expand academic writing vocabulary and be good at choosing them".

The writing of Haru and Sotty show not only that they had different disciplinary interests within the humanities, but also that, in their respective disciplines, their writing in English was at different levels of development. The paradox is that while Sotty, with less well-apprenticed writing, was actively engaged with his disciplinary community beyond the university through conference participation and publication, thus enacting a public identity as a bioethicist. Haru's academic engagements were more local and circumscribed in their claims to contributing to the field.

4.4.3 Taka

Taka was in his first year MA studying development economics. The overall impression from Taka was of a dedicated graduate student with ambitious plans for overseas' doctoral research who worked in a relatively insular and quiet way in and out of class. In my notes for the sixth week of classes, I mentioned Taka's continuing unease in presenting his homework task to the whole class, even after others had presented. This may be associated with Taka's relatively low level of fluency in spoken English; compared to the speech of many students in the class, his tended to be hesitant and contained a relatively high number of basic syntactic errors such as in subject-verb agreement. A similar proportion of errors occur in his writing, even as the economics is well-construed ideationally and interpersonally (see Chapters 6 and 7). Although he did not identify in his needs analysis any specific areas of weakness in his writing, he valued the opportunity for individual attention. As noted in Table 4.2, one of the reasons Taka provided for taking the course is "that I am attracted to the feed back system of this course".

It would therefore appear that Taka was oriented to working on his writing independently with the instructor and instruction. One of the challenges that he expressed during and after the course was with understanding and using recontextualized linguistic metalanguage for analyzing writing; he expressed this twice in writing, specifically in notes on revisions after instructional feedback, rather than in questions in class, when these terms were introduced, discussed and practiced in groups. For example, commenting on the revision of his data commentary, he wrote: "I have not been able to understand the use of social positioning here so have not revised for it." It is also noted that, unlike several of the students in development economics that I had worked with, Taka had not undertaken any field studies to developing countries (especially in south-east Africa). Nor had Taka undertaken study abroad before Writing I. There are suggestions then of Taka being the more insular kind of economics graduate student for which the focal university was known.

While Taka's writing throughout the course consistently showed gaps in some basic features such as the construal of highly specific entities in nominal groups, and perhaps more than any other student in the class he expressed uncertainty about the meaning and use of technical pedagogical metalanguage, his writing showed improvement in important areas such as organization and logical reasoning. Also, as he had continued in development economics from work in this area as an undergraduate student, his commitment to the field was very evident.

This assessment of Taka's writing accords in several ways with that of the expert reader in economics. The reader made a couple of brief comments in Taka's texts and summarized his thoughts on the two writing assignments as follows:

> The two pieces show that this student is familiar with the way empirical economists set up their papers. There is clear rationale for the research that he proposes and from there he reasons out the specific study. The writer makes a subtle point in the first piece [extended definition] when he takes steps to correct for econometric methods that can potentially be manipulated to yield preferred results. This adjustment shows his interest in finding out what's really going on rather than squaring off the data to fit the stats. In econometrics, if a method is open to manipulation, this is a liability, not an advantage. The fact that he recognizes this and tries to correct for it is a sign of an empirical economist expecting close scrutiny from readers… so he dots his i's so to speak.

> His level of apprenticeship - he could be later undergrad or graduate level. He has potential as an academic economist from what I can make out from these short pieces. But the lack of any econometrics makes this difficult to assess. All I can really assess are general aspects like how he sets up the paper, how he's cautious in the methods, etc. Another source of difficulty in assessing this writing are [sic] the problems with grammar and spelling. I know the writer is an ESL student and as a TA I typically let trivial errors go but this writer should get help in these areas before he submits his papers, even for an undergraduate course if he wants a sympathetic reading. A simple spell checker would be a good start.

Thus the economics reader concords with my assessments as an EAP instructor that Taka's academic ideas were well-construed but that the frequency of errors was costly. Several additional points of interest arise from this commentary. These include the observations of Taka's participation in a community of economics practitioners with appropriately rigorous ethical standards. Taka's level of apprenticeship was also correctly identified from the writing. Additionally, in his comments, the economist recognized the distinction between the problems of expression associated with gaps in the lexicogrammatical foundations of Taka's English and the valued economic ideas advanced in the writing.

4.4.4 Yoshi

In important ways, Yoshi's participation in class contrasts with Taka's. In addition to a quick intellect, Yoshi had an upbeat and outgoing attitude. He participated comfortably in class activities to an extent similar to Haru. Despite some issues in his wording choices as well as his status as an undergraduate student, he asked questions, challenged positions, and presented his ideas with relative ease compared to most of his peers, even the more senior ones. Another aspect of Yoshi's participation that contrasts with Taka's is that he used the pedagogical metalanguage relatively frequently, comfortably and productively.

It was easy to appreciate how he came to be employed by a major international investment bank around the time of the Writing I course. Yoshi was being guided in his BA graduating project by a close colleague of my superior in the Graduate School, another well-

known international economist in Japan who published regularly in English in well-regarded international economics journals; together the two economists were known as the core of what might be called the internationalizing contingent of professors in the Graduate School, in charge, for example, of managing the EAP program. Yoshi told me early in the course that he had been advised to take the course, adding that he did not need to be persuaded because, as he said, "This is what I want to do since my sophomore year, economics research." Like his advisor, Yoshi focused on international economics.

With respect to this discourse, Yoshi makes an interesting effort to localize the theoretical discourse in a way that accords with *kokusaika*. In his presentation of an abstract model of investment behaviour, he posits a "Japanese investor" taking action. In my feedback, I mentioned that there was nothing in his model that indicated the relevance of the nationality of the investor; however, in what may be considered a small move to ensure the research was identifiably Japanese and thus engaging, knowingly or otherwise, in accordance with *kokusaika*, he retained that adjective even in the final draft. These efforts stand out for taking place in what is, among the fields studied by the four focal students, the least 'localized' body of scholarship. On a related note, in his brief needs report, Yoshi explained that he hoped to apply what he learned about academic writing in Writing I in English to writing in his first language.

Yoshi's orientation to knowledge about language as a resource for meaning-making emerged at various points in his comments on assignment revisions, classroom discussion, and, very notably, his post-course reflection. Some of his comments in the latter about the limitations of the instructor feedback indicate that, during the course, he had found new footing in self-regulating his meaning-making practice in writing. Responding to a question in the survey about students' "usual revising processes for the course writings", Yoshi wrote,

> I am regretted that I focused too much on revising the parts the teacher commented because there were still rooms for improving the problem of CONTENT and ORGANIZATION, which I failed to taking into account.

An important implication of this statement for our understanding of Yoshi as a recontextualizer of international economics within the L2 academic writing course is the primary role he ascribed to the meanings he wished to convey, as well as his recognition of the writing instructor's limited

access to those meanings. The statement also shows the relevance of the pedagogical metalanguage in his ability to identify and refine what he meant in his writing. A paradox that arises is how his recognition and parsing of the limitations of instructional feedback is enabled by the foundational instructional metalanguage. This paradox can be partially explained by the scope of intellectual tools provided to the students for mediating their academic engagements, whereby localized interventions such as instructor feedback become the subject of conscious reflection, which productively differentiates areas of focus by means of a foundational instructional metalanguage that is brought to bear implicitly, functioning in the background. (This discussion informs about Yoshi's processes but also feeds directly back into the study of GM, especially this study, which has problematized the treatment of metaphorically-derived metalanguage that has become socially and intellectually naturalized as dead metaphor, as noted in Chapter 5; the point is taken up again in the Chapter 8.)

As with Taka's writing, Yoshi's writing shows familiarity with the conventions for construing valued economic knowledge in his field. This, in combination with a satisfactory lexicogrammatical base, meant that the challenges he faced were those typical of more advanced writers at the more delicate levels of language use (Matthiessen, 2006); for example, with lexis. Indeed, as shown in Table 4.2, Yoshi identified this as a challenge in his needs analysis, "poor word choice". He also wrote that he would like help conveying his opinions; however, he often presented his arguments in interpersonally subtle and mature ways. An area where I, as his instructor, identified a potential for improvement was in the use of explicit, speech-like reasoning where the reasoning can be expressed more concisely by being nominalized. It was noted that, at times, Yoshi may have stayed too close to the conventions of writing mathematical economics in economics writing without mathematics (i.e., for non-economists); in this case perhaps more than in others, it is the recontextualizing and re-mediating of the economics that becomes the challenge, one that may also be considered representative of an advanced learner.

The economics reader's comments on Yoshi's writing were generally positive. Except for some brief comments made within the texts, the following comment presents the economist's assessment:

> Both pieces of writing indicate that this writer is well on his way in undertaking serious economics research. The writing indicates familiarity with conventions for setting up a

> theoretical model, including intuitions and assumptions. It is easy for me to follow. The writing makes sense and nothing in it doesn't make sense – there are no wasted words or confusing digressions. The lack of ticks and fluff is an achievement in itself. The pieces suggest to me that this writer is a graduate student. But in this case, even more than in the case of the development economist, it is difficult to tell because of the lack of a formal [i.e., mathematical] statement of the model. As the writer himself indicated, the definition of the concept is intuitive and therefore formally incomplete. So I have to go on the general presentation of the problem and the model, which look familiar. As an ESL writer, he makes some errors, most of which are trivial but his writing would stand up better in grad school if it were error-free.

Despite the difficulty of assessing the economics ideas construed without the central theoretic tool of mathematics, the reader places Yoshi's recontextualized economics writing at a level of apprenticeship above his actual level of senior BA. He also indicates the potential cost of the errors in Yoshi's writing to the successful take-up of his ideas in graduate school.

In the comment on Yoshi's framing of the definition of an economic term as "intuitive", the reader also draws attention to what can be considered a subtle and strategic approach taken by Yoshi in recontextualizing mathematical economics for non-experts. In his definition text, "Intuitive Definition of 'Portfolio Approach': An Extended Definition Text (Draft 3)", Yoshi took care to frame the definition in terms that would be sensible to non-expert readers. Yet, rhetorically, the aim of communicating an intuitive definition was clearly unsatisfactory for Yoshi. Attached to the second draft of this assignment was the following comment:

> I added 'intuitive' in the title because the definition in this text is indeed intuitive, and I want to briefly introduce the mathematical definition as a hyper-new [i.e., closing distillation]. Is [Does] it work?

Thus, Yoshi chose to close the extended definition by acknowledging expectations for such definitions within his field (directing readers to the formal, mathematical model). In this way, the text not only orients readers to a concept in his field, but also leaves them with direction in what Yoshi evaluates as a more principled apprenticeship in neoclassical economics.

This revision of the title and hyper-new elements of the text, which Yoshiyuki undertook with the help of new, instructed knowledge about language and writing but independently of instructor feedback, reflects the kinds of initiative that he would later express regret about not taking more often. Yoshi's question and revision in his draft accord closely with the views of the economics reader (which were not shared with students), which is further testament to Yoshi's academic enculturation. As apprentice economists working within the mainstream paradigm, they also share an understanding about the specificity of this particular writing assignment relative to the disciplinary practices they have in common.

A closing observation about these developments concerns their relevance to our understanding of the various uses of abstraction in play in this context. These include the relevance of abstraction in regulating disciplinary specificity through choices of either linguistic or mathematical mediation as well as for regulating the processes of writing and revising through abstract grammatical concepts.

4.5 Data collected

Data collection took place almost entirely within the duration of the course, although it did include some informal discussions with subjects after the end of the course and the results of university-administered survey of students about the course. The data collected also includes numerous sources, including my notes and recollections of the previous four and half years of teaching EAP at the institution. Table 4.3 provides a summary of the data. The top row shows the core data, which comprise the students' pre-course writing task and multiple drafts of their three written assignments. Only the writing of the four focal subjects was analyzed for GM and nominal density. Before being analyzed for GM and being sent to the expert readers for commentary, all the students' writing was checked for plagiarism using Google Search and Turnitin software, which produced no indication of inappropriate textual borrowing.

The supplementary data are organized by focus, including categories of student, classroom, instructional, office hour and other institutional data. As noted in Table 4.3, instructional data were also collected. Instructional data include material from instructional presentations, lesson plans, handouts as well as instructor feedback on student writing. Originally, the study was framed to include investigation of the interactions between students'

use of GM in their writing and the nature of instruction, including instructor feedback. Feedback was to be studied in conjunction with GM use as the social practice of pedagogical discourse.

Table 4.3. Summary of data (core and supplementary)

Data	Focus	Description of Data
Core Data	Student writing	- Pre-course writing assignments (written in Word on computers in instructor's office, with option to use a prepared outline; students scheduled in groups of three or four) - Drafts of the three course writing assignments (submitted by email as Word attachment)
Supplementary Data	Students & their writing	- Pre-course needs analysis survey - Students' brief notes on one revision of two assignments (collected with assignments) - Written post-course reflection (hard copy submitted in final class) - University-administered anonymous student evaluations of course (hard copies delivered by admin) [submitted by 8 students] - Written feedback from two subject experts, in economics and philosophy/ethics, on final drafts of two main writing assignments
	Classroom discourse	- Instructor/researcher's field notes on points of interest in spoken and written classroom discourse
	Instructional materials	- Textbook (Swales & Feak, 2004) - All other instructional material used (digital and hard copies)
	Office hours	- Instructor/researcher's field notes on points of interest (Sotty only)
	Institutional	- Notes and recollections from researcher's teaching and employment history - University-administered, anonymous surveys of students about their experience in the writing course.

However, with pilot analyses, it became clear that analysis of instructional discourse and its relationship with the students' writing would significantly expand the scope of the study. Nonetheless, in focusing on the nature of and changes in students' use of GM in their writing, it is important to recognize the nature of the pedagogical context in which the writing took place;

for this reason, instruction is described as a central feature of the context of the study: see Section 4.6 of this chapter.

As noted in the introductions to the four focal participants, an important part of the supplementary data in the study is assessment of the final drafts of students' extended definition and problem-solution texts, the two main writing assignments, provided by subject-area specialists in the respective fields of economics and philosophy/ethics (some of their comments were included in the descriptions of individual students' writing above). Both specialists had significant experience as teaching assistants in undergraduate courses in their respective departments. They were recruited at a large Canadian research university; neither was known to the researcher before recruitment. The philosophy reader was recruited through the researcher's professional network (at an instructional training workshop) while the economics reader was recruited in person in the graduate student lounge of the economics department. Both were offered and accepted remuneration (or a donation to a preferred charity) for reading the four texts (an early and late text by both Writing I students in the specific subject area) and, within two weeks, providing brief evaluative written comments on the writing in Word files. Both readers were given information about the context and constraints of the assignments (e.g., EAP writing course in which the main readers were not subject area experts; for the economist, this meant that mathematics would not be used; the length of the two main assignments was 250–400 words). The readers were asked to keep the constraints in mind as they assessed the writing, both in specific and general aspects, using as a general guide the hypothetical writing of a disciplinary insider writing for non-experts in a similar context. Additionally, in assessing the student writing, the experts were asked to estimate the "disciplinary age" of the writer, that is, how far along in their disciplinary apprenticeship the writing indicated they were, from high-school to doctoral level. Accordingly, the readers were not told the actual level of academic attainment of the student writers.

As noted above, the readers' commentaries varied somewhat in format. While the philosophy reader wrote many brief commentaries on specific parts of the writing and provided a brief summary, the economics reader made very few comments within the body of the writing and provided a longer summary. In considering their comments, it is also important to keep in mind that, as PhD students, the readers were themselves apprentices – albeit senior apprentices – in their respective fields.

4.5.1 Distillation: Data and participants

While the four focal participants share important general characteristics, it is the uniqueness of their respective orientations to writing and engaging academically that is highlighted. The four arrived at the EAP class as successful, academically-engaged learners, L1 users of Japanese with plans for careers in academia in which English language and writing have important roles. However, their ways of engaging in pedagogical discourse in and beyond the classroom varied. Taka appeared to prefer to work out his ideas and questions individually through written feedback and revision in one-to-one engagement with the instructor, whereas Haru and Yoshi consistently took opportunities to extend their understanding of writing practice by engaging critically through spoken interaction in the classroom and written dialogue with the instructor about their revisions. All students were required to add reflective notes and possibly also questions about their revisions; however, Haru and Yoshi engaged with this task more thoroughly to reflect on and extend their writing practice. For example, Yoshi asked questions about his revisions and used new meta-discursive tools for thinking about language and writing, while Taka seemed less disposed to doing either of these, at least as evidenced in spoken and written exchanges.

The learners' orientations to knowledge construction in their respective disciplines position them in unique ways in relation to the cultural aspects of internationalization in Japanese higher education. The cultural localization of concepts in bioethics constitutes a key feature of Sotty's contribution to his discipline. Sotty and Yoshi both aim to localize knowledge in their respective fields of bioethics and international economics, an aim that accords with the internationalizing national policy of *kokusaika*; however, their efforts position them very differently in relation to conventions in their respective disciplines and in academic discourse more generally. While Sotty's problematizing of autonomy from the view of Japanese cultural values is consistent with the extension of bioethics practice, Yoshi's stubborn attempt to localize otherwise context-independent knowledge in international economics stands out as token localization. In this view it is interesting to note that in Haru's writing of philosophy she does not attempt to link to local cultural practice; of course, this is expected only in light of the force of the *kokusaika* ideology, which is in play in this context in complex and varied ways.

The discussion has introduced the unique sets of interests and orientations that the four apprentice scholars bring to their writing in the course. While aspects of the students' background – for example, their positioning as students at a prestigious national university, engagement in graduate-level studies and participation in an EAP writing course – predict a relatively well-developed capacity for varying abstraction, other aspects of their dispositions at various scales – disciplinary, ontogenetic, rhetorical – predict the emergence of variability in the functions of abstraction in their EAP course writings. The above presentation of the setting and participants has been designed to focus on the variability and changes in the ways these four students use language to mediate degrees of abstraction in the disciplinary writing that they recontextualize in the EAP course. Before proceeding to the presentation in Chapter 5 of the primary methodological instrument, nominal density, and findings for the students' use of GM presented in Chapters 6 and 7, the present chapter offers a brief overview of the final key aspect of the setting for the investigation, the pedagogical context of the writing course.

4.6 Pedagogical context

This section describes the Writing 1 course syllabus with particular attention to the aims and organization of the syllabus, the teaching of grammatical metaphor, and the writing assignments.

4.6.1 The Writing I syllabus

The syllabus was guided by the SFL-based notion of register, which is modeled theoretically and pedagogically as a resource linking language use and meaning-making in contexts of situation (Halliday & Matthiessen, 2004). Register was taught and practiced in three short writing assignments: an extended definition, a commentary on data that is presented in a figure, and a problem-solution text. The students were asked to write these based on research (their own and/or others') in their respective disciplines while keeping in mind an educated, non-specialist reader. The course description as listed in the Graduate School of Economics' student services website provides a useful overview:

> The objective of Research-based Academic Writing I is to prepare new scholars to write academic research in English at a graduate level. Students will improve their research

> writing by increasing their understanding of the qualities and purposes of writing in the academic world. We observe the grammatical and vocabulary choices writers make in order to achieve their aims and contribute to the research community. The language choices are studied in three functional aspects: how writers represent their ideas, negotiate claims to academic knowledge with their audience, and create coherent texts. Students learn to read and analyze their own writing as well as that of expert writers; the analysis of writing is tested in a mid-term quiz. The main assignments are three academic texts: an extended definition of an important concept in their field of study, a commentary on data and a problem/solution text. Students revise each of these after instructor feedback, and submit their best revised versions in a writing portfolio at the end of the course.

The textbook used was Swales and Feak's (2004) popular EAP writing textbook, *Academic Writing for Graduate Students: Essential Tasks and Skills.* Readers familiar with this book will likely recognize the three writing assignments as the culminating tasks from three successive early units (Units 2, 3, 4) of the textbook. The first half of this book covers these and several associated writing skills (such as summary writing) constitutive of academic research writing, including book reviews and research reports. The second half of the book focuses on the research report by means of the canonical Introduction-Methods-Results-Discussion (IMRD) model. Accordingly, the writing course that follows Writing I in the EAP curriculum (i.e., Writing II) is organized around the writing of a brief report of a specific research project, drawing on the second half of the book and assuming familiarity with the three elemental text-types.

Within the constraints of a 20-hour course, the students would observe "the grammatical and vocabulary choices writers make in order to achieve their aims and contribute to the research community" by learning to exploit the complementarity between register and text-type. The metafunctions of register (textual, ideational and interpersonal) were studied successively as ways of accessing the semantics of Mode (the nature of the message), Field (the nature of the world) and Tenor (the nature of social relations) through which meaning is contextualized in specific situations. Mapped onto this order were the three elemental text types that instantiate key, cross-disciplinary conventions for organizing academic texts.

This scope may be considered ambitious for a 20-hour course. The breakdown of instruction can be tracked in the overview of the syllabus provided in Table 4.4. The students received classroom instruction in weeks 3-5 in the extended definition text-type and, drawing on SFL, linguistic aspects of text organization. In weeks 6-8, instruction involved the data commentary text-type taught with reference to the ideational (or, as recontextualized in the course, "content") function (also drawing on SFL) while also reviewing the organizational function. In weeks 10-12, instruction in the problem-solution text involved all three metafunctions with a focus on the interpersonal or social positioning function using Hyland's (2005) classification of interactive resources. As students had the opportunity to draft each of these texts once or twice, instructor feedback would integrate taught material; thus, students eventually received feedback on the three metafunctions. Also, students were in a position to apply what they had learned throughout the course to their drafts because the best drafts were to be submitted in a writing portfolio only at the end of the course. It is noted that instruction on citation and referencing was relegated mainly to instructor feedback in the Writing 1 course, given the brevity of the course; these aspects of research writing were a focus of instruction in the second course.

Table 4.4. Overview of Research-based Academic Writing I syllabus

week	Language and Writing Focus
1	Orientation, placement, pre-course writing sample (PC), needs analysis
2	Language & meaning in academic writing; Textbook Unit 1: content, positioning, organization
3	Textbook Unit 2: General-specific texts; Extended definition (DEF) assignment
4	Organization: Theme/New in clauses in DEF
5	Organization: Thematic patterns in paragraphs; Instructor feedback key
6	Textbook Unit 4: Data commentary (DC): move model & assignment
7	Content: Participants, processes, & circumstances
8	Content: Nominalization: packing experience and logical reasoning; noun phrase
9	Mid-term Quiz
10	Social positioning: The writer's position on claims
11	Textbook Unit 3: Problem-solution (PS): move model & assignment
12	Social positioning: The positioning of writer and readers
13	Feedback & revision workshop; Course wrap-up

4.6.2 Instruction in grammatical metaphor

This section briefly describes the instruction in grammatical metaphor in the Writing I course. The general distinguishing features of academic writing – such as tendencies towards internal coherence, formality, abstraction, technicality, and objective stance – were presented to, and analyzed by, students early in the course both through SFL-based instructional materials and through readings and tasks from the textbook (Swales & Feak, 2004). Instruction on grammatical metaphor focused on its experiential, logical and textual functions. While there were many instances throughout the course when GM-related features of academic writing were in focus both as GM or otherwise, the formal instruction on GM proper took place over approximately 90 minutes, mainly in week 8, as shown in Table 4.4. Homework tasks specifically related to GM amounted to about 2 hours. In the course, GM was referred to as nominalization, which was achieved through "grammatical packing" and "information packing"; experiential and logical GMs were referred to as nominalizations of content and nominalizations of logic, respectively.

As the students were familiar by the eighth week with the notions of Theme and Given-New information order, initial instruction on GM involved presentation and elicitation about the role of "information packing" associated with Theme and Given information. From these textual functions of GM, instruction moved to experiential and logical functions. The presentation of these and other functions of language was followed up with students' investigating the features in their writing corpus; students were asked to bring to every class samples of their own writing and at least two representative pieces of writing in their field. This corpus served throughout as a basis for checking concepts, analyzing features, and generating comparisons and discussion.

The lesson on ideational grammatical metaphor aimed to raise awareness of, and provide practice in, adapting language choices to different contexts by varying the degree of metaphoricity along the speech-writing mode continuum (Halliday, 1985a). The lesson began with a simple sentence-completion and matching task with visual supports contrasting informal and academic construals of a similar semantic configuration. The construals of this configuration, about children receiving medical treatment, was then shown mapped into a table, shown in Figure 4.1. The table shows the respective grammatical realizations of the various semantic configurations in a more "literal", speech-like clause-complex, an increasingly dense clause, and finally a complex nominal group (referred to as a noun phrase in the course).

Students were then directly to the first row, asked to identify semantic units such as “children”, “grow”, “well”, and “because” grammatically and semantically, and track the grammatical and

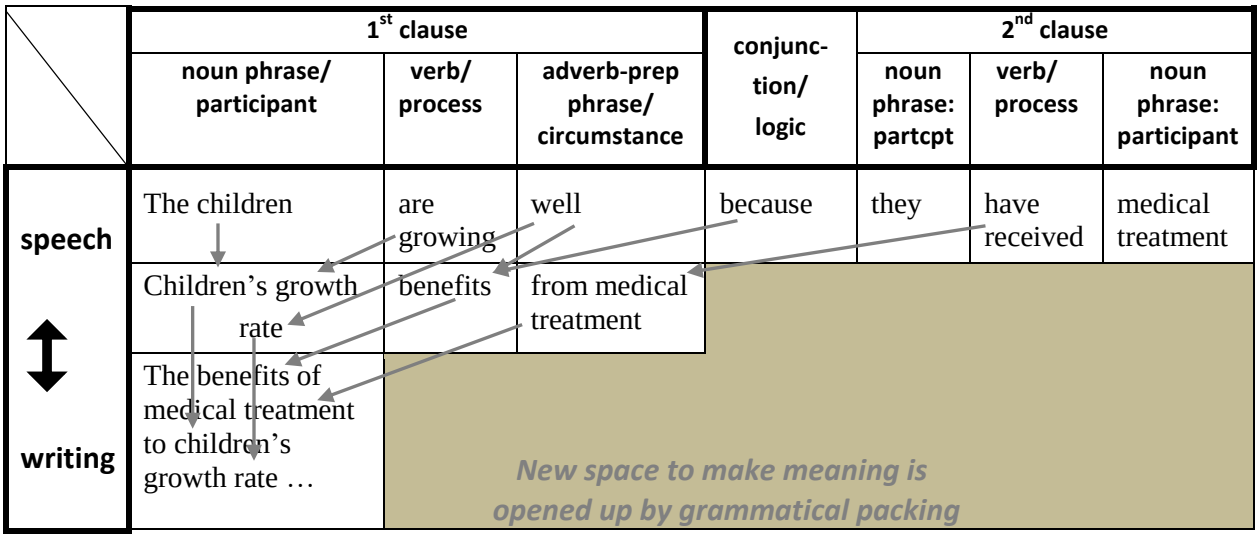


Figure 4.1. Nominalizing shifts: packing meaning from speech-like to writing-like register

semantic shifts that occur to these units as the discourse becomes more writing-like. For example, in the top row, “children” is a head noun of the noun phrase that ‘constructs’ the participant, while in the next row it is a pre-modifier of growth, which premodifies the head noun “rate”; the conjunction “because” constructs causal logic in the first row, while in the middle row the logical meaning is constructed by the verb/process “benefits”, which in the bottom row is the head noun that ‘constructs’ the participant. The various functions of GMs were then reviewed from the examples in this table; for example, GM to create coherence (e.g., the third row, a Theme, could follow from the second in discourse), generate technicality (e.g., “growth rate”), and generate concepts from logical reasoning (e.g., “benefits of medical treatment”).

The major experiential and logical shifts realized by GM, shown in Table 4.5, were identified in a model text in this way (note that the numbering of GMs in this table does not correspond to the numbering system adopted for GM in this study). In class, students were then assigned about three types of GM each, and to find examples of similar GMs from their corpus, and provide a plausible motivation for the shift from the perspective of construing disciplinary knowledge. For

homework, they were asked to identify examples of sensible use, and under- and/or over-use of GM in their own writing, and to discuss their findings in groups. Another task was to pack and unpack GMs as appropriate in a modified data commentary text, which is the text-type they were then drafting. Instruction on the use of GMs eventually shifted to instruction in the construal of entities in nominal groups; Table 4.5 was used in that lesson.

Table 4.5. Types of grammatical packing: Shifts in meaning and grammar with examples

	From literal version to grammatically packed version		**Examples**	
	Literal grammar →	**Packed grammar**	**Literal grammar →**	**Packed grammar**
1	adjective	noun	unstable	instability
2a	verb	noun	transform	transformation
2b	modified verb	noun	can + verb going to + verb	possibility plan, promise
3	preposition	noun	with ~	accompaniment
4	conjunction	noun	so if	cause, proof, basis condition, result
5a	verb	adjective	[poverty] increases	increasing [poverty]
5b	modified verb	adjective	begin to + verb	initial
6a	adverb	adjective	[acted] brilliantly	brilliant [acting]
6b	prepositional phrase	adjective	[argued] for a long time	lengthy [argument]
7	conjunction	adjective	before	previous
8	adverb	verb	quickly	quicken
8	conjunction	verb	then so	follow lead to
9	conjunction	prepositional phrase	when so	in times of as a result

The instructor feedback on GM use of course adopted the same metalanguage. Several general features of the feedback are particularly relevant for the way the apprentice scholars were guided to learn: (1) it tended to focus on aspects of writing and language in focus at the time in the course while also encompassing an increasing number of these foci as the course progressed; (2) I sought to reinforce metafunctional awareness and metalanguage by including in all in-text feedback annotations (by means of the software program *Markin'*) two or three scales of delicacy

of analysis. This is shown in the extract from the feedback on the second draft of Taka's extended definition:

> Another example*word choice CONTENT* is that although it*Cut* has passed 10 years*word order format ORGANIZ* 19 since MDGs are set*nominalize CONTENT* 20, the current situations are far from the goals.
>
> [Taka, DF2]

As can be seen, the feedback entails a selected, underlined word or passage, then a feedback annotation for the specific issue, such as the superscript "*nominalize*"; this was then categorized metafunctionally using all-caps ("*CONTENT"*). For many annotations, an elaborating comment was also added (as indicated by superscript numbers for footnotes). Finally, (3) the approach to feedback attempted to support students' self-regulated mediation of writing by shifting in the course from initially being relatively delicate, detailed, and supportive (occasionally including corrective scaffolds such as sentence stems), as shown in the above feedback for Taka, to being quite schematic. By the final assignment, the problem-solution text, the feedback annotations comprised only the identification of the focal word or passage and a metafunctional label, i.e., *CONTENT*, *LOGICAL, INTERPERSONAL*, ORGANIZ(ational). It is also relevant to note that annotations involving "nominalization" (involved most centrally in one of the three registerial variables of *CONTENT*, *LOGIC,* or *ORGANIZATION* functions) accounted on average for approximately 20% of all feedback annotations. Instructor feedback also included general comments, such as these for Taka's and Sotty's respective problem-solution drafts, which are particularly relevant for GM use:

> The main issue here in Content is use of noun phrases (eg mainly un/countable, articles, pre/post-modification). There are also instances here of too much nominalization, in which ~tion nouns could be verbalized.

> Issues in the Content function include noun phrase formation (eg balancing pre-post modification (nice effort though). In Logic, issues include sentence/clause boundaries (some incomplete or vague clauses). But your writing shows maturing in the packing of logical relations.

As can be seen from the general feedback for Taka as problem-solution draft, instruction in GM use also addressed its over-use by students. In such ways, instruction in GM was designed to develop students' capacity to regulate their use of this resource in accordance with their rhetorical interests as scholars engaged within and around their respective scholarly communities.

4.6.3 The four writing assignments

This section describes the instruction and task parameters for the four pieces of writing that were assigned during the course and analyzed for grammatical metaphor: the pre-course writing task, the extended definition, the data commentary, and the problem-solution.

4.6.3.1 The pre-course writing assignment (PC)

The pre-course writing assignment was designed to provide a key reference for students' writing at the beginning of the course. The context of this assignment is not only relevant for the time that the writing was undertaken, before instruction, but also for a number of other important distinguishing features: the limited timeframe allowed for writing (45 minutes), limitation on references and other resources (only a basic prepared outline was allowed), location (in the instructor/author's office), specific conditions (the writing process shown on the computer screen was recorded), and audience (a reader *within* the student's field). The last listed feature of these texts – that the writing was for disciplinary experts - makes them particularly interesting given the concern for variation in discourse between the disciplinary centre and periphery, and the corresponding experiences of apprentice L2 scholars as engaged within and beyond their disciplinary communities. In making this observation, it is useful to keep in mind that, in this aspect, the task is something of a simulation because the actual reader is not a disciplinary insider. What students were able to produce under these conditions provides useful perspective on the writing they did during the course.

The main task parameters for the "Writing Sample" were as follows:

> Write 150-250 words. TOPIC: Introduce an issue, problem or question in your academic field(s) (e.g., sociology, political science, law, economics) that is of interest to you and

> others in your field. The target reader for this writing is an educated specialist who understands your field. Briefly introduce the issue, and explain why the issue is interesting and/or worth studying further.

As assigned, the task asks for a research area to be identified and the rationale for its scholarly pursuit explained. Therefore, this expository text is a factorial explanation (Martin & Rose, 2008), whereby a phenomenon is identified and factors that motivate the phenomenon explained. Such explanations in any context beyond those in very early schooling imply the use of experiential and logical grammatical metaphor in the construal of entities and of the logical reasoning that obtains in clarifying their relations to each other. This text type was assigned for its schematic resemblance to a research proposal; as such, it would alert students very early on to the research-based nature of the course. Additionally, this focus would serve to motivate students who are intent on developing their research-based writing.

4.6.3.2 The extended definition (DF)

The definition is of course a central resource for elaborating disciplinary taxonomies (e.g., Halliday, 1998); as such definitions have a central role in pedagogical discourse. Although not without acknowledging some counter-argument, Halliday (1998) indicates that definitions close down the semantic junctions generated by GMs (e.g., in technical definitions), thus freezing technical terms as non-metaphorical; however, it was argued in Chapter 3 that the pedagogical role of definitions in recontextualizing disciplinary knowledge precludes them from losing their metaphorical status. The argument drew on Halliday (2004/1999) recognition that disciplinary experts must unpack their definitions even for each other.

The presentation of definitions in the EAP writing textbook provides models of canonical academic definitions; for example, “Road pricing is a transportation control measure…” (Swales & Feak, 2004, p. 57) but does not describe them in formal, functional terms. In functional grammatical terms, the canonical definition

> construes as a token-value relation between fairly delicate semantic type that is lexicalized within the lexicogrammar and a restatement of this type by means of other resources in the ideation base. The restatement draws more on the resources towards the

> grammatical end of the scale, so that in the definition a lexicalized token is construed as a grammaticalized value (Halliday & Matthiessen, 1999, p. 76).

In academic disciplines, the definition entails a term, or token, that is classified by means of its value within the ideation base of the discipline. In this respect, the canonical definition element in the extended definition text-type is lexicogrammatically relatively constrained in choices for instantiation. This draws attention to the *extension* move of the text-type, about how the definition is extended. In the extended definition writing task as presented in Swales and Feak (2004), and also as assigned in the course, there was relatively little explicit instruction or constraint with regards to how the definition was to be extended. The associated task from the textbook (p. 67) presented a series of short extended definitions in which students were asked to identify the nature of the extension, whether the extension concerned "components, applications, history, examples, or other" (p. 67) kind of extension of the definition. At this point in the writing course, explicit instruction was focused on the textual resources of Theme/Rheme and Given/New information order, which were only illustrated in the definition element. The task assignment was as follows:

> Write an extended definition of an important term in your field. Use 250-350 words. The definition may be of a concept, object, theory, method, or other term. You may elaborate on the thing defined by exploring components, types, applications, procedures, limitations, history and/or examples. The target reader is an educated non-expert with an interest in your field. Include any references that were used.

An interesting feature of this assignment is the different degrees of openness between the two moves, with the definition move being relatively constrained and explicitly taught, and the extension being left open as generally expository. As seen above, the task assignment for the extension follows closely from the options provided in the textbook. Although not included in the task assignment, the option was also given for students to provide a preamble to the definition, a move that helps motivate the need for a definition; this flexibility is sensible given that the term selected for focus was to be "important" in the students' discipline.

4.6.3.3 The data commentary (DC)

The data commentary text type is a verbal commentary on data that are shown in figures, tables or other visual intertexts. The commentary on visual representations of data has been recognized as a key element in academic and especially science discourse. This text type has recently gained attention of researchers in language for specific purposes (LSP) interested in multimodality in academic discourse (Guinda, 2011). Lemke (1998) calls this kind of text "a primitive form of hypertext" (p. 95) for the non-linear reading paths that it stimulates. The visual-verbal correspondences in such texts are constitutive of scientific thinking, according to Latour (1987). Focusing on the writing, Swales and Feak (2004) emphasize the canonical data commentary demands critical intelligence, a capacity to analyze and synthesize.

Although there is no consensus on the staging or move structure of data commentaries, Swales and Feak (2004) provide a three-stage pedagogical model comprising an indicative summary, highlighting statement(s), and extension. In the Writing I course, an additional, optional stage was added after the indicative summary, which I called an "interpretive aid"; this stage directs readers in reading the figure, such as in how information is presented or what to look for. As with the extended definition assignment, students had the option of including preamble to the data commentary. Figure 4.2 was used in Writing I to introduce the model.

An important feature of this text type in relation to abstraction is that the general-specific-general structure has an hourglass shape. That is, the indicative summary is typically general and abstract; the highlighting statements imply analysis of specifics which emerge from the meaning potential of the figure; and the extension typically generalizes from the highlighting statement, implying synthesis with more general concerns.

The data commentary writing task was assigned as follows:

Write a data commentary of 150-250 words keeping in mind what we have practiced about academic writing so far in the course, including the move model for this type of text. For this task, unless you have your own data ready to use, you will have to find suitable data and/or figure from your field. If this is your case, it is suggested that you re-purpose existing data by highlighting features in the data that have not been highlighted by other researchers. The analysis of the data should be your own. Include the numbered figure and references.

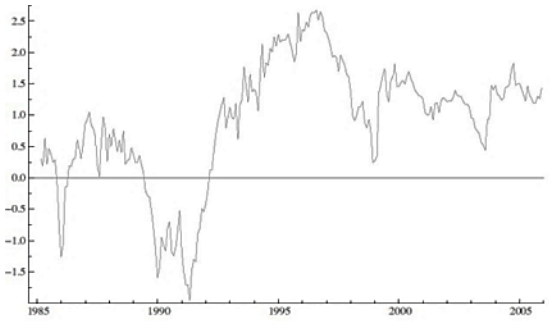
Staging (adapted from Swales & Feak, 2004)	**Model Commentary** (Sugita, 2006, p. 6)
 Figure 2: Spread between Long- and Short-term Interest Rates (Sugita, 2006, p. 6)	
1. **Indicative Summary** (obligatory): reference to figure & summary of content 2. **Interpretive Aid** (optional): how to read the figure 3. **Highlighting Statement** (obligatory): salient features of the data 4. **Extension** (obligatory): Interpretation of the highlights	Figure 2 plots the yield spread between Japanese short- and long-term interest rates. If the expectations hypothesis holds, the spread shown in Figure 2 should follow a stationary process. The spread shows a negative trend until around 1990. This negative trend implies a lower risk premium due to higher expectation of future economic expansion.

Figure 4.2. Pedagogical model for the staging of a data commentary

Experiences in the classroom inform two observations about the data commentary. The first is that the time for students to revise their first draft after feedback was relatively short – about four days. The second is that Haru, the apprentice philosopher, noted that she found this a difficult text type to reconcile with her discipline, which does not typically deal with empirical data. Therefore, she shifted her focus in this assignment, as well as the problem-solution text, from writing contributing directly to her MA thesis to work towards a proposal for researching Christian evangelism in the U.S. as part of her preparation for applying for graduate studies in that country.

Haru's experience is relevant in understanding the (non)correspondences between the text-types selected for instruction and students' disciplinary practices, the ways graduate students who have mapped the potential professional territory are able to productively re-direct their coursework, and, specific to the empirical focus of the present study, the need to account for

potentially wide variability in the disciplinary profile of the writing that is included in the portfolios of individual students.

4.6.3.4 The problem-solution (PS)

The problem-solution text-type is a "culturally popular pattern of organization" that has been described, furthermore, as archetypal in academic discourse (Hoey, 2001, p. 122). By contextualizing and identifying a problem, offering a solution, and evaluating the solution, this text type is schematically co-extensive with much of the work of scholars across disciplines. Yet it is also distinguished in important ways from more expository text-types such as the extended definition and data commentary. In the introduction to the unit on "Problem, Process, and Solution" in the Writing I textbook, Swales and Feak (2004) note

> As we have seen, general-specific passages tend to be descriptive and expository. In contrast, problem-solution texts tend to be more argumentative and evaluative. In the former, then, graduate students will most likely position themselves as being informed and organized; in the latter as questioning and perceptive (p. 83).

In this respect, the problem-solution assignment is similar to the pre-course assignment, which asks students to propose a research focus and argue for its value. Thus, while all the texts involve at least some description and exposition, the pre-course and problem-solution assignments predict more interpersonal negotiation of claims.

The discourse analytic research on the problem-solution pattern has concentrated on two aims: identification of the pattern through analysis of causal relations and the signalling of shifts to the problem and solution, which is typically analyzed through lexis (Flowerdew, 2008). As Flowerdew's (2008) corpus-based research shows, the latter lexical signals often realize the author's interpersonal stance; she explores this through the Appraisal framework (Martin, 2003; Hood, 2010) by distinguishing the evaluative meaning in the lexical signals as either Inscribed (evaluation is implicit in the lexis, as in the word *problem*) or Evoked (evaluation is merely connoted, as in the word *dust*). Flowerdew's (2008) research also points to the role of grammatical metaphor and nominalization in signalling discourse shifts in clause Themes.

These lines of research are relevant to the present case study; for example, there was instruction on ensuring clear signalling and logical linking of stages (e.g., Swales & Feak, 2004, Unit 3). The problem-solution writing task assigned in the course was to be 250-400 words in length, could optionally include a process description (an option not generally taken), and was to address non-expert readers. Students were also encouraged to take special care in writing the first draft of the PS text because they were expected to 'take over' the task of providing feedback from the instructor. Accordingly, as indicated above, instructor feedback on points for suggested revision in the writing of the PS text were reduced in delicacy, such that only the metafunctional category of the identified section of writing was mentioned.

4.6.4 Implications of assignment order for changes in abstraction

The following closing comments about the pedagogical setting focus on very general predictions that can be made about the nature of metaphoricity and abstraction in the four assigned text-types and the kinds of changes in degrees of metaphoricity across text-types indicated by their ordering in the course. All four texts are essentially expository but the first and last imply an increased role for argumentation and evaluation. Also, all of these text-types generally involve a general-specific-general order. The in-course writings begin with a highly abstract move, the definition element within the extended definition assignment. Also adding to the likeliness of relatively high levels of abstraction in the early course writings is the pre-course writing task, which asked that students write for expert readers in their field. In contrast, the data commentary and problem-solution texts would appear to allow for additional specificity, and thus congruency in representation; however, this prediction can only be made very cautiously as the specific entities of concern in these texts may well be highly metaphorized disciplinary abstractions, such as "a negative trend" in "yield spreads" observed in the model data commentary. Given these observations, a safe claim about the ordering of these text-types in the Writing I course is that the PC-DF-DC-PS order does not itself imply *increasing* levels of GM use and abstraction over the three months, as would, for example, a set of assignments beginning with a personal reflection, proceeding to a narrative essay, and closing with a review of literature.

4.7 Distillation

This chapter outlined the setting and methods of the study, which show this to be a case study of successful learners with ambitions of becoming professional academics. From within this group, considerable variation emerges in context-specific language proficiency and the socio-semantic dispositions, including in their disciplinary interests, of course, but also in other important aspects. These include, for example, their ways of engaging in the classroom, the role in their research of local cultural knowledge, their use of pedagogical metalanguage for mediating their writing, and the level of disciplinary maturity indicated by their course writing. Although they were mostly early graduate students in the same writing class, their trajectories as apprentice scholars were unique, and this uniqueness is the result of many interconnected factors. Chapter 5 describes the main analytic focus in the writing, grammatical metaphor, and the instrument developed to understand it, nominal density. Chapters 6 and 7 provide analytical insight into these students' writing in the shared context of the writing class and the trajectories indicated by their various disciplinary and other social semantic dispositions. Theoretically, these features of the context are understood to predict tendencies in the writing and, by implication, the use of grammatical metaphor. Chapter 6 provides the results of the analysis of patterns in GM use across texts and corpora of the writing of student writers in the same general discipline, and of the cohort of apprentice scholars as a group. Chapter 7 focuses on the trajectories in GM use of individual students.

Chapter 5: Operationalizing Grammatical Metaphor in Nominal Density Analysis

5.1 Research questions and introduction to the methodology

The review of GM in Chapters 2 and 3 found that this meaning-making resource is a key means for mediating the sociocultural functions of registers in academic writing. Discourse across contexts and scales of practice is characterized by variability in the roles of GM, including variability in the experiential, logical, interpersonal and textual functions of GMs. Accordingly, variability is also present in the general *levels* of concreteness and abstraction mediated by GM in discourse. The dynamic ebb and flow of abstraction is observed in late adolescence as a feature of fully developed adult language (Halliday, 1993a), and in the writing of disciplinary experts, such that, for example "[e]very scientific text… contains a mixture of levels of wording, from most congruent to most metaphorical, right up to the end" (Halliday, 2004/1999, p. 121). Variability in the functions and levels of abstraction is also evident in the texts of L2 academic writers and their developmental trajectories as scholarly writers and L2 users (Byrnes, 2009; Ortega, 2015).

While GM enables apprentice L2 scholars to engage in disciplinary knowledge-building and conversation, it also presents challenges to students' disciplinary and more general academic engagement. The main challenges for L2 academic writers revolve around the nature and level of abstraction in their writing as, relative to more expert writers, these writers tend to under-, over-, and otherwise mis-use this mediating resource in any of the various key functions of GM. Much remains to be learned about the use of GM by L2 academic writers. Chapter 4 introduced the setting and methodology of the study, including the four apprentice L2 scholars whose use of abstraction in academic writing is expected, correspondingly, to have appreciable personal and professional implications.

The study is guided by following research questions:

1. What are the functions of GM as a mediating resource in students' writing for regulating the nature and extent of abstraction in the construal of valued academic knowledge?
2. How does learners' use of GM change within and across drafts of individual writing assignments and across the assignments they produced in the course?

3. What is the relationship between these patterns of GM use and the sociocultural functions of the registers of students' texts?

These questions are addressed within the following organization of the remaining dissertation chapters. The present chapter presents the primary instrument for analysing GM use, nominal density. Chapters 6 and 7 present the analysis, in which the research questions are addressed by focusing on the distribution of various types and functions of GM, and GM as a unified mediating resource, at a number of levels aggregation: the text, multi-draft text, and course-wide texts of the four individual learners and across the two broad disciplinary fields of economics and the humanities, each field represented by two learners. Across these scales, the key analyses of GM focus on:

- General, aggregated quantitative results for the use of grammatical metaphor, analysed by nominal density, lexical density, length of clause, and grammatical intricacy.
- Text- and student-specific median levels of abstraction construed though GMs.
- Changes in the median levels of GM-construed abstraction across individual student texts during the writing course.
- The experientialization of the interpersonal function of modality through GM.
- The relative distribution of GM between Theme and Rheme.
- The relative distribution of GM between the experiential and logical metafunctions, which are two subfunctions of ideation.

The tendency of these foci to cluster around ideation is predictable, considering that written academic discourse tends to rely more on ideational GM than interpersonal GM, which is far more common in casual speech (Halliday & Matthiessen, 1999). However, given the textual and interpersonal implications of ideational GM, the register-wide scope of analyses allows for investigation of question 3. The accounts of GM use build on each other for a contextualized understanding of the role of GM as a mediational resource in the EAP course.

The question for the present chapter is about the needs and opportunities for methodologies used in investigating GM. Predictably, individual studies are found to focus on select corpora and particular types and sub-types of GM, such as logical or experiential

metaphor. Findings from these studies typically involve contextualized generalizations about case practices, which are illustrated with salient examples of GM use in texts. Where the investigation of GM use and development aims for more global insight into learners' regulation of abstraction in their writing, the findings are typically achieved by proxy measures for the development of writing along the speech-writing mode continuum (Halliday, 1985a); typically, this kind of investigation involves analyses of lexical density and grammatical intricacy (e.g., Byrnes, 2009). Accordingly, studies considered exemplary (according to Ortega, 2015), such as Byrnes (2009), involve a two-pronged methodology with global, quantitative-oriented investigation of GM development using proxy measures of lexical density and grammatical intricacy, linked with more delicate or fine-grained qualitative discourse analytic investigation of focal kinds of GMs in student writing. This approach is understandable given that comprehensive analysis of GMs in texts would appear unwieldy to carry out and report.

Thus, among the insights that emerge from the review of GM as a central resource of academic discourse, there is a paradox. On the one hand, the picture emerges of a multifunctional – experiential, logical, interpersonal, and textual – resource with a central role in knowledge construction across empirical contexts of academic writing and scales of writing practice: textual, ontogenetic, and cultural. On the other hand, profiles of variability in the nature and degree of GM-related abstraction as this is realized in L2 writing contexts are *nowhere described from the view of GM as a unified mediating resource for regulating abstraction.*

Such an analysis would provide a valuable foundation for addressing the research questions, that is, for understanding the role of GM in regulating abstraction and tracking any changes in its use in student writing. For example, such an analysis would afford a close methodological link between quantitative and qualitative analysis whereby the most delicate choices in the use of GM in individual texts can be tracked in quantitative analysis of grammatical metaphor proper, and vice versa. The task of the present chapter is to introduce an instrument with such affordances, and to demonstrate how such an instrument can be used as a basis for describing GM variation and interpreting the functions of this variation in the writing of apprentice L2 scholars.

As noted in Chapter 3, a commonly used instrument for analyzing variability in abstraction associated with academic register variation is lexical density. Lexical density (LD) analysis (e.g. Byrnes, 2009; Christie & Derewianka, 2008) informs register analysis with

qualitative and quantitative findings about the density of information in texts. As an extension of this use, LD is also the primary instrument for determining the degree of grammatical metaphor in a text; as such, LD is the main proxy measure for GM-mediated abstraction.

The conventional operationalization of LD outside of SFL involves measurement of content lexis as a percentage of overall lexis per text. In an effort to achieve greater delicacy in the analysis of information density, Halliday (1985a) develops LD analysis from this text-based measure to a measure of content lexis per *clause*, using the grammatical rank of clause as a "differential system of weightings" (p. 66) for information density. Halliday adopts the clause as the basis for analyzing information density because, through the lens of systemic grammar, the clause is the basic analytic unit for ideation; the clause "functions as the representation of processes" (Halliday, 1985, p. 101). This refinement to the initial distinction in LD analysis helps to account more subtly for variation in construals associated with speech – which typically involves many short clauses – and writing, which typically involves fewer, longer clauses. Instruments closely associated with LD that are used as additional proxy measures for GM-related abstraction along the speech-writing mode continuum are grammatical intricacy (GI; studied as a feature of grammatical complexity in SLA) and mean length of clause (LC). Writing typically involves higher LD, longer clauses and, as reviewed in Chapter 1, lower GI than does speech. (The raw, quantitative data for ND, LD, LC and GI for all the writing is provided in Appendix 3.)

Halliday (1985a) argued that the analysis of frequency of lexis in text and the likeliness of its occurrence in particular contexts provides insight into information density as a feature of register variation:

> [The notion of density] has to do, as already suggested, with how closely packed the information is. This is why the probability of the item is important: a word of low probability carries more information (Halliday, 1985a, p. 66).

For example, clause (a) below is perceptibly denser and less concrete than clause (b), though they contain the same number of lexical tokens (Halliday, 1985a, p. 65):

(a) the mechanism of sex determination varies in different organisms

(b) the way the sex is decided differs with different creatures

Discussing these clauses, Halliday (1985a) proposed that the lexical token "mechanism" is less likely to occur than "way"; this variation contributes to the relatively high information density of "mechanism". However, Halliday recognized that the clause-based LD analysis that he developed produces a similar LD measure for the two clauses (they both have an LD of 6). Thus, while clause-based LD analysis does provide a "differential system of weightings" for the information density of lexis, it does not fully account for the variation in register that emerges from comparison of clauses such as (a) and (b).

In considering ways of achieving greater delicacy in the analysis of information density, Halliday (1985a) envisaged an analytic framework which would account for the greater information load associated with less frequent lexical items:

> For a systematic, formal investigation of lexical density in texts we should have to adopt some weighting whereby lexical items of lower frequency 'scored' more highly than common ones… But for immediate practical purposes, either all lexical items can be treated alike – this will still show up the difference between spoken and written texts – or a list can be drawn up of high-frequency lexical items to be given half of the value of others. This is equivalent to recognising three categories rather than two: grammatical items, high-frequency lexical items, and low-frequency lexical items (p. 66).

As indicated by the conciliatory "But for immediate practical purposes", Halliday did not formally pursue such an analytic framework for frequency-based variation in the information density value of lexical items. Neither has this particular notion been pursued elsewhere, to my knowledge. Or rather, it can be said to be pursued by other means, outside of LD analysis in, for example, distinguishing typologies of abstract lexis, as in the taxonomies and heuristics of abstract terms proposed by Martin and Rose (2007) and Biber (2006) that were reviewed in Chapter 3. Thus, in the absence of LD analysis that accounts for a differential informational weighting of lexis based on frequency and probability, clause-based LD analysis is advanced as the preferred instrument for the study of register variation associated with information density.

In detailing clause-based LD analysis, Halliday (1985a) goes on to focus on nouns and nominality as an important source of variation in information density: "the overwhelming proportion of 'content', in the sense of lexicalized meaning, is carried in the nominal groups" (Halliday, 1985a, p. 72). As reviewed above, nominality is an important feature of variation in academic discourse. Focusing on science, Halliday (1985a) adds:

> There are a lot of things that can only be said in nominal constructions; especially in registers that have to do with the world of science and technology, where things, and the ideas behind them, are multiplying and proliferating all the time (p. 73).

Although GM is not Halliday's focus in this discussion (which appeared near the time that the idea of GM was first published (Halliday, 1985b)), GM is posited as the chief resource for generating nominality in academic discourse (Halliday, 1998; Halliday & Matthiessen, 1999). A feature of the above passage reminds us of Halliday's insistence on recognizing the variation in the construal of human experience; it is not only metaphorically-construed, nominalized "things" that multiply and proliferate in scholarly discourse, but also "the ideas behind them." This differentiation within the dynamic socio-historical processes implied by nominal discourse can be understood as an early reference to the logogenetic, ontogenetic, and phylogenetic history of metaphorical construals in earlier, often more congruent, construals.

It remains the case that when the focus of analysis is on the nominality of discourse and associated variation in levels of abstraction or "thinginess" (Halliday & Matthiessen, 1999, p. 265), LD is a proxy measure. In searching for a refinement in LD analysis that would inform such analyses, Halliday probes frequency and probability but (to my knowledge) abandons these as formal features of LD analysis. However, while proposing the clause as the most relevant functional scope for LD analysis, he dismisses what can be considered an alternative to LD-based frequency analysis:

> *But words are not packed inside other words*; they are packaged into larger grammatical units… It is this packaging into larger grammatical structures that really determines the information density of a passage of text (Halliday, 1985a, p. 66; italics added).

It is reasonable to ask: Are words *not* packed into other words? With the understanding of grammatical metaphor as a semantic junction formed by the realization of the semantics of two functional structures in a single lexical token, we appreciate that, indeed, a single GM may be said to construe not only a metaphorical *entity* but also the congruent *ideas behind it*. For example, the entity *junction* develops from the process meaning of *joining*. If "words" in the above passage are understood as delicate lexicogrammatical choices realizing semantic configurations, then indeed, the passage would appear to posit a false choice between packaging meaning either in words or in clauses: GMs are words that contain other words – Bakhtin (1981) might call it the containment of other voices and histories – and these words are also packaged into clauses. As reviewed in the previous chapters, contexts of academic discourse select out multivoiced practitioners predisposed to constructing knowledge by means of productive shunting between concrete and abstract ideation.

This discussion leads to a methodological proposal, developed over the next several sections. It is briefly outlined here by way of introduction. For a "systemic, formal investigation" (Halliday, 1985a, p. 66) of abstraction itself, clauses provide one "differential system of weightings" (Halliday, 1985a, p. 66) and grammatical metaphor provides an additional, more delicate system of weightings. Halliday's typology of grammatical metaphor (1998; Halliday & Matthiessen, 1999) accounts for various scales of metaphorical shift associated with GMs instantiated in texts. These scales of metaphorical shift can be calculated in the manner of "some weighting" that Halliday (1985a) envisaged. However, while Halliday (1985a) envisaged such weighting as applied to more and less frequent lexis (which carry less and more information, respectively), the weighting of GMs refers to the nominalizing – and therefore abstracting – construals of specific types of GM. This nominalizing tendency of GMs will be called nominal density (ND). Thus, while LD is a measure of information density that serves as a proxy measure of abstraction, ND, as a "differential system of weightings" associated with the nominalizing scope of GMs, provides a direct measure of GM-mediated abstraction.

5.2 Halliday's typology of grammatical metaphor

As reviewed in Chapter 3, a grammatical metaphor is generated when the typical semantic resonance of a grammatical structure is transposed onto the semantics of another structure, generating a semantic junction in which the meanings of two structures are held in

tension. A brief explication of the term rank scale and the closely associated term, grammatical constituency, may be useful as a way of distinguishing general types of GM, beginning with the fundamental distinction between embedding as GM and Halliday's typology of ideational GM.

Constituency refers to the part/whole nature of linguistic structures. It is a familiar concept in the analysis of units of speech and writing and is equally applicable to lexicogrammar, hence the term grammatical constituency: e.g., in the experiential structure of a clause, constituted by a Process, Participants and Circumstances. The rank scale refers to the hierarchical arrangement of grammatical structure so that, as Halliday and Matthiessen (2013) express it, "an element of any given rank is constructed out of elements of the rank next below" (p. 84): e.g., clauses out of groups and phrases, groups and phrases out of words and so on. Typically, clause constituents are encoded by, or, more precisely, realised by, groups and phrases: e.g., the constituent, Process, is realised by a verbal group; a Participant by a nominal group; and Circumstances by an adverbial phrase or a nominal group.

A very general distinction is made between GMs based on whether they occur through downranking (as in embedding) or downgrading (as in ideational GMs). An element of a higher rank can be 'downranked' (or 'rankshifted') to form part of an element of a lower rank. Thus, for example, a clause (which construes, in semantic terms, a figure) can be downranked and embedded as a constituent of another clause, or further down as a constituent of a nominal group (noting that phrases and groups can also be downranked).The following clause from Yoshi's definition assignment illustrates a clause embedded as part of a nominal group, functioning as a quality of an entity (traditionally known as a defining relative clause; embedded clauses are shown in double square brackets): "This model introduces two chief factors [[that influence the FX rate]]." Further details on the operationalization of embedding as GM in this study are provided in Section 5.4.

The other general and very common form of GM is associated with downgrading. Downgrading appears at first similar to downranking but is distinguished from it because, unlike downranking, the focal unit does not in itself form part of a lower-scale unit. With embedded (downranked) units, such as an embedded clause, the clause (such as "that influence the FX rate") remains intact within a lower rank unit (the nominal group, in the example). Rather, a unit is downgraded by being reconfigured into a new unit (Halliday & Matthiessen, 2014, p. 719ff.). The subtype of GM in play is determined by the nature of the source and target structures and the

dialectical semantic junction created. The main types of GMs, not including embedding, are shown in Figure 5.1. The typology shows how each type of GM is a translocation across "ranks" in the lexicogrammar (clause nexus, clause, and nominal group) and semantics (sequence, figure, and element).

For example, cause-conditional logic is congruently realised by a conjunction such as 'if', linking two clauses in a clause complex. This logical meaning can be reconfigured through grammatical metaphor as a grammatical unit at a lower scale, such as a Thing within a nominal group; Yoshi's word "factors", taken from the extract shown above, illustrates such a GM of cause-conditional logic, which is classified as a logical GM for maintaining in semantic tension the causal logic relation of the conjunction along with the semantics of an entity in the noun. Unlike with downranking, the downgraded unit (in the example, a logical relation between two clauses) is itself structurally reconfigured (from a conjunction to a noun, which forms a part of a nominal group) while maintaining logical semantics of the original structure.

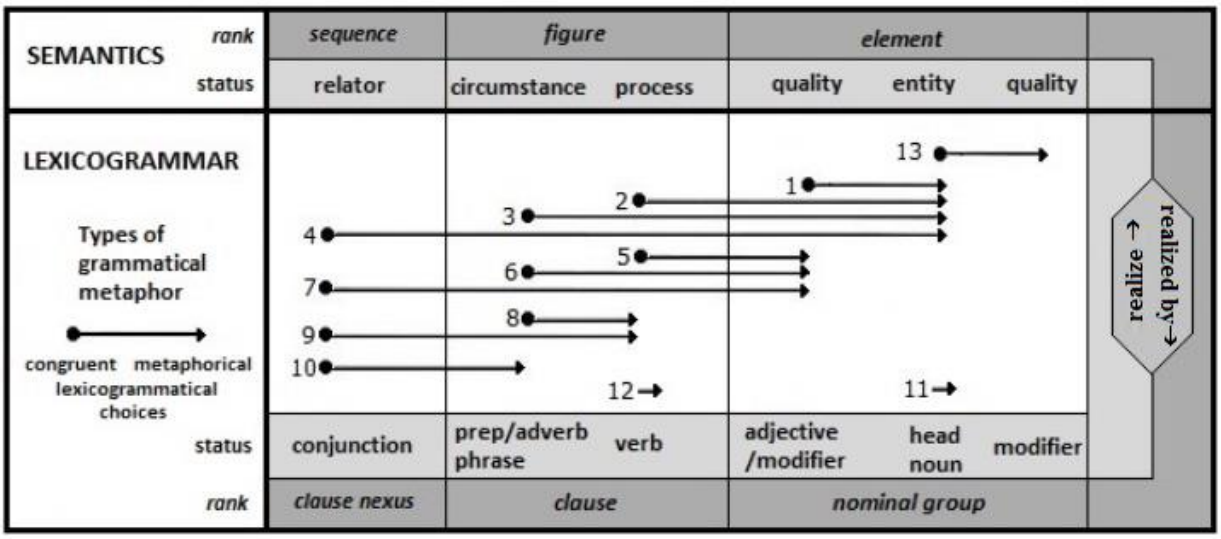


Figure 5.1. Types of grammatical metaphor by scope of downgrading (adapted from Halliday, 1998; Halliday & Matthiessen, 1999)

Yoshi's draft definition assignment illustrates the structural and functional aspects of downgrading: "factors" is used as an organizing concept for introducing "market volatility", whose subsequent explication as a factor in determining "the FX [foreign exchange] rate" includes the following cause-conditional logical relation construed congruently with the conjunction "if": "If the risk of dollars increases, you may prefer the asset paid in yen." The example illustrates how "factors" is understood as a logical GM of the congruent logical relation of "if", which is also the reconfiguration associated with downgrading. The example also shows the function of the GM in generating abstract terms ("factors") and technical terms ("market volatility"), as well as its textual function in previewing complex ideas for readers.

Academic writing, which tends to be informationally dense, is typically characterized by downgrading, which allows writers to 'pack' more ideational meaning into smaller structural units. In contrast, speech, in which interpersonal meanings are typically foregrounded, often involve 'upgrading', as in the metaphorical representation of modality in a projecting clause such as 'I think' from a group such as 'possibly': e.g., 'Possibly we should go' is upgraded through GM (to two ranking clauses) in 'I think we should go'.

Figure 5.1 presents the main types of downgrading, as described most fully by Halliday and Matthiessen (1999). The numbers 1-13 represent the 13 types of GM; the respective arrows for each type describe the downgrading involved in that type, with the head of the arrow at the metaphorical form and the tail (where the GM number is shown) at the congruent form.

These types of GM can be illustrated with a pair of configurations of an idea seen in Chapter 3: (a) "Registers have evolved" reconstrued metaphorically as (b) "This sociocultural evolution". The semantic configuration in (a) is realized by a clause; its metaphorical construal in (b) is at the rank of nominal group. The head noun "evolution" at the word rank is a de-verbal nominalization from the clause-ranked nuclear process "evolved", indicating that "evolution" is GM type 2 in the typology in Figure 5.1. In this process, the meaning of the higher-rank lexicogrammatical unit (clause) is downgraded and thereby 'packed' into a lower-rank one, implying that the meanings thereby shifted are realized within a smaller semiotic or meaning-making space. The notion of packing – as when information or processes of reasoning are said to be packed into discourse – is a useful lexical metaphor for the reconfiguring of meanings by downgrading.

As reviewed in the previous chapters, GM analysis implies an integrated theory of language in which language comprises lexicogrammar and semantics. Figure 5.1 provides various perspectives on the dynamics of GM within this integrated framework. At the centre of the figure are the thirteen general types of GM. These GM types can be tracked from below by lexicogrammatical status and rank; for example, GM type 2 involves a verb reconfigured in the structure of the nominal group as a head noun. They can also be tracked from above in the semantic stratum, which, following Halliday and Matthiessen (1999), also has various levels of delicacy. Most often, in SFL-based analyses these perspectives are integrated. The modelling of the semantic stratum into *sequence, figure* and *element* represents a theoretical advancement in the modelling of GM. With this development, metaphorical shifts can be viewed not only in terms of interstratal tension between lexicogrammar and semantics (as when a noun realizes a process meaning associated with verbs), but also as occurring within the semantics itself, intrastratally (e.g., the process selects the semantic figure, which, when metaphorized, realizes an element).

Before proceeding to an explanation of the thirteen types of GM, the discussion will benefit from a further clarification of the term *nominalization*. As introduced above, the interest in the present study is in the tendency of GM use to construe more nominal discourse; this tendency is clearly evident in the typology, as all GM types collectively tend to shift ideation from less nominal, more concrete construals of human experience and reasoning to more nominal and abstract construals of experience and reasoning as semantic entity. In this view, all thirteen types of GM may be considered nominalizations. However, in the literature, the term *nominalization* is often reserved for a limited number of GM types, a group that is reported to account for the majority of GMs in practice (Halliday, 1998). As described by Halliday and Matthiessen (2004, p. 656), nominalizations are GM types 1 and 2; that is, nominalizations are de-verbal and de-adjectival GMs. The special status of these GM types appears to be related to their relatively high visibility, related to high frequency and common realization by derivational morphology. In order to avoid confusion, this use of the term nominalization is retained in this study while the terms *nominality* and *nominalizing* are used in association with the wider mediating process of construing logical relations and human experiences as entities. Thus, in the present study, GM types 3-13 along with embedding will be referred to as grammatical metaphors or nominalizing (grammatical) metaphors.

Most types of GM are realized not by means of derivational morphology but rather by lexical reformulation. A lexically reformulated GM occurs, for example, when the congruent mental process *assess* is construed metaphorically not as the nominalization *assessment*, which entails a morphological extension of the congruent form, but as ideational grammatical metaphors such as *evaluation*, *view*, or *estimation*. While lexical reformulation is optional in de-verbal and de-adjectival ideational grammatical metaphors, it is necessary in metaphors of various other structures such as adverbial phrases (GM type 3) and conjunctions (type 4). This is the case in the example shown above from Yoshi's writing of the logical meaning congruently realized by the causal conjunction *if* being downgraded to the noun *factor*. Because of the additional semantic, lexical and morphological systems in play in lexically reformulated GMs, these GMs are understood to entail a more encompassing act of semiotic mediation than do morphologically derived nominalizations.

5.3 Realized grammatical metaphors: Types of shift

The full typology of GMs used in this study, shown in Table 5.1, is a synthesis of variations of typologies emanating from Halliday's theory of GM, notably from Halliday (1998) and Halliday and Matthiessen (1999), including a variation developed by Ravelli (1985/1999). The differences in Ravelli's typology (1985/1999), adopted, for example, by Jones (2006), are that it presents a reduced number of GMs compared with Halliday's, numbers them differently, and adopts classifications using the SFL system of transitivity, specifically of process types, to account more delicately for congruent realization. The typology used in the present study, which is described in more detail below, maintains the same number of basic GM types as in Halliday's model (with some variation in the number of sub-types), but uses Ravelli's numbering system as well as her account of process types.

As is conventional in GM analysis, the metaphorical shifts shown in Table 5.1 are broken down into four general kinds of shifts: shifts to entity, quality, process, or circumstance. The view of the typology from these four shifts de-emphasizes the congruent construal and the mediating process while emphasizing the realized GM, that is, the construal produced through the grammatical metaphor. The four shifts help organize the presentation of the GM types.

Table 5.1. Types of grammatical metaphor (adapted from Halliday, 1998; Halliday & Matthiessen, 1999; Ravelli, 1985/1999)

GM Cat. No.	**Metaphorical Realization** Function/ Status	**Congruent Realization** Function/ Status	**Example Metaphors** (***bold italics***)
1a	Thing/ nominal gp	Quality of a Thing/ adjective	***similarity;*** an ***extreme***
1b	Thing/ nominal gp	Modality/adjective	***ability; requirement; potential***
2a	Thing/ nominal gp	Material Process/verbal gp	***construction; experiment***
2b	Thing/ nominal gp	Mental Process/ verbal gp	***consideration***
2c	Thing/ nominal gp	Relational Process/ verbal gp	***identification***
2d	Thing/ nominal gp	Verbal Process/ verbal gp	***conversation***
2e	Thing/ nominal gp	Behavioural Process/verbal gp	***perception; behaviour; hearing***
2f	Thing/ nominal gp	Existential Process/ verbal gp	***existence***
2g	Thing/ nominal gp	AuxPr(tnse/mod/catn)/ vrbl gp	***prospect*** [*going to*]; ***desire*** [*want to*]; ***intention***; ***potential***
3	Thing/ nominal gp	Quality of Process; Circumstnc/ adverb; prep phrase	***manner; way; approach; attitude surroundings; proximity***
4	Thing/ nominal gp	Logical relator/ conjunction	the ***reason; comparison; condition***
5a	Epithet,Classifier/ adjective	Material Process/ verbal gp	***combined*** action; ***successive*** sections
5b	Epithet,Classifier/ adjective	Mental Process/ verbal gp	***considered*** way
5c	Epithet,Classifier/ adjective	Relational Process/ verbal gp	***characteristic*** features
5d	Epithet,Classifier/ adjective	Verbal Process/ verbal gp	***undiscussed*** issue
5e	Epithet,Classifier/ adjective	Behavioural Process/verbal gp	***unheard*** comment
5f	Epithet,Classifier/ adjective	Existential Process/ verbal gp	***existing*** evidence
5g	Epithet,Classifier/ adjective	AuxPr (tnse/mod/catn)/ vrbl gp	***previous*** [*used to*]; ***initial*** [*begin to*]
6a	Epithet,Classifier/ adjective	Quality of Process; Circumstnc/ adverb; prep phrase	***brilliant, early*** work; is **consistent** with [done *similarly*] ***superficial*** marks [marks made *on the surface*]
6b	Epithet,Classifier/ adjective	Modality/ adverb (modal)	***impossible*** idea; ***potential*** action; **bare** pass [*barely* pass]
7	Epithet, Classifier/ adjective	Logical relator/ conjunction	***previous*** task; ***causal*** reasoning
8	Process/ verbal gp	Minor Process/ preposition	***replace*** [instead of]; ***concern*** [about]
9	Process/ verbal gp	Logical relator/ conjunction	he ***develops*** X***; he argues*** [*to* get X, he says A *then* B]
10	Circumstance; Conjunctive/ prep phrase	Logical relator/ conjunction	***as a result*** [*so*]***; under those conditions*** [*if* it snows]
11	Thing/ nominal gp	X	the ***fact*** ; ***phenomenon***
12	Process/ verbal gp	X	something ***occurs; happens; exists***
13a	Qualifier/ postmod.adjective	Thing/ nominal gp	decision ***of gov't*** [*gov't* decides] views, works ***of Plato***
13b	Possessive Deictic/ adjectve	Thing/ nominal gp	***government's*** decision; ***Augustine's*** works
13c	Epithet, Classifier/ adjective	Thing/ nominal gp	***government(al)*** decision; ***Augustinian*** view
13d	Epithet/ adjective	Circumstance/ prep.phrase	***lengthy*** argument [argued *for a long time*]
13e	Qualifier/ postmod.adjective	Circumstance/ prep.phrase	departure ***for the airport*** [departed *for the airport]*

Table 5.1 presents the types of GM by function and status, the corresponding congruent realization by function and status, and example metaphor. For this study, Halliday and Matthiessen's (1999) numbering of sub-types of GM has been adapted; for ease of reference and concordancing, the roman numeral suffixed to the GM number (e.g., 2i, 2ii, 2iii, 2iv) has been adapted to letters (e.g., 2a, 2b, 2c, 2d). Also, some subtypes in the typology presented in Halliday and Matthiessen (1999, pp. 246-248) were combined in the present operationalization, including for GM types 3 and 12.

5.3.1 Shifts to entity

Figure 5.1 shows the arrows for GM types 1, 2, 3, 4 and 11 terminate at the semantic status of *entity*. Thus, these GM types represent *shifts to entity* (or *Thing*). GM types 1 and 2 are de-adjectival and de-verbal nominalizations. As shown in Table 5.1, de-adjectival nominalizations are of two types: GM type 1a is the unmarked type and 1b is a nominalization such as *ability*, which is construed from a modalized adjective (i.e., *able*). GM type 2 represents de-verbal nominalizations, with seven subtypes. As shown in the central column of Table 5.1, GM types 2a–2f represent shifts from the six types of processes identified in the transitivity system (i.e., Material, Mental, etc.). Thus, for example, GM type 2a represents a shift from a congruent Material Process such as *construct* to an entity *construction*, while GM type 2b represents a shift from a congruent Mental Process such as *consider* to the entity *consideration*. GM type 2g represents shifts to entity from modalized processes, thus, for example, from *will go* to *intention to go.* The overlap between interpersonal and ideational grammatical metaphor is evident in GM sub-types 1b and 2g (as well as 5g and 6b, introduced below), all of which involve the experientialization of the interpersonal function of modality.

GM type 3 involves shifts to entity from circumstances or qualities of processes. The congruent grammatical categories associated with type 3 GMs are preposition and adverbial phrases and adverbs. As with de-verbal nominalizations, these GMs represent a downgrading shift from semantic *figure* (grammatical *clause*) because the process and its qualities are theorized ideationally as clause-nuclear. GM types 1–3 all represent a downgrade of a single rank, semantically the shift from figure to element. GM type 4 represents a downgrade across two semantic ranks, from a sequence (realized grammatically by a conjunction in a clause nexus), by-passing the clause, to an element. This is the most extensive possible metaphorical

shift; correspondingly, as metaphors of logical reasoning, these GMs are highly abstract, such as *reasoning* and *condition*, which could be metaphors of the respective conjunctions *so* and *if*. The last type of shift to entity is GM type 11. GM types 11 and 12 are abstract, strictly semiotic construals. They construe an experience without necessary reference to a natural congruent precedent. Thus, GM type 11 is a direct-to-abstraction wording realized as a noun/entity such as *phenomenon*.

5.3.2 Shifts to quality

GM types 5, 6, 7 and 13 represent downgrading shifts from various semantic statuses to the status of quality. This target status is the quality of an element that is realized grammatically by a nominal group modifier. As with GM type 3, GM type 5 is a shift whose congruent realization is a process; correspondingly, the qualities that are construed by these GMs are subclassified by the type of process it originated from. Thus, for example, GM type 5c resonates with the semantic junction of a relational process, such as the attributive relational process *have,* which may be metaphorized as the quality *characteristic.* As noted, GM type 5g originates from a congruent modalized process; the congruent modalized processes include not only modal verbs such as *can* and *will* but also conative expansions of verbs in complex verbal groups such as ***want to*** *explain* and ***come to*** *understand*. Like GM type 3, type 6 GMs originate as qualities of a process, either unmarked (e.g., *similarly*) or modalized (e.g., *possibly*), which are metaphorized to qualities of an entity, e.g., respectively, *consistent* or *possible*. GM type 7 represents another extensive, two-rank downgrade, in this case from a relator (e.g., *before, because*) to a relatively abstract quality of an entity, such as, respectively, *previous* and *causal*. The only type of GM in Halliday's typology that represents a shift away from entity is GM type 13 and its subtypes, which involve the construal of an entity as a quality. The effect of these types of GM on textual 'density' can easily be appreciated in type 13c, which represents a very common shift in academic discourse, the shift of an entity to the classifier of an entity, thus from the entity *government* to its construal as a nominal group modifier, as in ***government*** *decision*.

5.3.3 Shifts to process

With shifts to process and circumstance, GM types 8, 9 and 12 may not be perceived as metaphorical perhaps because the metaphor is not directly nominalizing; that is, they do not

construe an entity or quality of an entity. However, these metaphors are nominalizing in the overall system of GM in the sense of drawing meaning towards greater abstraction and nominality. GM type 8 involves the construal of a preposition as a process (Halliday and Matthiessen (2004) theorize the preposition as a *minor process*, that is, a structure with some semantic features of a process); this occurs for example when the preposition *about* is construed as a process *concern*. Like GM type 1, type 8 involves a relatively minor shift as it occurs within a rank. GM type 9 involves the reconstrual of a semantic relator, congruently realized as a conjunction, as a process, as when the conjunctive meaning of *so* realizing a causal relation is construed in the process *cause.* As noted above, GM type 12 is of the strictly semiotic type, when a meaning is construed without a congruent experiential precedent, as in the metaphorical process *happen*.

5.3.4 Shifts to circumstance

The final general type of GM is GM type 10, which is a shift to circumstance from a relator. This type can be illustrated by the downgrading shift from the congruent construal of a logical relator such as *because* to a circumstance or information-rich adjunct such as *because of this* or *as a result*. Even though the downgrading involved in GM type 10 is just of a single rank from sequence to figure, this type of metaphor is especially productive in mediating processes of reasoning from their congruent form between clauses to a metaphorical form of language logic in clause-internal reasoning (Martin, 1992).

5.4 Embedding as grammatical metaphor

A kind of GM not represented in Figure 5.1 and Table 5.1 but which is conventionally treated as nominalizing metaphor is embedding. The distinction between embedding as a process of downranking, and ideational GM as one of downgrading was made in Section 5.2 above. Embedding involves a downranking of phrases and clauses. A clause naturally realizes a semantic *figure*, the transitive nature of which is selected by its Process; a prepositional or adverbial phrase naturally realizes the clausal constituent, Circumstance. The most common use of embedding is to expand the nominal group through postmodification (Halliday & Matthiessen, 2004). When the figure is downranked as a quality of an entity and thus embedded within a nominal group (as in a post-modifying relative clause), the result is a semantic junction between

the embedded semantic *figure* (realized by the relative clause) and the semantic *quality* of an *element*. For example, the following nominal group contains a post-modifier achieved by downranking (in italics): "the materials [[*that compose a sedimentary rock*]]" (Halliday & Matthiessen, 2004, p. 438). As per convention, embedded clauses are shown in double square brackets and embedded phrases in single square brackets. A phrase may also be downranked and embedded as a quality of an entity in the nominal group. The entire nominal group quoted above is itself embedded in a downranked, embedded circumstance (in italics), which is in turn embedded as a post-modifier of a nominal group: "the origin [*of the materials* [[*that compose a sedimentary rock*]]]" (p. 438).

A less common type of embedding is when the clause or phrase is downranked to the lexicogrammatical rank of the group realizing a Participant, as when a clause functions as a Participant and, typically, Subject in the clause. In the following example, a clause is embedded as the Subject within another clause: "[[Knowing the origin of the materials that compose a sedimentary rock]]… will permit such interpretation" (Halliday & Matthiessen, 2004, p. 438).

5.5 Genetic analysis of GM-mediated abstraction in L2 academic writing

As indicated in Figure 5.1, a GM is identified by tracing the dynamic process of metaphorical construal back to the congruent construal from which it emerged logogenetically, ontogenetically and/or phylogenetically (Halliday, 1998; Derewianka, 2003; Ravelli, 2003). The congruent realization of many GMs in students' writing can be traced either endophorically or exophorically, and their classification in the GM typology determined by a genetically prior construal. A brief explanation of the approach to identifying GMs is called for.

The process of determining the genesis of GMs in student writing begins with identifying a possible grammatical metaphor and tracing the meaning realized by this wording across agnate or approximately agnate construals in the text and across the student's writings *in the EAP writing course*. This approach implies that the course is a key genetic timeframe in the act of mediating knowledge construction by means of GMs in play in this context. This methodological choice was made because, in the span of the writing course, students recontextualize and construe a relatively bounded domain of knowledge within their respective scholarly fields. The interpersonal domain of the course is particularly important as the primary reader, the course instructor (who is also the present researcher), is the same person throughout the course, and is

not an expert in these fields. For these reasons, the students' writing is understood to build the reader's disciplinary knowledge incrementally over the 14 weeks of the term in a networked set of field-specific knowledge claims recontextualized within a relatively constant interpersonal context.

As noted in Chapter 4, the four focal learners were committed to specific research streams within their respective fields: Yoshi: 4th year undergraduate student in international economics; Taka: 1st year master's student in development economics; Haru: 1st year master's student in religious philosophy; Sotty: 1st year master's student in medical ethics. This disciplinary focus is reflected in the scope and purposes of the four short writing assignments written and revised in the English for academic purposes (EAP) writing course. The writing includes a pre-course assignment identifying a focal problem in their field, an extended definition of a disciplinary term, a commentary on data, and a problem-solution text. The apprentice scholars had multiple purposes for these course assignments; indeed, in supplementary data, the four focal students reported planning to re-purpose these texts in their MA theses, graduating projects and graduate school applications. This focus accords with another feature of the sampling. These four students reported the intention to pursue doctoral-level studies in their respective fields.

An example of the process of identifying a GM genetically is provided from Sotty's writings. For the second piece of writing produced for the course, the extended definition text, Sotty defines and problematizes the concept of *autonomy* in medical ethics, in the clinical context of artificial insemination by donor (AID). Intuitively, *autonomy* stands out as an abstract concept construed by means of grammatical metaphor. The task in genetic analysis of GM is to identify the kind of GM "autonomy" might be by identifying the genesis of this concept in Sotty's writings within the scope of the EAP writing course. In the same writing assignment, a logogenetically prior, congruent realization of the semantics of "autonomy" is construed in the adjective "free", within the figure "a person should be free to make decisions" (Sotty; DEF1; cl.3). With this semohistory, "autonomy" could be identified as a de-adjectival, type 1 GM. However, another congruent construal of "autonomy" that is prior to GM type 1 is identified in Sotty's earlier writing from the course, the pre-course writing assignment. This construal indicates that the semantics of autonomy originate in a combination of conditional logic and deontic force of "if couples want AID and it makes them happy, it should be carried out" (Sotty;

PC; cl.11). Thus, "autonomy" is tagged in the corpus as a type 4, de-conjunctive GM. Sotty's construal of "autonomy" in the EAP course is tracked to a more fundamental ideational and interpersonal meanings associated with the condition (n.b., "if") and ethics ("should") of choice. This is also the premise upon which autonomous subjects would be considered "free".

The analysis proves to be appropriate in the context of Sotty's exposition. He goes on to problematize the logic of individual parental autonomy by indicating that children conceived through AID face different conditions and unequal levels of autonomy, a matter of ethics that has not been sufficiently problematized in view of rapid developments in medicine. What stands out is that Sotty's arguments against the conventional notion of autonomy in medical ethics are clarified by being unpacked not just to the attributes of differently positioned social subjects (whether or not they are "free") but rather to the ethics and logic of the conditions under which differently positioned social subjects can or cannot act.

This relatively explicit determination of the genesis of metaphor in the social semiotic context of the EAP course is a methodological solution to the challenges in metaphor studies of identifying the genesis and longevity of metaphors (see e.g., Ravelli, 2003). However, as discussed in the literature review, in contexts of second-language learning and teaching, as well as in contexts of disciplinary apprenticeship and recontextualization, semantic and lexicogrammatical systems in play are unstable in many aspects.

The relative fuzziness and systemic play that characterize these social semiotic contexts encourage an expansive definition of what constitutes a metaphor. From the ontogenetic view, potentially much can be gained from investigating the semogenesis of abstract ideas in apprentice L2 scholars' writing. The openness of metaphors to downgrading and upgrading (packing and unpacking) is highlighted in L2 academic writers' practices as they negotiate knowledge construction using variably limited foundations in their second language in conjunction with developing understanding of the scholarly field. As noted in the previous chapter, the expanded semiotic potential in such contexts increases the potential for error as well as for originality. A related argument for making metaphorical construal explicit emerges from context of instruction; according to Byrnes (2009), Schleppegrell (2004a, 2004b) and others, the explicit instruction in GM contributes to learners' academic writing development. Accordingly, from the ontogenetic perspective, these contexts require that metaphors rarely be taken for granted as conventionalized (i.e., dead).

More generally, the context recommends treating grammatical metaphor as a robust, dynamic and highly determining social semiotic phenomenon. As can be observed from the analysis of "autonomy" in Sotty's writings, insights into learners' resources for mediating knowledge construction can be gained from tracking semantic junctions associated with GMs across their writing. Of course it is not the task of this report to present the genetic history of every GM tagged in corpus, but rather to report the results of such analysis with sensitivity to context. The insights gained from such tracking inform the nature of learners' language and literacy development. As part of this, the genetic tracking of metaphors is also responsive to the context of writing in the multidisciplinary EAP course, where apprentice scholars are tasked with recontextualizing knowledge for non-expert readers.

5.6 Cross-checking grammatical metaphor analysis using corpus methods

The analytic methods described above were brought together and cross-examined against the theoretical framework, the research questions and the data with the aim of producing a reliable and valid account of grammatical metaphor (GM) use by the apprentice L2 scholars in their writing. However, the design of the research should go further to guarantee such an account. The complex process of text analysis introduces other possible problems. In GM analysis, one area of vulnerability is variability in the analyst's interpretation of the parameters of semogenesis of specific GMs and GM types (e.g., see Derewianka, 2003; Ravelli, 2003). Such risks are heightened in analysis carried out by a researcher working alone on the corpus.

One solution would be to recruit trained analysts – whose analyses have been calibrated for consistency and accuracy – to cross-examine the GM analysis. Predictably, this has not been possible in this study but two features of the study should help the case for an explicit and replicable analysis. The first is that the GM-tagged corpus of writing produced by a focal subject Yoshi is provided in Appendix 1; this affords transparency in the analysis that stands to inform discussion and possible improvement of the methods. More immediately, the analysis of GM in the corpus was calibrated against itself and the typology of GM using the two-stage corpus-based method described below. Key references in the use of corpus methods in this study are Boulton, Carter-Thomas and Rowley-Jolivet (2012), Sinclair (2003), and Thompson and Hunston (2006).

During and after the analysis and tagging of students' texts for GM, the texts were saved as text (.txt) files and input into the concordancing software program AntConc (Anthony, 2006,

2014; Römer & Wulff, 2010). The GM tags have been added in superscript at the end of the metaphorized lexical item (e.g., from Taka's definition assignment: This limitation[4n] [of[13a] the NPV[7n, 6a, 5b] framework[3n]]) using the number of the GM type and a letter for the subtype, thus 13a, 7n and so on. The placement of the GM tag in phrasal GMs deserves explanation; while the great majority of GMs are realized as a single lexical token, for GM type 10, which is a de-conjunctive metaphor realized as a phrasal Circumstance or Adjunct, the tag was placed after the preposition initiating the phrase. This also applies to metaphorized post-modifying phrases of nominal groups in GM types 13a (as in the embedded phrase quoted above, "of the NPV framework") and 13e. It is also noted that the number-letter format of the tags facilitated queries of GM tagging in the corpus by filtering out the many stand-alone numbers that appear in the students' writing; for this reason, GM types with no subtypes (3, 4, 7, 8, 9, 10, 11, 12) were tagged with the letter 'n', thus 3n, 4n, 7n and so on).

The calibration of the GM analysis was conducted in two phases. First, concordances were run for all GM subtypes. This produced concordance results for each GM subtype, the results of which were cross-checked against each other for consistency. Antconc has the facility for querying specific concordance lines; by clicking one result, this result is shown in its original textual context, making available to the analyst the full scope of the original cotext for genetic analysis of the metaphor, if necessary. A screen shot of an early concordance result for GM type *1a* is provided in Figure 5.2.

The sample concordance result in Figure 5.2 can be used to illustrate the processes of calibration and correction of the analysis. In this result, hit #6, shows that "realm" was tagged as a grammatical metaphor, as was "reality" in hit #11; however, while "reality", in context of Haru's writings in religious philosophy, was found to resonate semantically with the genetically prior attribute "real", the token "realm" was not. In this case, "realm" was re-categorized as a relatively rare GM type 11, which construes the more strictly semiotic entities such as *phenomenon*. This process helped to ensure accuracy in the classification of GMs.

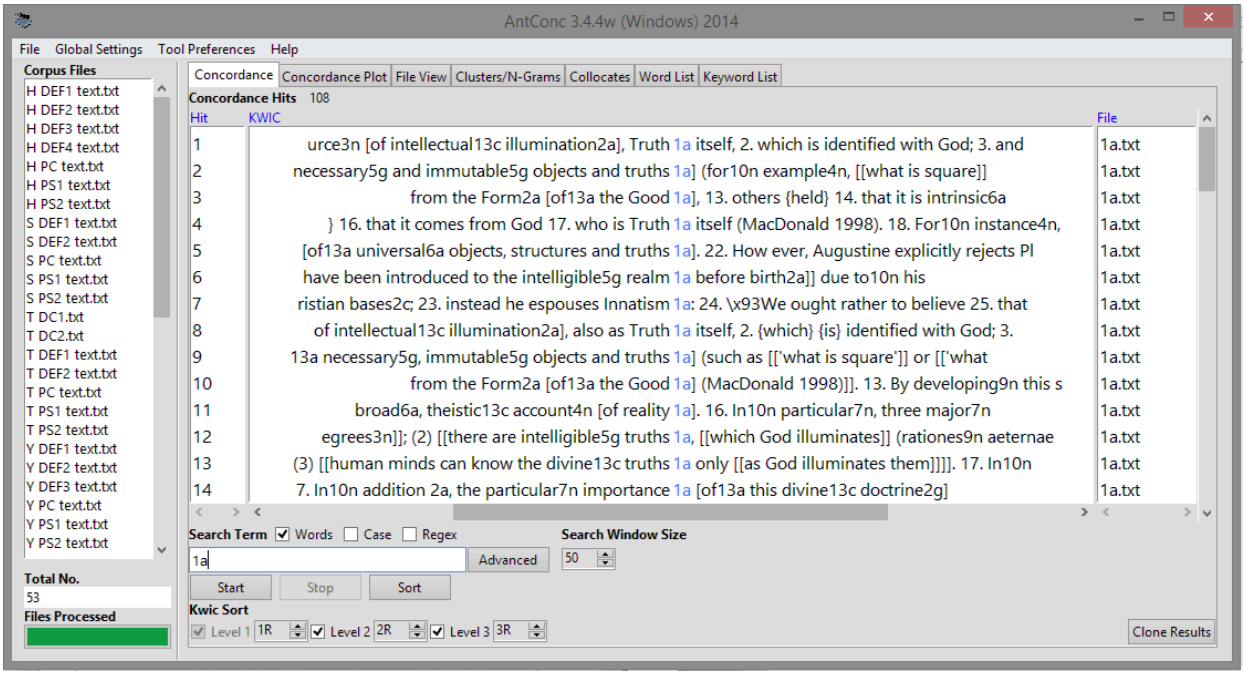


Figure 5.2. Calibrating GM analysis: Concordance result for the GM sub-type *1a*

As shown in the above example, perspective on the analysis is also gained from querying lexis, which of course is a key affordance of concordancing (Sinclair, 2003). Thus, a second phase of the calibration and correction process involved querying the GM analysis from the lexical perspective. Using Antconc's wordlist function, a list of words used in the corpus was produced in order of frequency of occurrence. The words listed that had been analyzed as GMs appear with their tags; this allowed for focused sampling of salient individual GM tokens for consistency and accuracy in the analysis. It is important to appreciate, in accordance with various theoretical parameters of GM analysis reviewed above, that the same word may be one type of GM in one context, and another type in another (Derewianka, 2003). The screenshot in Figure 5.3 shows such a case.

The concordance result shown in the Figure 5.3 is for the GM token "developing"; the first fourteen hits are shown. The first five hits are from Haru, who uses "developing" as a non-finite process. In this use, "developing" reconstrues the logical and semiotic processes undertaken by philosophers in generating their mediating concepts such as an "analogy" and a "moral"; it is a GM type 9 because the process is a compacted reconstrual of a series of logical moves involved in generating such philosophical concepts, i.e., a series of clause complexes

joined by conjunctions. The logical sequence metaphorized and compacted in the process "developing" is implied by the associated circumstance of manner (quality), "in an explicit theological direction", which can itself be further unpacked (schematically) to an implication sequence such as 'x was undertaken *and* y was considered *so* z was conceived theologically'. A similar explanation applies to the sixth hit for "developing", which nonetheless comes from Sotty in medical ethics, where the semiotic tool in discussion is not an "analogy" but a "moral principle".

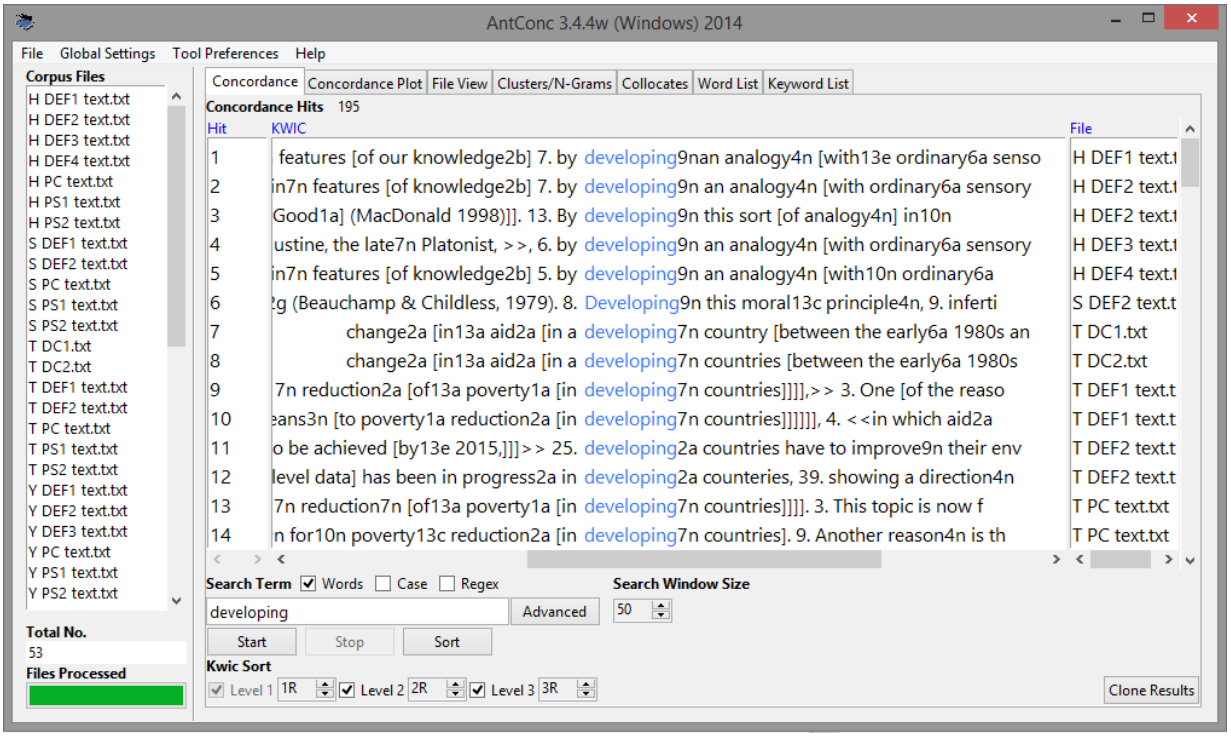


Figure 5.3. Calibrating GM analysis: Concordance result for the token *developing*

Hits 7-12 are from Taka in development economics, where, predictably, "developing" is a nominal group pre-modifier used to sub-classify countries. None of the uses shown in this sample are for "developing" as a non-finite process. However, as with GM type 7, this use also finds its genesis in a series of logically-linked steps. This hit is a GM type 9 because the logical steps lead to the construal not of a process but a classification of a country. This explains how these are grammatical metaphors of logical meaning. In this case, however, the query produced

an inconsistency, shown in hits #11 and 12, where "developing" was tagged as GM type 2a, which is incorrect on two counts: GM type 2a is a metaphorical process-entity; however, "developing" is in this case a classifying premodifier of the entity "country". So if the genetic analysis of this metaphor had found it to reconstrue a Material Process, the tag should have been GM type 5a. However, in this context of development economics, as those described for philosophy and ethics, the process of "developing" has a prior semogenesis in a logically staged implication sequence of how economies change. Thus, the two tags were corrected to GM type 7. By using the corpus tool to query the analysis of GM from the two perspectives of type of GM and lexical lemmas, I cross-examined the original GM analysis of the corpus twice.

5.7 Nominal density

In order to define the term *nominal density*, it is important first to establish the motivation for introducing this term in discourse studies. The concern in this part of the study is with the ways the writing students use GM to mediate context-relevant changes in levels of abstraction, which Halliday calls the "pay-offs" of GM (Halliday, 1998). These changes implicate all aspects of register: the functions of interpersonal positioning, text organization, logical reasoning, and representation by academic abstraction and disciplinary technicality. As noted in the earlier chapters, these functions have been identified as challenging for apprentice second-language academic writers (e.g., Schleppegrell, 2004a).

For the tasks of choosing where to focus and what to highlight in relation to the above functions of GM in the student writing, I have relied on the concept of nominal density (ND), which is an extension to Halliday's (1998) GM analysis that was shown in Figure 5.1. Broadly speaking, ND analysis provides a single analytic instrument for investigating the use of GMs collectively and by type. The affordances of ND analysis as described here assume a corpus of texts that has been comprehensively tagged for GM types. This note also serves as a reminder that ND analysis extends rather than replaces conventional GM analysis. Procedures for calculating ND analysis will be presented in the next section, following a discussion here of the rationale for ND analysis.

One major advantage of the analysis of GM in discourse by means of ND analysis over conventional GM analysis is scalability. ND analysis allows relatively easy change in the granularity of focus between mediation carried out in various linguistic functions, levels of the

word, phrase, group, clause, text, and corpus. For example, ND analysis provides a general view of the nominal profile of the text – the dynamic profile of changes in abstraction. This profile is useful in itself in addressing such questions as changes in levels of abstraction associated with the nature of claims and their support, as well as (yet unexplored) generalized aspects of academic writing such as median levels of abstraction – reminiscent of Halliday's (1998) "favourite clause type" in science – determined by rigorous methods for particular texts, tasks, writers, or disciplines. The overview of changes in abstraction offered in the ND profile of a text can indicate areas of interest deserving of closer investigation, such as of specific discourse functions or specific types of GM. Findings for such functions can be interrogated in their dynamic aspects; for example, in Chapter 6, results are presented for variable trajectories among the four students across their course assignments in the distribution of abstraction of logical reasoning relative to abstraction of experience. Analysis at any of these scales can be linked to distributions of GMs according to other functional grammatical tools at more delicate levels, such as within the clause; for example, Chapter 7 provides an analysis of the distribution of abstraction in the clause-level Theme relative to the Rheme. Of course, the results of such analyses are made relevant by being linked to variation in situated meaning-making practice. Additionally, similar to lexical density and grammatical intricacy analysis, ND analysis is quantifiable with the attendant advantages of a stable basis for discussing the extent of abstraction in L2 academic writing and the role of GM therein.

As discussed and illustrated in Halliday's (1998) typology, GMs clearly vary in the scope of the metaphorical shift involved. However, conventional analysis of nominalization or quantitative analysis of nominalizations per clause, for example, do not inform us directly of the semiotic scope of the GM and hence the extent of the semiotic mediation involved. For example, analysis of nominalization per clause alone does not distinguish between the radical reconstrual of ideas involved in a de-conjunctive nominalizing metaphor (GM type 4) and a relatively subtle reorganization of modifiers within a nominal group (GM type 13) or a de-adjectival nominalization (GM type 1) that involves a relatively small shift, an act of mediation within the nominal group rank that is often morphologically accommodated. A de-conjunctive GM implies an elevated level of mediation involved in re-construing the logical reasoning linking two clauses as an entity, that is, in experientializing logic. The lack of distinction in weighting the extent of mediation is also evident in conventional analysis of nominalizations whereby de-adjectival

nominalizations are accorded the same mediational weight (if a different mediating function) as de-verbal nominalizations. Although the latter act of mediation involves a traverse across semantic ranks from figure to element, the former involves a relatively local shift occurring within the nominal element. Of course, the analyst of nominalizations per clause is able to extend the analysis by pointing out these distinctions in the mediating scope of the metaphor. The issue at hand is that the conventional analysis does not itself generalize these distinctions in scope of mediation to a single account of the nature of GM, nominality and abstraction.

Interest in relative functional loads of GMs is especially motivated by the theorization of language as a social semiotic. We know that situated social subjects mediate meaning with and for others in contexts using (with or without conscious intention) socially-evolved semantic systems (Halliday & Matthiessen, 1999; Hasan, 2005/1992; Williams, 2005b). It follows that the more semantically encompassing the linguistic system or structure, the greater its functional potential in context. This applies to lexicogrammatical systems: our potential for realizing experiential meaning, for example, is greater with the complete system of process types than with, for example, the system of Material Processes alone. In view of language structure and constituency, the claim is trivial: all else being equal, we are able to mean more in a clause, for example, than in a group or phrase; likewise, a clause-complex has greater meaning potential than a clause.

5.7.1 Operationalizing nominal density

The key methodological move associated with nominal density analysis is to emphasize the semogenesis of GM as a mediational resource. Thus, while the conventional GM analysis tends to emphasize the semantic configuration that *results* from GM, a focus that is evident in the *shift to x* perspective on GM (reviewed above), ND analysis accounts for the mediating process that takes place in metaphorical construals across the language system. The scope of the mediating process involved in a particular GM is analyzed according to the scope of the downgrading in and beyond grammatical rank in the language system. While grammatical rank of course implies a clause-level unit, the analytical unit immediately above the clause accounted for in conventional GM analysis is the clause nexus, congruently realized by a conjunction. Because the term ‘rank’ does not capture the domain of all possible GM downgrading shifts, the terms ‘scale’ and ‘level’ are used. As shown in the bottom row of Figure 5.4, nominal density

analysis is based on values attributed to metaphorical shifts that occur within a level (ND value of 0.5), across adjacent levels (ND value of 1.0), and across two levels (ND value of 2.0).

As the basis for ND analysis, a baseline value for ND of 1.0 represents a semantic displacement of a single level. This is a metaphorical displacement spanning adjacent ranks, which is the most common scope of shift among GMs and also represents the best-known type of GM, which is de-verbal nominalization (GM type 2). As seen in Figure 5.4, the baseline ND value of 1.0 is observed in two kinds of shifts: from the clause-complex to its adjacent level, the clause (GM types 8, 9, 10), and from the clause to the nominal group (GM types 2, 3, 5, 6).

The baseline ND value of 1.0 is situated between the two other possible scopes of metaphorical dislocation, one of greater scope and one of lesser scope than the baseline. Of greater scope is the dislocation between non-adjacent levels, which is only possible in the shift from a sequence to an element, as when the logical meaning of a conjunction is construed as a head noun, or nominal group modifier. This dislocation is valued at twice the baseline value, at ND 2.0. Thus, the GM types 4 and 7 have ND values of 2.0.

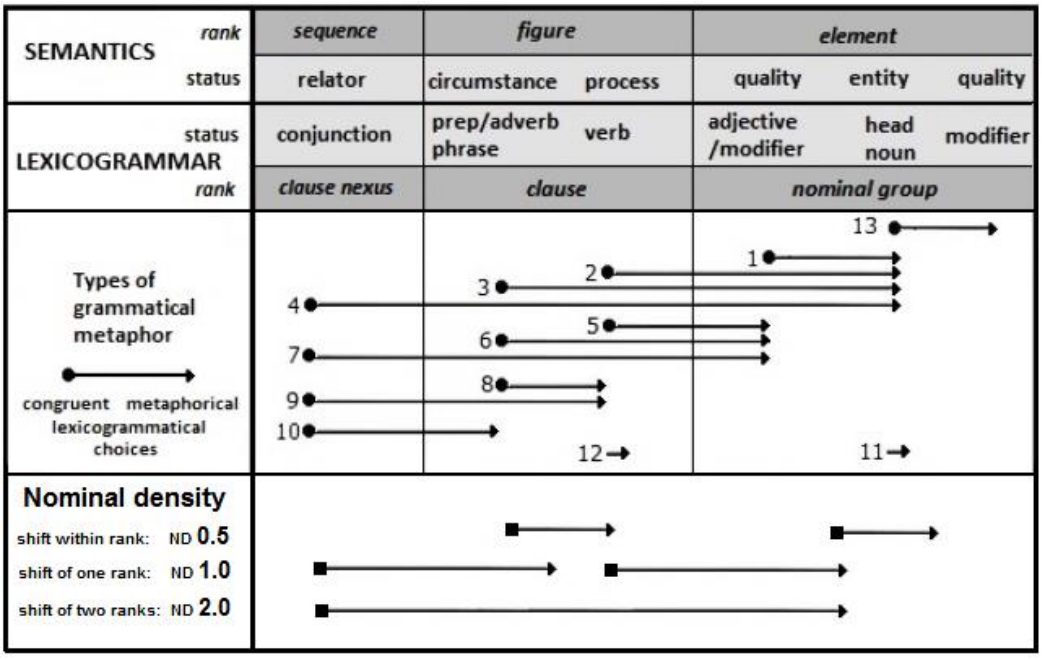


Figure 5.4. Typology of grammatical metaphor with nominal density values

Of lesser scope than the baseline value is the dislocation *within* a single level. This occurs in two possible grammatical contexts: within the nominal group, between the head noun and noun modifier; and within the clause, that is, between the adverbial or preposition phrase and verb as presented in Halliday (1998) and Halliday and Matthiessen (1999). The shift within a single level is accorded half the baseline value, ND 0.5. The types of GM with an ND value of 0.5 are 1, 8, 12 and 13.

Nominal density analysis must also account for embedding. The ND values of embedding are determined by the rank of the host structure of the embedding. A phrase or clause that is embedded as a Qualifier, that is, as a nominal group modifier, has an ND value of 0.5. When a phrase or clause is construed as an Element embedded in a clause, specifically as a Participant in the transitivity of a clause, the ND value of the embedding is 1.0.

This simple "differential system of weighting" (Halliday, 1985a, p. 66) applied to Halliday's immensely rich model of GM provides a renewed vantage from which to investigate linguistically-mediated abstraction. With ND analysis, the dynamic semiotic work of GMs is not assessed at any single static level, notably the clause, which SFL shows to be an extremely pliable and scalable mediating resource. The theory shows that with advanced adult language, we think not in clauses, but in grammar, where the clause rank itself is a central mediating resource among the several others also available. Accordingly, the baseline for ND analysis is not the clause, but the dynamic process of downgrading within, to and from the clause.

A particularly exciting potential insight offered by ND analysis emerges from the analysis of its standard deviation in individual texts and across learner corpora; that is, what is the median scope of abstraction within which learners construe knowledge in any particular corpus, text, or text phase? Answers to this question would appear to approximate descriptions of learners' situated potential for regulating abstraction in their writing, in accordance with Halliday's (1993a) theory of language learning as the potential to mean.

The main potential benefits of ND analysis have been explained and, it is hoped, will become evident in the analysis of student writing in Chapters 6 and 7. As may be expected, there are also costs associated with ND analysis. The costs are primarily associated with generalization and potential greying out of an immeasurably complex array of semantic and linguistic practices involved in socially situated meaning making. For example, it may be argued that a single clause is capable of realizing several semantic elements, so attributing an element with half the

semantic value of clause may seem almost arbitrary. The response to such a criticism is that the ND instrument is initially proposed here as a tool for gaining a scalable, social semiotic perspective on the nominal profile and abstraction of a text. In this regard, it is important to keep in mind that ND analysis as it is proposed is only achievable through the same painstaking text analysis of conventional GM analysis, work that involves the tracing of meanings across text in order to determine the presence and nature of metaphoricity. Thus, the benefits of close qualitative GM analysis are available in ND analysis. As indicated above, a distinct advantage of the ND extension for such analysis is the text- and corpus-wide quantitative perspective on abstraction, indicating possible areas of interest deserving of closer investigation. This completes the first stage of operationalizing GM analysis in the nominal density instrument.

The second stage is to begin to validate nominal density analysis formally against the established instruments in the field, lexical density, grammatical intricacy, and length of clause. The close association of these measures is evidenced in the results of qualitative and descriptive statistical analyses presented in Chapters 6 and 7; these analyses are the best evidence in this study for the validity of ND analysis. However, evidence for the validity of the ND analysis is also provided through inferential statistical analysis, although it is understood that the results from this analysis should not be generalized to other populations or subjects. The main purpose of the inferential statistical analysis is exploratory, to indicate directions for ND-based studies with larger datasets.

5.7.2 Pilot statistical analyses for validating nominal density

As nominal density is a new instrument, it is important to interrogate its validity. The quantitative nature of the instrument facilitates this. As noted above, the three established means for investigating the use of GM and associated development of academic writing are lexical density (LD), grammatical intricacy (GI) and length of clause (LC). LD analysis has been shown to be a relatively reliable indicator of the nature and extent of information density in a text, especially as this is evidenced in the continuum between speech-like and writing-like discourse (Halliday, 1985a). However, as Halliday's (1985a) own discussion of LD analysis shows, LD is not without problems in the way density is weighted; two texts with the same LD score can vary significantly in levels of metaphoricity and abstraction. Problematic features in LD analysis also arise that highlight the difference between LD-related information density and nominal density-

related abstraction; an easily identifiable issue being how list-rich texts such as shopping lists, and relatively name-rich texts such as literature reviews which contain many proper names, will show a high LD but whose information density cannot be well-accounted for by GM analysis. In the final analysis, while LD is very useful, it is a proxy measure of the nominal and abstract nature of discourse. Still, along with GI and LC, LD remains a useful instrument, as is evident by the many exemplary studies in which it is employed. While ND is the main instrument in this study, results for LD, GI and LC are also presented. Furthermore, as established means of indicating the extent of GM in a text, these instruments provide a useful methodological point of departure for the study.

This report is from inferential statistical analysis of correlations between the analytic results from the four writing students' course writings for ND and the other measures. As noted above, the study also integrates many descriptive statistical analyses; however, the focus in this section is on inferential statistics, which are statistical analyses based on a model that adjusts the data for intervening variables. As a quantitative measure, ND invites statistical analysis. However, it must be emphasized that the inferential statistical analyses reported in this study are based on a limited dataset; other limitations are also reported, such as the non-independence of ND scores for multiple drafts of a single assignment written by the same writer, which, for simplicity (and due to the limited size of the dataset), were treated as independent texts. Also, although the ND measures for all clauses in each text are aggregated at the level of text, it may also be argued that, as a clause-based measure, the ND measure for each clause is not independent of the same measure for clauses in the same text. For these reasons, the results should be considered exploratory, and should not be generalized to ND use in other texts or by other populations. While these inferential statistical analysis provide useful insight into the nature of ND in relation to LD and other measures, and thus into the students' use of GM, especially when read in conjunction with the results from qualitative and descriptive statistical analysis, their main value is in piloting relatively simple, inferential statistical approaches to GM and ND analysis. The pilot analysis reported here was undertaken under the guidance of a senior statistician, a faculty member at UBC.

The nature of the data indicated the use of a 2-way analysis of variation (ANOVA), which was carried out using the statistical program *R* (R Core Team, 2015). Previewing briefly, the main result is of a generally strong correlation reported between the response variable, ND,

and the predictor variables LD, GI and LC. The strength of this correlation, along with the relatively small corrections of the data needed to account for intervening variables such as differences in writers and text-types, means that there is relatively little difference between the results from inferential statistics and descriptive statistics based on raw data for ND and other variables. Thus, while some results are reported from inferential statistical analysis of disciplinary variation across the corpus of student writing, inferential statistics are used primarily for validating ND, while descriptive statistics predominate in the remaining quantitative analyses reported in Chapters 6 and 7.

5.7.2.1 Assignment of variables and their measurement scales

The variables for analysis were assigned as follows:

1. Response (dependent) variable (1): nominal density (ND)
2. Predictor (independent) variables (3): lexical density (LD); grammatical intricacy (GI); length of clause (LC)
3. Intervening variables (3): subjects (4); text types (4); disciplines (2)

Nominal density was calculated and aggregated per clause on an ordinal scale. This indicates that it is possible to calculate the mean and standard deviation values for ND, LD, and LC. As GI is a text-level measure, it only has a per-text mean and no standard deviation. Strictly speaking, 'GI mean' is an oxymoron; however, this term is used for consistency.

5.7.2.2 Question for statistical analysis and general hypotheses

The question for statistical analysis is: What are the correlations between ND and LD, GI, and LC? The theoretical and empirical research reviewed in the present and the previous chapters suggests the following hypotheses: LD and LC are positively correlated with ND; thus, as LD and LC increase or decrease, so will ND. GI is hypothesized to be negatively correlated with ND; thus, as GI decreases, for example, ND is hypothesized to increase.

5.7.2.3 Assessment of strength of correlation

In applied linguistics, the strength of correlation between variables is assessed along similar lines to assessments in much quantitative research in the social sciences. Discussing the implications of correlations across tests in applied linguistics, Dörnyei (2007) makes the following claim:

> we can find meaningful correlations of as low as 0.3–0.5 (for example, between motivation and achievement) and if two tests correlate with each other in the order of 0.6, we can say that they measure more or less the same thing (p. 223).

This of course means that a correlation coefficient of 0.5 is weaker than one of 0.6, the latter implying a closer relationship between the variables (i.e., that 25% of shared variance is accounted for in the case of 0.5 and 36% for 0.6). The correlation between variables is equally strong whether the variables are positively or negatively correlated. Thus, correlation coefficients of +0.6 and –0.6 are equally strong; however, in the latter case, as noted above for the hypothesis for the relationship between ND and GI, there is an inverse relationship between variables.

5.7.2.4 Limitations of the inferential statistical analysis

The overall sample size is small. Therefore, as noted above, the results of statistical analysis should be used with caution. Even considering the relatively focused sample, the limited size of the data and the nature of the (ordinal) scales involved allows only interpretations about these subjects and texts.

Estimation of the correlation between ND and the other measures requires independent observations; that is, one observation (e.g., ND measure for a text) should not be influenced by the observations of other texts. In view of this aim for estimation, a specific limitation arises from the nature of the sampling. It is that some of the students' texts are revisions of a previous draft. Students wrote four different types of text (i.e., four writing course assignments), revising three of these once or, less frequently, twice or three times. Although the per-text ND, LD, and LC measures are individually aggregated from many more measures of these variables at the clause level within individual texts, there is still insufficient data to account in a statistically principled manner for potential dependencies between drafts of individual texts. The additional

statistical procedures necessary to correct the data were judged to be too complex for the pay-off, especially given the small dataset; therefore, each text is treated in the analysis as if it were independent of the other texts even as it is known that the depth of revision across drafts varied significantly from very light revision to almost complete re-writes.

5.7.2.5 Statistical procedures

Measures of ND and the other variables were measured at the clause level and aggregated to individual texts, that is, for each draft of all course assignments written by the focal students. To estimate the correlations between variables in these texts, the potential influences of intervening variables, that is, of students' varied capabilities and the assignments' varied requirements had to be removed. Removing these effects from the data required:

1. Postulating a single linear relation between variables, that is, for
    a. ND mean / LD mean
    b. ND std.dev / LD std.dev
    c. ND mean / GI mean
    d. ND mean / LC mean
    e. ND std.dev / LC std.dev
2. Establishing a confidence interval of *0.95*. This is a score range considered significant, within the limitations of the data, for the group investigated (Dörnyei, 2007, p. 211).
3. Estimating the intervening effects of student and assignment for each correlation;
4. Subtracting the estimated effects from the original estimations of each correlation and drawing out the residual values;
5. Calculating the correlations from the residual values.

The nature of the data and questions indicated a two-way (or factorial) analysis of variation (ANOVA). A *two*-way ANOVA is recommended because two intervening categorical variables were present: subjects and text-types. The two-way ANOVA removes the effect of these variables from the estimation of correlations between dependent and independent variables. The two-way ANOVA can proceed if three assumptions are met:

1. The dependent variable is calculated in interval-level measurement;
2. The data are independent;
3. The data are normally distributed, with equal variance among variables.

These assumptions are generally met but two features must be noted. With regards to assumption 2, it has already been mentioned that each piece of writing is treated as independent even though some pieces are revisions of others; although statistical techniques are available for resolving this, the small dataset precludes the use of these techniques. Also, some of the distribution of the standard deviation measures showed asymmetricality, presenting a small but notable challenge to assumption 3 in the standard deviation measures. This distribution means that the standard deviation measures for the dependent and independent variables should be translated to a logarithmic scale. While this improves the accuracy of analysis of variance, it is costly because results on a logarithmic scale are relative measures, meaning that measures for specific texts must be read relatively within a dataset, losing their natural correspondence (i.e., iconicity) to the original ND, LD and LC measures. The translation was undertaken for standard deviation analyses but the results added only marginally to the accuracy of the analysis of variance (for example, with the treatment, the correlation between the NDstd.dev and LDstd.dev is 0.72, while without the treatment it is 0.62; both reasonably strong positive correlations). As this treatment has only minor benefits and adds significant complexity, standard deviation data were re-analyzed and used without this treatment.

5.7.2.6 Results from the 2-way ANOVA

This section presents the results for the correlation analyses, which are summarized in Table 5.2. As shown, the correlations between nominal density (ND) and the three other instruments, in the analyses of both mean and standard deviation values, show correlations above the 0.6 coefficient. While some of the relationships are especially strong, for all pairs of variables, the results imply a correlation between the pairs. These results also imply that the hypotheses about the relationship between all pairs of variables hold. Finally, with regards to the presentation of the results, the graph shows that ND, LD, LC, and GI can be measured on the same scale, given that all of these measures tend to cluster between 1 and 15.

Table 5.2. Summary of correlations between focal variables

Paired Variables	Correlation Coefficient	Assessment of Correlation
1. ND mean / LD mean	0.93	Strongly correlated
2. ND std.dev / LD std.dev	0.62	Correlated
3. ND mean / GI mean	-0.66	Correlated
4. ND mean / LC mean	0.89	Strongly correlated
5. ND std.dev / LC std.dev	0.63	Correlated

The results for these five analyses are detailed below.

1. Results for analysis of correlations between ND mean and LD mean:
   a. The correlation is 0.93. The two variables are highly correlated.

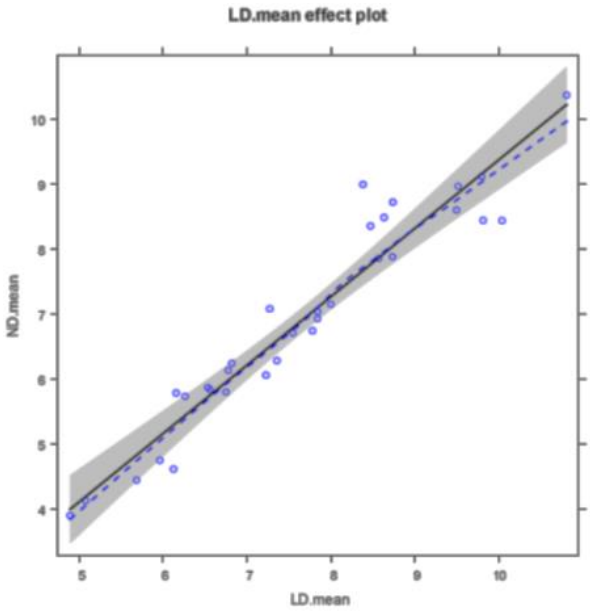


Figure 5.5. Plot graph for ND mean and LD mean

   b. Commentary: In the plot graph shown in Figure 5.5, the solid black line represents the linearity of the relationship against which the actual correlation is assessed. The dotted

blue line shows the smoothed line through the residual values; so the closer the blue line to the solid line, the better the linear relationship between the variables. As can be seen, the blue line is very close to the solid line, indicating a strong correlation. The shaded area is the error band for the analysis; if the dotted blue line is within this band, there is no significant challenge to the claim of linearity. Additional analysis of whether interactions between NDmean and LDmean are dependent on the student produced a correlation of 0.77. This indicates that the 0.93 correlation between NDmean and LDmean holds for all four students.

2. Results for the analysis of correlations between ND std.dev and LD std.dev.
   a. The correlation is 0.62. The two variables are correlated.

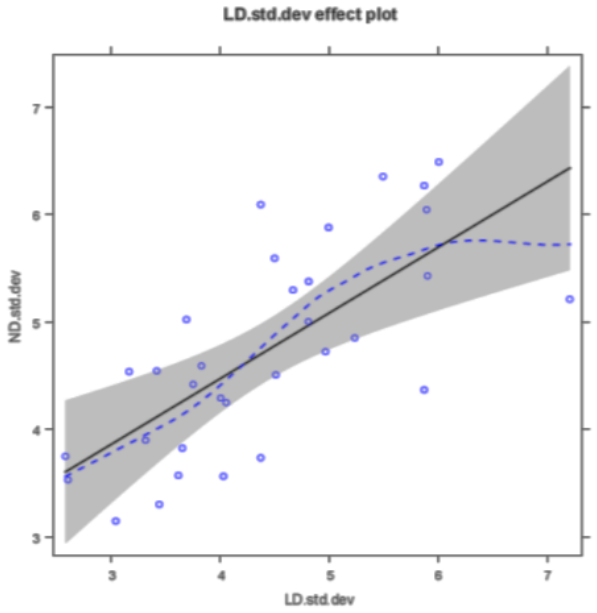


Figure 5.6. Plot graph for NDstd.dev and LDstd.dev

   b. Standard deviations in ND and LD are interesting because these results point to the scope of variability in abstraction and information density that is achieved in the students' writings. As can be seen, in the graph, the blue dotted line remains close to the linear correlation except at the top, where it curves away. This indicates that the correlation is partially nonlinear. However, the dotted blue line stays within the shaded error band. Also, the curve is affected by a single point with high leverage (at the far right). While

the correlation between the standard deviation of ND and LD is not as linear and strong as between NDmean and LDmean, the correlation is still strong. The small sample size is a factor here because a single point skews the results.

3. Results for analysis of correlations between ND mean and GI mean.
   a. The correlation is -0.66. The two variables are negatively correlated.
   b. The negative correlation between ND mean and GI mean is shown in Figure 5.7. There is minor skewing resulting from two high points at the right of the graph but overall the relationship is strong. Again, the dotted blue line showing the smoothed path through the residuals is within the shaded error band, indicating no challenge to the claim of a negative correlation.

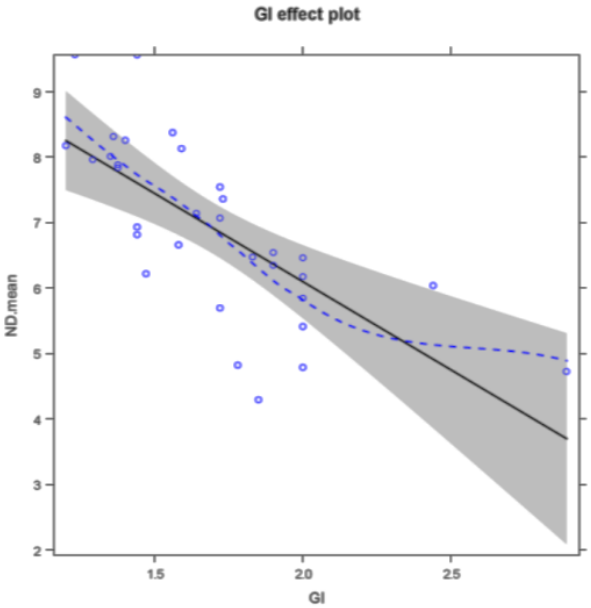


Figure 5.7. Plot graph for ND mean and GI mean

4. Results for analysis of correlations between ND mean and LC (length of clause) mean.
   a. The correlation between these variables is 0.89. They are highly correlated.

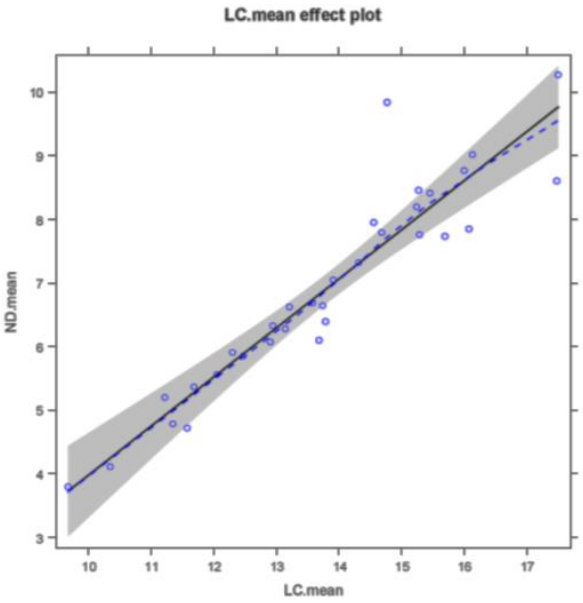


Figure 5.8. Plot graph for ND mean and LC mean

b. The plot graph in Figure 5.8 shows that the linear line and the residuals line almost overlap, implying NDmean and LCmean are very closely correlated.

5. Results for analysis of correlations between NDstd.dev and LCstd.dev (length of clause).

a. The correlation is 0.63. The two variables are correlated.

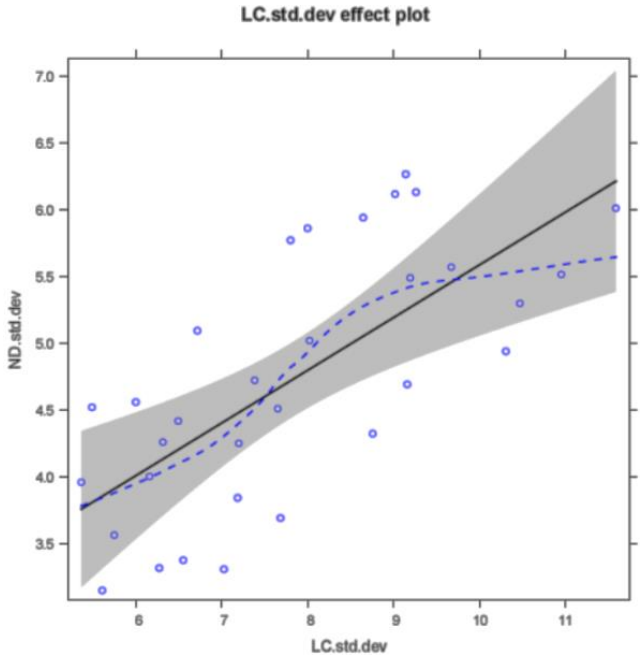


Figure 5.9. Plot graph for NDstd.dev and LCstd.dev

b. In Figure 5.9, the plot graph for these variables shows that the linear line and the residuals line remain close until near the end, when some lower NDstd.dev values leverage the relation away from linearity. Still, the line through residuals remains within the shaded error range and a correlation holds between the variables.

5.7.2.7 Distillation of the pilot inferential statistical analysis

The results from the pilot statistical analysis provide a small additional measure of confidence in the value of ND analysis beyond the theoretical rationale for this new instrument and the descriptive statistics reported in Chapters 6 and 7. Due to the limitations of the inferential statistical analysis, the main value of this part of the analysis is in suggesting potential directions in future inferential statistical analyses of ND and associated measures.

5.8 Distillation

This chapter has presented the research questions about apprentice L2 writers' use of GM, and the associated methods used to analyze GM and abstraction in the course writings. The presentation of the analytic methods began by outlining Halliday's (1998) typology of GM, indicating how this has been used in studies of writing and GM development in L2 writing literature in conjunction with lexical density and other instruments which are used as proxy measures for GM development. The foundational analysis of GMs for the study was detailed, organized by the four canonical shifts towards nominality, as well as embedding. The methods for cross-checking the GM analysis were detailed.

The chapter drew attention to Halliday's (1985a) interest in advancing the granularity of clause-based LD analysis by means of an additional "differential system of weightings" (p. 66) for investigating information density in LD analysis via a scale of lexical frequency. In this chapter, Halliday's (1985a) effort at developing such a system was redirected from frequency of lexis to a measure based on the scope of downgrading associated with the types of GM in Halliday's typology and its extensions (1998; Halliday & Matthiessen, 1999; Ravelli, 1985/1999). The resulting instrument, nominal density analysis, focuses directly on nominality as this is achieved by GMs realized in words, groups, phrases, clauses, texts and/or corpora. To

help validate the nominal density instrument, ND analysis of the corpus of L2 academic writing was analyzed statistically against analysis using the conventional measures for investigating development of GM in writing, lexical density (LD), grammatical intricacy (GI) and length of clause (LC). ND was found to correlate with the other measures, implying that ND provides a principled "differential system of weightings" for measuring abstraction in discourse. However, unlike the proxy measure of LD and the other instruments, ND measures derive directly from GM analysis. As such ND analysis provides opportunities – through its sensitivity to the multifunctional semantic grammar of SFL – for more context-sensitive readings of the functions of abstraction. Furthermore, these analyses are available across scales from words and clauses to learner (and other) corpora, enabling the observation of patterns of semiotic mediation that can be linked to variability in students' socio-semantic dispositions.

Chapter 6: Grammatical Metaphor and Abstraction in L2 Academic Writing: General Results

6.1 Introduction

The results of the analysis of apprentice L2 academic writers' construals of abstraction through the use of grammatical metaphor (GM) are reported in this chapter and Chapter 7. The present chapter reports the results from quantitative and qualitative analysis of GM use in students' writing aggregated as a single group and as disciplinary pairs, with two students in economics and two in humanities. These aggregated quantitative results are illustrated with samples of student writing which indicate disciplinary and individual variation. Chapter 7 narrows the focus of Chapter 6 in two ways, empirically and methodologically: it focuses on the four students' individual trajectories in the use of GM, especially Yoshi's; and the chapter attends to the relative functional load of GMs, notably of human experience versus logical reasoning, as well as the ratio of GM use in Themes versus Rhemes. Throughout both analysis chapters, the reports from the quantitative and qualitative analyses are accompanied by brief commentary relevant to the research questions; at times the commentary necessarily extends to the methodology. More comprehensive interpretation of the results in relation to the research questions is reserved for the discussion in Chapter 8.

Following this introduction, subsection 6.2 presents the results of quantitative analysis of the use of GM by the four students collectively, initially focusing on the construal of abstraction across the aggregated corpus of the four students' writing. The quantitative results are reported for median scores in ND, lexical density (LD), length of clause (LC), and grammatical intricacy (GI) from the writing of all four subjects. To illustrate these general results and provide a more instantial perspective on student writing, samples of the opening of three students' pre-course (PC) assignment are analyzed qualitatively and quantitatively in subsection 6.3. In illustrating the nature of abstraction in the sample, this analysis provides an initial, working insight into the co-genetic relation between students' use of GM, the situated context of their writings, and their socio-semantic dispositions as specialist academic writers.

In a major subsection (6.4) of this chapter, the investigation of disciplinary variation is extended by differentiating the contributions to the analysis of knowledge construal from ND, on the one hand, and LD on the other. The largely contrastive analysis shows that ND captures

disciplinary and longitudinal variation that LD does not capture. Empirically, students' writing is found to differ along disciplinary lines. The methodological claim is that ND analysis reveals this difference. Although LD, LC and GI remain relevant and complementary measures, the investigation of abstraction proceeds mainly on the basis of the results of ND analysis. The final section, 6.5, provides a transition to the focus on individual students' writing reported in Chapter 7; it continues to focus on the comparison of ND and LD results, but these are considered for the comparative rate of change in GM use between each student's first pre-course (PC) writing and the last draft of their final writing assignment, the problem solution (PS) text.

The selection of samples of student writing that are used to illustrate the identified tendencies in the use of GM deserve a brief comment. Across qualitative and quantitative discourse analysis, including in SFL-based studies, a challenge arises in achieving representativeness in illustrating results. Throughout the two analysis chapters, an attempt has been made to address such challenges by exploiting the novel affordances of the ND analysis. A key affordance of ND analysis is the description of median level of abstraction construed in the writing at any scale, including functional grammatical units within the clause, such as Theme, as well as the clause itself, a section of text, a whole text and a corpus. Thus, for example, the level of abstraction of an illustrative extract of student writing with an ND score of 5 can be claimed to be representative of the *level* of abstraction of the text (if not its functional specificities) from which it was extracted if that text also has an ND score of about 5.

Furthermore, this technique of sampling mean level of abstraction provides a basis for enhancing the delicacy of the analysis by highlighting the specific functions of abstraction at both scales. If, for example, GMs of logical reasoning account for 20% of the abstraction in an extract from the beginning of a text but accounts for 60% of abstraction in the entire text, the specific functional roles of GM in both the extract and the whole text can be contrasted and highlighted. Further delicacy in the analysis is possible at any scale by drawing on the ND-tagged corpus, including the investigation of specific types of logical GM such as, say, GM type 10, which is the circumstantiation of logical reasoning (for the GM typology, see Table 5.1). This sampling method is particularly beneficial in linking observations from qualitative analysis to quantitative results; as such, it is adopted in the qualitative analysis of student writing presented in section 6.3 following the quantitative results presented in section 6.2.

6.2 Results for GM use aggregated from the writing of the four focal subjects

The quantitative analysis of abstraction in discourse allows for results from individual texts to be aggregated. Such a procedure can provide a useful global perspective on practices across a research site. The perspective gained is useful, furthermore, for highlighting disciplinary and individual variation. Such perspective may be sufficient rationale for aggregating the results; however, in the present case, the results from the analysis of ND, LD, LC and GI of the four students' writings are sufficiently consistent across the corpus and across the four measures to provide a useful basis for understanding general patterns of abstraction. The main point of consistency is one predicted in the empirical literature on GM and writing development in L2 writing: the increased use of GM shown in all four students' writing is developmentally relevant, indicating, furthermore, the potential for positive development in their academic writing during the Writing I course.

The aggregated results for the four students are presented in Figure 6.1 in mean scores for drafts of the four assignments and in trendlines showing a smoothed trajectory across the mean scores. In order to highlight longitudinal changes, the trendlines are logarithmic. This calculation of trends smooths the mean scores by capturing variation in the *rate* of change of the score over time; thus, the trendlines provide insight into when and where change is more or less dynamic. This kind of calculation also helps to account for the robustness of students' socio-semantic dispositions in such contexts; such robustness, especially at these levels, predicts that while students' practices may change to some degree over the period of the writing course, a tendency will be perceived towards a steady state in students' writing practices. Regarding the sampling from the corpus for this analysis, as students wrote a variable number of drafts of the assignments (often just 2 but in some instances up to 4 drafts), just the first and final drafts of the assignments from all students were selected for the analysis reported in this section (the figures aggregated by individual students are reported in Chapter 7).

The data used in the inferential statistical analysis for the validation of ND reported in Chapter 5 were corrected for student and text-type (because the interest was in investigating possible correlations between ND and other measures). In contrast, the data used in the analysis of the results reported in Figure 6.1 are raw, that is, they were not statistically corrected for student and text-type. While these aggregated results do not show variation by student (nor,

therefore, by discipline), they do show variation in the four measures by assignment/text-type and drafts of the texts. The four text-types are sequenced horizontally on the x-axis in the order that they were taught, assigned, and produced. It is important to note that the sequence in which students worked on these texts is complicated by the opportunity they had to revise or alter any of their early drafts (such as the early definition text) at any time before the submitting their writing portfolios at the end of the course.

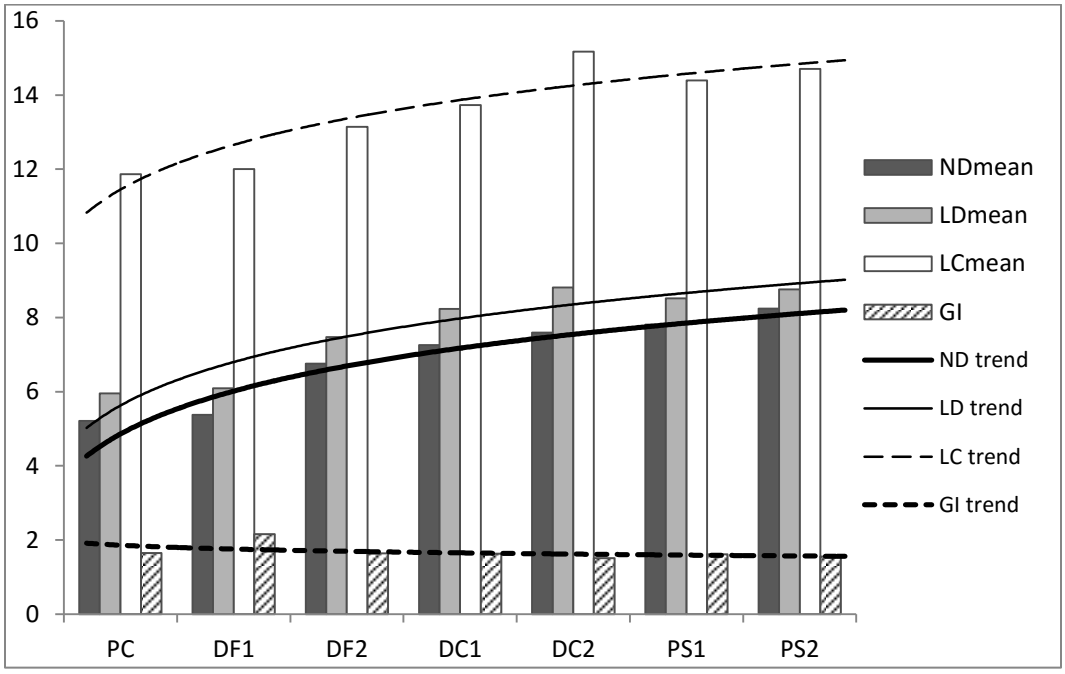


Figure 6.1. Aggregated results for course writings (X-axis) of four EAP writers: means and trendlines for nominal density (ND), lexical density (LD), length of clause (LC) & grammatical intricacy (GI); Y-axis provides a common scale for ND, LD, LC and GI.

It is already known from the inferential statistical analysis of the correlations between ND and LD, LC and GI reported for the corpus in Chapter 5 that changes in the ND of the four students' writing correlate with changes in LD and LC, and these are negatively correlated with GI. Those results accord with the hypotheses for these correlations in SFL theory. The results from analysis of the raw data shown in Figure 6.1 confirm these findings. The results also extend our understanding of the nature of abstraction in the writing. The bars and trendlines for

aggregated results show that ND, LD, and LC have a very similar pattern, which is that they began at their lowest level with the pre-course writing assignment, rose in parallel and relatively rapidly through the drafts of the definition text (DF1, DF2). Although the ND, LD and LC values continued to increase until the final assignment, the rate of increase slowed noticeably from near the first draft of the data commentary (DC1) until the final draft of the problem-solution text (PS2). This result implies that, on the whole, the use of GM in the writing increased relatively rapidly early in the course and, as the course progressed, the use of GM tended to plateau.

In reflecting on these results, it is relevant to recall that the sequence of DF, DC and PS text-types and associated parameters of the course assignments did not themselves predict an increasing degree of abstraction. Only in the PC writing assignment was there some encouragement towards more personalized and thus potentially more congruent construals; however, as is observed in the analysis of the PC writings of three students presented in section 6.2 below, students did not generally take this option. The increases in use of GM are therefore explained by the students' use of language in mediating the meanings at stake for them in this context.

Another important observation of the aggregated data is that, for the three drafted assignments, the final draft of all drafted assignments has higher or marginally higher ND, LD and LC than the first draft, and lower GI, indicating that revision resulted in increased abstraction. Given the consensus among L2 writing scholars that apprentice L2 academic writers' underuse of GM contributes in significant ways to these students' not meeting the expectations of experienced readers (e.g., Byrnes, 2009; Colombi, 2006; Schleppegrell, 2004b), as well as the generally positive feedback by the expert readers on the final versions of the DF and PS texts which present increased GM use, these results indicate positive, developmentally-relevant changes in at least some of the students' use of GM and academic writing. Although it is already known from Chapter 5 that all students increase their use of GM, the rates of increase in the use of GM, the changes in the functionality of GM, and the disciplinary functions of GM vary appreciably between subjects and their respective disciplines, as reported below and in Chapter 7.

Figure 6.1 also presents the results of the analysis of GI. Parallel findings are highlighted for GI in a negative correlation between the variables: as nominality increases, grammatical intricacy decreases. The drop in GI was slightly faster early in the course but overall was slow,

stable, and subtle. It may be a mistake, however, to suggest that the empirical change in the GI of the aggregated data is less notable than that of the other measures: the slow pace of change in GI shown in the figure relative to the other measures is predictable from the nature of the GI measure, which, in written academic texts, typically has a small range of between GI 1.0 and 3.0 (because in academic writing, single-clause sentences are common, while sentences comprising over four ranking clauses, for example, are relatively scarce). In accordance with the findings for the other measures, the GI of final drafts is appreciably lower within its conventional range than that of the first drafts.

The slower change in all measures after the DC texts is explained by the fact that the final draft of the DC (DC2) is more abstract than the first draft of the next assignment, the PS1. Indeed, in the aggregated results, the DC2 had the highest overall degree of abstraction of any assigned text. It is reasonable to speculate that the high degree of abstraction of this text is associated with its multisemiotic composition. The figure showing the specific data highlighted by the analyst for discussion presents a co-text of already-formed abstract entities. In section 6.4, the changes in abstraction between the DC and PS texts are investigated and illustrated in some detail with samples from the writing.

The analysis of aggregated data also provides an interesting finding concerning the relationship between ND and LD. As shown in Figure 6.1, while ND and LD moved in a highly correlated pattern, levels of ND are consistently below those of LD across all the assignments. To preview the report in section 6.4, what emerges from the analysis of disciplinary variation in these two measures is that the higher level of LD relative to ND is accounted largely by the gap that emerged in these two measures in the writing of the humanities students. In the writing of the economics students, the two measures virtually overlap. This finding motivates the choice of a parallelized differences analysis of the students writing, reported in Section 6.4.1; this analysis uses the variation in correlation between ND and LD to distinguish the writing of the two general disciplines. Before turning to the quantitative and qualitative analysis of disciplinary variation associated with GM, an initial illustration of the variable level and functionality of abstraction in the students' writing, with some discussion of implication for the students' developing socio-semantic dispositions as academic writers, is provided in the next section, 6.3.

6.3 Three students' use of GM early in Writing I

Within the pattern an overall increase in GM use during the Writing I course, considerable variability emerged. It is useful to illustrate the range of abstraction in extracts of students' writing and initially consider its functionality by text, text-type, discipline and students' associated socio-semantic dispositions. Such grounding in the prose itself is especially useful before moving to consider the results aggregated by discipline. The PC writing provides useful insight into the variable levels and functional and disciplinary scope at the beginning of the course.

The three in-course assignments called for students to recontextualize specific research domains. It will be recalled that the PC writing task served a dual purpose of providing a writing sample of a schematic research proposal (identifying and justifying a research focus) while also supporting students' application for a space in the writing course. This context was predicted to activate students' default construals of field-specific knowledge in addition to possible personalization of the research as the writers write about themselves as invested apprentice scholars and writing students. These two aspects of context of the PC text were predicted to orient knowledge construals towards, respectively, greater and lesser abstraction.

In this section, the first four clauses of three subjects' PC writing are presented as a basis for understanding patterns of GM use and associated knowledge construals. As space is short and the main purpose of this analysis is to initially illustrate degrees and functionality of abstraction in the corpus, the analysis of the PC text written by Sotty is not presented. The samples provide initial insight into disciplinary variation in the respective apprentice scholars' socio-semantic dispositions; in so doing, the analysis provides useful illustration for the results from the analysis of disciplinary variation reported in the next section, 6.4. Included in the analysis are notes on errors associated with using GM. Of the four PC text openings, only Yoshi's was explicitly personalized. In contrast, the openings of Haru's and Taka's PC texts are illustrative of the more conventional objective orientation to the construction of knowledge.

On a presentational note, the extracts from student writing shown in Chapters 6 and 7 will typically show the superscripted tags for the various types of GM (e.g., "early^{7n} works^{2a}") as per the GM typology in Table 5.1. These extracts also show square brackets [ ] for embedding (which is counted in the ND measure, with single brackets for embedded phrases and double brackets for embedded clauses) and curly brackets {} for ellipsed lexis (not counted in ND

analysis). In most cases the numbers of the ranking clauses sampled are also given for ease of reference. Each extract is also referenced to the corpus, as in (Y.DEF2.2-4), which means the extract is of clauses 2-4 from the second draft of the extended definition written by Yoshi. The GM-tagged corpus of Yoshi's text is available in Appendix 1. Also, as briefly indicated in the introduction to this chapter, an attempt is made to provide illustrative samples from the student writing that are, in a principled way, representative of the levels and functions of abstraction in the text. Although I have not observed this method of sampling for LD analysis, it is possible to use it with LD analysis as well.

However, ND has important additional affordances in sampling student writing. The first is that the mean ND measure affords not only principled sampling across scales of discourse but also a method of observing the functions of abstraction at these scales. This affordance indicates the second advantage. LD measures the words chosen to construe knowledge while ND measures grammatically-mediated abstraction; that is, as a direct measure of grammatical metaphor, ND accounts for the largely unconscious process of socially-evolved cognition involved in using language to enable academic knowledge construal. Accounts of GM use are accounts of specific acts of mediation that are the genesis of abstraction in discourse whose semiotic power, furthermore, is in the traces of social history that are directly involved in their instantiation.

As a method of investigating semiotic mediation, ND analysis can buttress claims of a general semantic nature such as those concerning the subjects' socio-semantic dispositions; furthermore, in linking directly to SFL semantic and lexicogrammatical description, ND analysis also provides a way of observing the generally slow development of large-scale semantic change in the choices of language to the most delicate levels of text, the "the cumulative value of innumerable small momenta" (Whorf, 1956, p. 151) by which socio-cultural dispositions are formed.

6.3.1 Haru's pre-course text opening

Haru's PC text is an argument (Martin & Rose, 2008) in Augustine studies for investigating an early work by St. Augustine, *De Musica.* Haru's argument is based mainly on the relative familiarity with and influence of this text in the field, as well as the potential insights it offers into the philosopher's early thinking and to music study. The opening four clauses are as follows:

(1) [*De musica*] [(On Music)] is one of early[7n] works[2a] [of[13a] St. Augustine], (2) {who} {is} a Church[13d] father and a philosopher [in 4th[7n] century.] (3) This is consisted of six books, (4) and first[7n] five books are written in Milan (Haru.PC.1-4)

An initial observation from the opening of Haru's PC text concerns the question of a trade-off between more objective orientations to knowledge construction and those that are more subjective and personalized. This extract is not personalized. Neither is it very abstract relative to the rest of the text and to Haru's other academic writing in the course: the average ND per clause in the extract is 2.6, while for the whole PC text the average ND is 4.97 and for Haru's course writing portfolio, 5.93. A useful reference for understanding this scope of abstraction in relation to disciplinary practice is the assessment of the final drafts of Haru's texts such as the problem-solution text (with an ND of 5.93, precisely also the average ND for her entire corpus). Haru produced well-regarded, Masters-level philosophical ideas at ND 5.93. Thus, this text is congruent relative to her other writing; however, despite the relative congruence of the above extract, there is no personalization in this text through such resources as personal pronouns. The extract construes an objective orientation in the style of Haru's other writings. This sample illustrates that a scholarly text can be relatively congruent and concrete in its construals without being explicitly personalized or subjective in its orientation to knowledge.

The abstractions that are present are non-technical, predictably for humanities discourse, and relatively sparse relative to the rest of Haru's course writing. Much of the total abstraction construed in this extract can be accounted for by the unexceptional GMs of logical reasoning in nominal group pre-modifiers realizing discipline-relevant logics of time and order: "early[7n]," "4[th7n]," and "first[7n]". These three metaphors of logic account for over half of the ND of the extract (6 of 10.5). GMs of logic thus account for 57% of the abstraction construed by GM in this excerpt, which is high relative to the ratio of 38% for logical GMs in the entire text. While the text goes on to involve a greater proportion of experiential abstraction in the argument for the study of *Da Musica*, at the opening of the text, Haru exploited logical GMs appropriately in contextualizing St. Augustine's works within the mainly temporal logics of history. The relatively high ratio of logical GMs at the beginning of the text is consistent with the role of logical GMs in reconstruing theoretical and/or methodological reasoning that contributes to

framing a study. The ratio of logical GMs to experiential GMs in students' writing is investigated more systematically in Chapter 7.

The principled ordering of phenomena in time and sequence is of course conventional in history discourse; however, advanced literacy in historical studies is concerned with arguments about such orders rather than the orders themselves, the explanatory details of which are typically highly contested (e.g., Coffin, 1997). Thus, Haru's attention to basic historical orders in the text as part of the discursive groundwork for subsequent contestation of current practice in Augustine studies appears to be appropriate in the rhetorical context of recontextualizing this knowledge for non-experts. Furthermore, in the graded construals of abstraction from fundamental to more advanced forms of disciplinary literacy, her text can be understood to be socializing readers implicitly – the Whorfian term is *cryptically* – in the construal of valued knowledge in Augustine studies. A parallel pedagogical use of GM in the context of L2 academic literacy is identified by Duff, Ferreira and Zappa (2015) in a high-school textbook.

The remaining abstraction in the extract was construed using just three instances of experiential GM (construing qualities of Participants, such as "of[13a] St. Augustine") and several instances of embedding. The first embedded phrase, the title of St. Augustine's work, "*De musica* (On Music)", is noteworthy methodologically for its relatively robust contribution to abstraction. "*De musica*" is a marked case of downranking because, despite its structural status as a prepositional phrase, it realizes, on its own, a Participant in the transitivity of the clause (also the Subject and Theme of the clause). This use of downranking for titles of works appears to be characteristic of early literary and philosophical works; the practice is nonetheless is perpetuated in contemporary works such as Wignell's (2007) *On the Discourse of Social Science*.

This instance of embedding contrasts with the majority of tokens of embedding, which more typically realize a *Qualifier* of a participant as a nominal group post-modifier. While the unmarked, typical uses of embedding are analyzed as ND 0.5, this token of embedding realizing a Participant has an ND value of 1.0. (The translation of the title is not counted as additional ND.) As with cases of technical GMs that might, in other frameworks of GM study, be counted as dead metaphor for being defined or otherwise reified, this case of embedding, despite its robust reification as the title of a manuscript, is treated as nominalization in order to take full account of the semantic junctions instantiated sociohistorically by the downranking of a phrase to an entity.

The short extract of four clauses also shows two errors that are likely to be L2-related and relevant to the construal of disciplinary knowledge. The first error is in the formation "is consisted of", one of several examples from Haru's portfolio of over-complicating a verbal group with the addition of an auxiliary *be*; here, *consists of* would have realized the targeted identifying relational process. This error is relevant to abstraction in that the nominality of academic discourse is known to culminate in relational processes, which identify or characterize the discipline's abstract and/or technical terms (Halliday, 1998). In relational clauses, nominalized participants are often identified by, or attributed to, other nominalized participants. The specific issue with the addition of the auxiliary *be* in the relational process *consists of* is indicative of the challenge L2 writers are known to have with ergative forms, an important set of functions for specialist discourse (as in *the economy improved,* when a Medium is selected without an Agent; economies do not actually improve themselves but, rather, are created or acted upon). The ergative function tends to be by-passed in instruction in the simplified, dichotomous treatment of voice as either active or passive, though such infelicitous construals as *the economy was improved* and associated errors such as "is consisted of" appear frequently.

The second, more significant and less visible issue is indicated by the coordinator "and" used to link clause 4. This choice is relevant for the abstraction of logical reasoning that typically occurs at the writing end of the mode continuum from speech to writing. This paratactic clause coordination (which continues in the passage, with clause 5: "*and* the last one is completed in Tagaste"; italics added), construes the grammatically intricate forms of reasoning associated with speech that, furthermore, are often imprecise in construing the specific form of logic semantically in play in academic writing. The speech-like reasoning between these clauses is matched by the arguable digression (and thus lack of coherence) into the *geographical* history of St. Augustine's theory in Haru's short text. The digressive geographical details are an artefact of the use of the grammar: while geographical history can, of course, be relevant, the focus of this text indicates that geography does not merit three additional clauses. That the propositions are linked by rather vague additive conjunctions exacerbates the lack of cohesion that arguably takes the construal off-register.

An interesting feature of this extract, then, is the variable maturity in the construal of logical reasoning in Haru's writing. Haru nominalizes logical reasoning effectively in accordance with contextualizing the knowledge focus in modifiers such as "early" in "early

works"; however, with the loss of experiential focus in the geographical digression, a vaguely coded, speech-like additive logic arises. It is reasonable to speculate that, as a philosopher, Haru is socio-semantically better pre-disposed, through internalized systems of logical GM, to reifying the logics of time and order in her writing than the logics of place and space. This example illustrates the potential variability in Haru's socio-semantic disposition at the centre and periphery of discipline-specific writing practices.

6.3.2 Yoshi's pre-course text opening

Among the focal students, only Yoshi personalized the PC text in ways predicted for the PC writing task. Some of the early experiential meanings in the text are construed congruently and personally in ways that are uncommon in the kind of quantitative economics research writing that Yoshi engages with. Again, the textual instance is minor but illustrative. Here is the opening of Yoshi's PC text:

> (1) Recently, China has been growing[9n] so rapidly [[that its GDP[7n, 6a, 4n] is almost the same [as[13a] that [of[13a] Japan]]]]. (2) I am especially interested in the macroeconomic[6a] framework[3n] [of[13a] Chinese[13c] economy[3n]], (3) and I assume[9n] (4) others are also concerned about this topic. (Yoshi.PC.1-4)

Yoshi's PC assignment opening is relatively congruent in its construal of experience and, for similar reasons as the extract from Haru's PC, speech-like in grammatical intricacy (especially in clauses #2–4). While the first sentence has an ND of 8.5, much of that is accounted for by the construal of the technical term "GDP", which is, notably, an element in the postmodification of an *adverbial*. There is a subtle indication of informal construal here in the interpersonally-weighted comparative adverbial of manner "so rapidly [[that…"; the embedded postmodification of an adverbial serves to modify a *process* rather than a participant, the latter being by far the more common semantic domain for high nominality in formal academic writing. It is also speculated that Japan is used here as more than a local reference. There is little scholarly value in specifying a Japanese investor. A viable explanation for Yoshi's classification of the investor in this way is that it serves rather unsubtly to centralize agency in a Japanese economic subjectivity and construe Japan's economy as a reference for measuring China's, a move that accords with

the discourse of *kokusaika*, Japan's official policy of internationalization. This instance of classification also serves as a reminder that not all technicality in technical academic writing serves the specialist community; like other aspects of discourse, technicality in scientific and positivist discourse is negotiated in contexts permeated with ideology.

The ND of the next three clauses, numbers 2-4, amounts to just 4.5, including zero in the last clause. Clauses with no GM are relatively rare in the corpus of the four students. The growth of China's economy serves as initial rationale for what is thematized with the pronoun "I" as his personal academic interest, which he speculates in a mental projection (again, with "I") will be of interest to his readers. While the undefined, technical, metaphorized entities such as "GDP" and "the macroeconomic framework of Chinese economy" function as a grounding academic context, the scholarly discourse is recontextualized in a personalized, relatively interpersonally-weighted, and speech-like opening.

The projecting process "assume" provides an example of a logical GM that, in its abstractness, was called upon by the writer to do more semantic work than is sensible in context. The inappropriate use of this process draws attention to Yoshi as an apprenticing economist mediating multiple functions of GM in recontextualizing economics in his academic writing. With the projecting process "assume", Yoshi enacted an explicitly subjective – and thus interpersonally metaphorical – stance (Halliday, 1994) that is closely analogous that of "I think", an overused choice for hedging claims in immature L2 scholarly writing (Schleppegrell, 2004b). As a logical GM, "assume" is unpackable to the causal conjunction in a clause nexus such as 'The structure of the Chinese economy is significant *so* others will find it interesting'.

However, to an academic economist, the lexeme "assume" at the opening of a research proposal is likely to construe a familiar epistemological procedure; "assume" would almost certainly resonate with the early, obligatory *assumptions* move that sets up a theoretical model in mathematical economics research reports, an ideationally-weighted move familiar to Yoshi (as indicated in his other writings, where the presence of the move was applauded by the disciplinary reader).

It is reasonable to speculate that, in attempting to set up the interpersonal framework for the text, Yoshi goes to this area of his semantic repertoire in economics normally used for setting up an ideational domain of the theoretical framework. However, the token "assume" does not suit the occasion interpersonally as it is explicitly subjective to the extent of being potentially

brash. This appears to be a case of an advanced L2 academic writer in an EFL context overgeneralizing from the deep but relatively narrow conventional semantic repertoire of his discipline to a new sematic context; as such, this case would illustrate the robustness of disciplinary discourse in Yoshi's socio-semantic dispositions in contexts of recontextualizing his research – a circumstance analogous to that of Haru discussed above. In both cases, GM-construed abstraction was deeply implicated in generating meaningful options as well as presenting challenges for the apprentice scholars in meeting expectations in context. The challenges potentially included that of recognizing and adapting to the semantic distance between their respective socio-semantic dispositions as apprenticed specialists and specific writing contexts.

6.3.3 Taka's pre-course text opening

A rather different strategy from Yoshi's was adopted by Taka, who opted for an opening research rationale move that is more conventional in neoclassical economics research writing, being ideationally technical, interpersonally objective and textually well-planned:

> (1) The selectivity[4n] [of aid[13c] distribution[2a]] is discussed recently. (2) The selectivity[4n] [of aid[13c] distribution[2a]] means a strategy[3n] [of aid[13c] distribution[2a]] | for[13e] efficient[7n] reduction[7n] [of[13a] poverty[1a] [in developing[7n] countries]]]]. (3) This topic is now featured for[10n] two reasons[4n]. (4) One of the reasons[4n] is [[that the end[2a] [of[13a] the Cold War] has changed[9n] the meaning[2c] [of[13a] the aid[2a]]]]. (Taka.PC.1-4)

While Yoshi's relatively personalized opening four clauses have an average ND of 3.25 per clause, the average clausal ND of Taka's opening is more than double this, at 8. The second clause by itself has a very high ND of 16. The ND of this clause may be elevated somewhat by the unnecessary repetition of the highly metaphorical entity "The selectivity of aid distribution", an issue that may betray Taka's lack of strategies for avoiding repetition in achieving textual cohesion. The mean clausal ND for the entire text is 7; thus, while this extract is abstract, it is close to representative of the level of abstraction of the entire text.

As a more writerly text, Taka's text also has half of the grammatical intricacy of Yoshi's, which, as has been noted, is more speech-like in its intricacy. Taka's construal of strictly

technical entities such as “The selectivity of aid distribution” and “efficient reduction of poverty in developing countries” is complemented by a thematic pattern that is conventional in academic writing, especially in the themes of the third and fourth clauses, which reconstrue the New information from the previous clauses as Given information. Interpersonally, an objective orientation is maintained throughout; however, the interpersonally costly lack of a scholarly citation for “is discussed” is noted. In several ways – technicality, objective orientation, text organization and implicit logical reasoning – the opening of Taka’s PC text is typical of the more mature and metaphorized writing that emerges regularly across the corpus later in the course.

A domain of the lexicogrammar that is not often referenced in discussions of abstraction is the verbal group. Taka’s miscalculated use of verb tense in the reference to recent research shows that Taka may have been challenged in positioning himself experientially in time in relation to the body of knowledge he represents. The verbal group also presents challenges for interpersonal positioning; in construing experiential meanings using verb groups, Taka appears also to have missed the opportunity to buttress his rationale move circumstantially, as with “*widely* discussed”. In such ways, the verb group appears to be an area in which Taka stood to develop. In Taka’s writing, what is not seen associated with the verbal group is the buildup of nominality through extensive circumstantiation, as with Yoshi’s use of comparative meanings in his PC text.

Taka’s early writing demonstrates a ceiling effect in its abstraction. The high, nominal group-based metaphoricity of Taka’s PC and other early texts – to a level that perhaps already met his needs and the audience’s decoding capacities in context – predicts that Taka’s writing would not increase dramatically during the course. It is reasonable to suggest at this juncture that a *small* increase from an already sufficiently abstract discourse at the beginning of the course would be a positive sign for Taka’s academic writing development. These questions are explored in greater detail in Chapter 7.

6.3.4 Distillation from analyses of pre-course text openings

The extracts from the students’ PC writing indicate the range of nominality and GM that was in play at the beginning of the writing course, from construals of experience that are entirely congruent to others, such as the second clause in Taka’s PC text, that are almost entirely metaphorical. The extracts attest to Halliday’s (2004/1999) claim that the construction of valued

knowledge occurs through variably metaphorical texts. Furthermore, these examples illustrate the multiple affordances of GM – its experiential, logical, interpersonal and textual functions – that students exploited in advancing their various rhetorical aims in context. The extracts also illustrate some of the challenges faced by the writers in instantiating register-appropriate forms of, for example, coherence, authoritativeness, implicit and explicit reasoning, and disciplinary taxonomies. In some cases the difficulties seem to lie in taking account of the context of situation of the text as one that calls for recontextualized disciplinary knowledge. The recognition of the need for recontextualizing a specialist register of course implies recognition of the specialist register itself. Thus, while the more general challenge facing students is that of being responsive to the contexts of situation, a crucial and perhaps under-recognized aspect of this would appear to be students' awareness of the socio-semantic dispositions to which they have been enculturated. Students stood to gain much from understanding meaning-making in context from the historically-informed perspective on their registerial repertoires.

Specific forms of mediation that help meet these challenges were shown in the analysis to involve not only the selection of a felicitous degree of metaphoricity but also accounting for cross-functional or register-wide implications of a specific choice, that is, recognition of how choices of metaphoricity in one particular function, such as text organization, implies changes in the construal of knowledge in another functional domain, such as logical reasoning. Many of these challenges can be identified in the more delicate systems of language, reflecting the fine-tuning that is typically needed by advanced L2 academic writers (Matthiessen, 2006). However, the challenges presented by the novel contexts of the writing assignments, including students' rhetorical interests as subjective social agents, also betray gaps in the students' more fundamental semantic and lexicogrammatical systems. In these aspects, students' choices of GM are deeply implicated in both meeting and not meeting their goals for scholarly engagement through their writing at the start of the course.

A final observation from the analysis concerns methodology. The scope and function of students' choices of GM can be productively traced through quantitative and qualitative analyses using the nominal density instrument.

6.4 Disciplinary variation in nominal density and lexical density

In this section, the nominal density and lexical density across the writing assignments are investigated for variation in the two focal disciplines, economics (comprising writing from development economics and international economics, both in the mathematical framework of neoclassical economics) and humanities (comprising writing from religious philosophy and bioethics). Disciplinary variation in ND and LD was analyzed statistically by two methods, one inferential and the other descriptive. The results from both statistical methods on the ND data indicate that the two disciplines – at least as these are instantiated in the writing assignments of the two pairs of apprentice scholars – differ appreciably in the use of GM.

6.4.1 Parallelized difference in pairwise comparisons of students' writing

The first results presented from the ND and LD analyses of disciplinary variation are from inferential statistical analysis. This analysis was originally carried out in coordination with the statistical analysis of the relationship between ND and LD, length of clause (LC) and grammatical intricacy (GI), the results of which were reported in Chapter 5. The findings presented here are from a parallelized difference analysis; this is the analysis of the degree to which the aggregated results for the relationship between mean scores for ND and LD in the writing of one student differ from these results from another student's writing. This analysis was carried out for all pairs of students. It was noted in Chapter 5 that NDmean and LDmean were highly correlated when the data were corrected for variation between students (and thus disciplines) and between text-types. The high correlation between these two measures when discipline is not a factor in discourse variation makes these variables especially suitable for parallelized difference analysis of disciplinary variation. As this analysis requires results for individual students, the data used in the parallelized difference analysis of writing from pairs of students were statistically corrected for text-type only. As for the results of the inferential statistical analysis of ND and the other measures, those for the present analysis are not to be generalized.

The results of the analysis of the six possible pairs of students, reported as parallelized values (p-values), are shown in Table 6.1. The standard for significance of difference is a p-value of 0.05. A p-value of less than .05 implies that the two students are different from each other in respect of the relationship between ND and LD in the writing, while a p-value greater than .05

implies that the writing of the respective individuals in the pair is not different in respect of ND and LD.

The results from this analysis point to significant disciplinary variation. As can be seen in row 1 of Table 6.1, no evidence of difference was found in the relationship between NDmean and LDmean in the writing of the two humanities scholars. Likewise, no difference in this respect was found in the writing of the two apprentice economists, as shown in row 6. In contrast, the writing of all mixed-discipline pairs (in rows 2-5) were different from each other in this regard. Among the mixed-discipline pairs, Sotty, the bioethicist, and Yoshi, the economist, were most similar in the use of ND and LD; however, their respective written assignments were nonetheless found to be significantly different in their use of ND and LD.

Table 6.1: Parallelized differences in ND/LD correlation between pairs of students

	Pairs of students H: humanities; E: economics	**Parallelized (p) value**	**Implication**
1	Haru (H) – Sotty (H)	0.34	no evidence of difference
2	Haru (H) – Taka (E)	< .0001	significant difference
3	Haru (H) – Yoshi (E)	0.0001	significant difference
4	Sotty (H) – Taka (E)	0.0006	significant difference
5	Sotty (H) – Yoshi (E)	0.0096	significant difference
6	Taka (E) – Yoshi (E)	0.69	no evidence of difference

The results also distinguish degrees of similarity between the two within-discipline pairs. The results show a closer association in the relation between ND and LD use by the two neoclassical economists (0.69) than by the two humanities scholars (0.34). This observation explains the intuitive prediction that writers working in the same academic domain and general theoretical framework, as is the case of the economists Yoshi and Taka, would construe knowledge in ways more similar to each other than writers working in the same general academic domain but in appreciably different fields and frameworks, as is the case of Haru and Sotty. While acknowledging the small sample, it is possible to deduce from this inferential

statistical analysis that, in the relationship between the use of ND and LD, these few samples of students' writings indicate the potential for disciplinary variation. Disciplinary variation associated with GM use is examined further in the next section using descriptive statistics for ND and LD measures in student writing data aggregated by discipline.

6.4.2 Nominal density and lexical density aggregated by discipline

Disciplinary variation was also analyzed using descriptive statistics of the NDmean and LDmean aggregated and averaged between the two writers in each of the two disciplines. The aggregation of data by discipline is additionally justified by the disciplinary variation that has been identified. The mean ND and LD measures for the writings by Yoshi and Taka were combined and averaged for a sample of recontextualized economics writing, and from Haru and Sotty for a sample of recontextualized humanities writing. From the results of the parallelized difference analysis presented above it is possible to predict that the descriptive statistics will also reveal disciplinary variation. It was necessary to account for the different number of drafts of the DF and DC assignments written by students; therefore, only the first and final drafts of these texts for all students were included in the descriptive statistical analysis. All students wrote only two drafts of the PS text. The data were analyzed from two perspectives, the first taking ND and LD as the points of departure (shown in Figures 6.2 and 6.3) and the second taking the two disciplines as points of departure (shown in Figures 6.4 and 6.5). The two kinds of analyses provide complementary perspectives on the same phenomena.

6.4.2.1 Two disciplines from the view of nominal density and lexical density

The results from the first part of the analysis are presented in Figures 6.2 and 6.3. Figure 6.2 shows the results of the analysis of NDmean in the student writing in economics and humanities while Figure 6.3 shows the results of the analysis of LDmean in the two disciplines. Several noteworthy findings emerge from the analysis of NDmean in the two disciplines. The bars and trendlines in Figure 6.2 show an overall increase in the ND of student writing during the writing course in both disciplines. Also, ND increases after revision for all text-types in both disciplines. Many of the same findings emerge from the analysis of LD in the two disciplines, shown in Figure 6.3. The main difference between the results of ND and LD analysis is apparent in the comparison of the trendlines in Figures 6.2 and 6.3. The difference is that while the ND

analysis in Figure 6.2 shows, in the separation of the trendlines for the two disciplines, appreciable variation in the two disciplines as well as a slight diverging trend, the LD analysis in Figure 6.3 shows just a minor variation and no divergence during the writing course. These comparative results are discussed further after the highlights from the ND analysis alone are presented and illustrated.

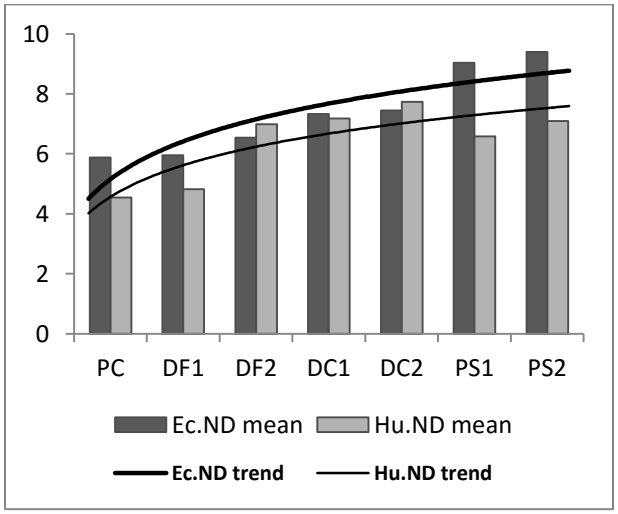


Figure 6.2. Nominal density (ND) of students' writing in economics (Ec) and humanities (Hu)

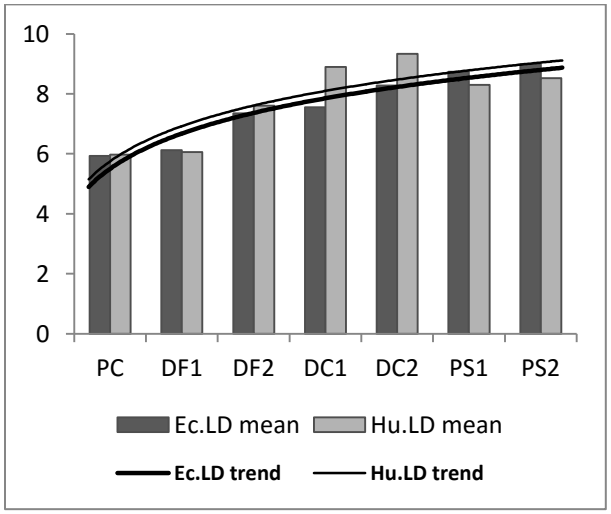


Figure 6.3. Lexical density (LD) of students' writing in economics (Ec) and humanities (Hu)

As shown in Figure 6.2, in both disciplines, ND increases between the first and final drafts of each assignment and, in almost every case, with each new text-type. There is, however, one exception. The ND of the PS text in the humanities writing decreases from the previous writing assignment, which is the DC text. An initial explanation of this decrease is possible. The DCs of both humanities scholars are informationally highly condensed as they are particularly short and pick up highly specific, abstract entities that were given pre-constructed in the co-text figure upon which the commentary was based. This is the case especially when compared to the PS text in the humanities, which tend to be more step-wise in building up abstract entities and arguments. Clauses 4-13 in Haru's PS text are useful for illustrating its relative congruence, as it sets up quite explicitly a dialogue between scholars of evangelicalism in the US. This extract

from the PS text has a per-clause average ND of 5.6, close to the per-clause average ND of the whole PS text (ND 5.9):

> (5) evangelicalism[1a] adapts[9n] to broad[6a] popular[6a] trends[4n] [in culture]. (6) For[10n] instance[4n], it is said that the evangelical[5d] gospel[2g] is "sold" in[13e] popular[6a] forms[2a], by[10n] accommodating[9n] themselves to consumerism[2a] [in[13e] public[6a] life[2a]] (Noll 2001)]. (7) In theology[2b] this kind [of phenomenon[11n]] has been treated[9n] as[10n] the problem[4n] [of "Christianity[1a] and culture"]. (8) The complexity[4n] [of this problem[4n]] since[10n] the New Testament[5d] era[3n] is described as "enduring[5c]" by Richard Niebuhr. (9) In his book *Christ and Culture*, Niebuhr noted the ways[3n] [[Christ could transform[9n] culture]], as[10n] the most preferable[6d] relationship[2c] [between them] (Niebuhr 1951). (10) However, "culture has transformed[9n] Christ" in the United States (Wolfe 2003). (11) "As the culture changes[9n], (12) the church changes[9n]", (13) insisted[9n] Leith Anderson, an advocate [of[13a] evangelical[5d] movement[2a]]; (Haru.PS2.9-13)

This moderately abstract review of scholarly positions reflects its relatively high GI (1.73) and correspondingly high use of projection and explicit reasoning realized by post-modification and clausal expansion. The relatively high GI draws the text towards lower nominal density, despite the many complex nominal groups.

In these respects, Haru's PS text contrasts with her substantially denser DC, as can be appreciated from the following extract from the DC. The extract of clauses 10-13 has an average ND of 8.9, which is just below the clausal average of ND 9.2 for the entire text:

> (10) and 'religious[1a] right' constituency[2c] was formed[4n]. (11) From[10n] theological[13d] perspective[3a], such evangelical[5g] movements[2a] can be included in reaction[5a] activities[2a] [against[10n] liberal[13c] Christian[13c] movements[2a] [[underlain by the prolonged[4n] conflict[2a] [over Biblical[13c] hermeneutics[2b]]]]] (Horton 1994). (12) In the late[6a] nineteenth century, the emergence[4n] [of new approach[3n] [to the Bible] [[based[4n] on modernist[13b] hermeneutics[2b]]]]] led[4n] fierce disputes[2d] [between liberalists[1a] and fundamentalists[1a]]. (13) In[10n] this theological[13c] battle[2d], fundamentalists[1a] gradually isolated themselves and

became ignored because of[10n] their anti[3n]-intellectualism[1a] and cultural[13c] separatism[5b]. (Haru.DC2.11-12)

Rather than reporting competing arguments, as in the extract from the PS text, here Haru presented condensed arguments, explaining from a more centralized, authoritative position the nature and scholarly implications of historical movements. In this respect, this extract illustrates the general registerial orientation in advanced literacy in historical studies to argumentation *about* the interpretations of history that underlie its descriptive recording (Coffin, 1997).

While there are highly abstract texts and moments in the humanities writing, the economics writing is generally more abstract. As shown in Figure 6.2, with the shift from the DC to the PS text, the economics writing becomes appreciably more abstract while the humanities writing becomes more concrete. The latter phenomenon may be associated with the functionality of the pedagogical PS text type – or rather its lack of functionality – in the discourses of philosophy and ethics, where a specific problem may not have a clear philosophical or ethical *solution*. Indeed, Haru complained about this in class discussion, responding to the instruction that the solution address the problem crisply: “we don’t really present simple solutions like that in my field”. This question is further explored in Chapter 7, when considering Haru’s and Sotty’s specific trajectories and texts; for example, these writers’ textual signalling of the shift to the problem and the solution is relatively ambiguous (for extended discussion of such signalling in PS texts, see Flowerdew, 2008).

The higher level of abstraction in the economics writing becomes pronounced in the PS texts. The comparative ND of the economics writing – especially Yoshi’s – increases substantially over that of the same assignment in the humanities, in which claims tend to build up more incrementally. Below is an extract from the second draft of Yoshi’s problem-solution text in economics, an extract that has a per-clause average ND equal to the clausal average ND of the entire problem-solution text (ND 9.5):

(12) This limitation[4n] [of[13a] the NPV[7n, 6a, 5b] framework[3n]] can be surmounted[9n] by[10n] "the real options[5b] approach[3n] (ROA)" [[introduced in Dixit and Pindyck (1994)]]. (13) This new approach[3n] considers the firm's[13c] ability[2g] [[to delay[9n] the irreversible[5g] investment[2a]]] as[13e] an "option[2b]" [[analogous[7n] to a financial[13c] call[13e] option[2b]]]. (14) In[10n] other words, the firm

holds the right[4n] [[to invest]] but not the obligation[4n]. (15) This increased[7n] flexibility[1b] [on[13e] investment[2a]] could eventually turn[9n] the highly uncertain[6a] investment[5a] projects << (16) regarded as unprofitable[5g] under[10n] the NPV[7n,6a,5b] measure[2a] >> into profitable[5g] ones (Arai, 2001). (Yoshi.PS2.12-16)

This extract gains its abstractness largely by the same means as Haru's text: extended complex nominal groups and low grammatical intricacy, which is also 1. However, while Haru's DC text gains its experiential abstraction by picking up abstractions from the figure, the experiential abstraction of Yoshi's text is construed through technical terms that are both built up (e.g., "real options approach") and introduced but relatively undefined or otherwise supported (e.g., "a financial call option").

In relation to disciplinary engagement, this writing shows the student's interest in communicating disciplinary knowledge through language as it is valued *within* the field. In such ways, these texts betray the apprentice scholars' intentions of using these texts within their respective proposals, theses and other disciplinary writings (as noted from their needs analysis and classroom conversation). In this view, it is sensible that Haru's complaint about the fit of the problem-solution text for her discipline is particularly telling, as there was no place in her thesis on Augustine philosophy for facile solutions. Herein is a potential explanation for the variation in the nature of abstraction of the PS texts. While Haru is compelled in this context to identify philosophical "problems" and "solutions" by breaking down competing scholarly positions on philosophical abstractions into an explicit dialogue, Yoshi and Taka are able to maintain and indeed grow into the in-group, positivist technical discourse of economists in which highly specific, mathematically sensible solutions (which critics have described as facile for their many assumptions (e.g., Stiglitz, 2001)) are commonly identified for problems. The technical crispness in neoclassical economics makes it particularly amenable to recontextualization in neoliberal economic policies (Lapavitsas, 2005).

Interestingly, Yoshi also pushes back against the contextual pressure on students in the EAP course to recontextualize conventional construals of disciplinary knowledge; however, as is explored in Chapter 7, in Yoshi's case, the complaint is not with the text type but a more general constraint on semiosis in Writing I, the restriction on the use of mathematics. Also interesting is that Yoshi recognizes this tension as a feature of context that is directly relevant to his course

writing. As is described in Chapter 7, his complaint with recontextualization is construed and addressed in highly strategic moves within the writing itself.

Returning to Figure 6.2, it is evident from the trendlines that the NDs in the writing from the two disciplines differ at the beginning and diverge as the course progresses. The three extracts presented above illustrate the disciplinary variation that gradually diverges. A general explanation for this divergence is the decrease in the ND from the data commentary to the problem-solution text in the humanities and, at the same time, the significant increase in the ND between these two text types in the economics writing.

Figure 6.3 shows the LDmean in the two disciplines. Some patterns observed for ND in the two disciplines are evident in the analysis of LD. For example, LD increases across the text-types in both disciplines, except for the problem-solution text in humanities. Also, like ND, LD increases after revision for all text-types in both disciplines. However, it is the differences between the results for ND and LD that are most salient. The trendlines for LDmean in the two disciplines show a relatively small difference between the two disciplines, with the humanities writing marginally higher in LD than the economics writing. Also, the trendlines for LD in the two disciplines run parallel throughout the course, showing none of the divergence revealed by the ND analysis. The lack of divergence in trends in LD relative to trends in ND can be initially accounted for by the fact that although LD does capture the notable decrease in density between the data commentary and the problem-solution texts in the humanities, LD does *not* capture the substantial increase in nominality that occurs in the economics writing between the same two text types. These observations indicate that LD does not reveal some aspects of variation between disciplines and between text-types that are revealed by ND analysis. These limitations of the LD analysis imply that LD analysis does not also capture the different rates of change in the writing practices in the two disciplines and the text-types that are captured by ND analysis.

An initial explanation for the different affordances between ND and LD can be attempted. The variation between economics and humanities writing highlighted by the ND analysis, observed at the beginning of the Writing I course, was predicted during the development of the ND instrument. An important source of the variation is that ND does not include content lexis that is congruent, such as names of authors or construals of other non-abstract processes and entities. In the economics texts, these are less common than in the humanities writing, which contains a higher ratio of tokens of non-metaphorical content lexis,

increasing the LD but not the ND. For example, Haru's writing shows a relatively high number of names, including *Augustine, Plato, Christ* and *God*, and cited authors as well as non-metaphorical verbal and mental process such as *refer, believe, rejects, espouses, held,* and *see*. Sotty's writing contains a relatively high number of non-metaphorical representations of people such as *individual, couples, baby, children,* and *people* as well as frequent references to non-metaphorical, transformative material processes such as *injecting, conceive, follow, operated, born,* and *using*.

Such congruent construals are relevant to the divergence in the ND of economics and humanities shown in Figure 6.2. Given that the ND analysis reveals variation associated with congruent versus metaphorical wording, systematic shifts during the writing course from congruent to metaphorical construals in economics would result in divergence. As described in Chapter 7, the increase in GM by the two apprentice economists involved an increase in the proportion of experiential GM in the total ND relative to logical GM. This development appears to be partially accounted for by metaphorical shifts of congruent content lexis into experiential GMs. An example is when *China,* which is congruent in the postmodification of the following nominal group "This higher[13d] CPI[13c,13d,13c] volatility[4n] [in[13e] China]" is metaphorized as a classifier that premodifies a nominal group, as in "This volatility[4n] [in the Chinese[13c] CPI[13c,13d,3a]]". Such developments would partially explain the rise of ND relative specifically to LD. This phenomenon can help explain the merging of the trajectories for ND and LD in economics, as shown in Figure 6.4 below, in which ND is observed gradually achieving the same measure as, and exceeding LD in, the economics corpus. More importantly for tracking writing development, the example of the metaphorical construal of the meaning 'China' indicates how the relatively minor metaphorical shifts that are possible within the nominal group rank (that is, the various subtypes of GM #13, shown in Table 5.1) can provide an important site for observing academic writing development.

6.4.2.2 Nominal density and lexical density from the view of two disciplines

Figures 6.2 and 6.3 show the results of contrastive analyses of the two disciplines based on ND and LD respectively; Figures 6.4 and 6.5 show the results of ND and LD within each respective discipline: Figure 6.4 shows the results of ND and LD analyses of the economics writing while Figure 6.5 shows the results of the two measures in the humanities writing. This

view of the data confirms previous observations related to disciplinary variation. As can be seen in Figure 6.4, in economics, the two measures start in the early texts very close together and tend to converge as more experiential meanings that were construed non-metaphorically early on are metaphorized, especially within heavily modified nominal groups. The results for the humanities writing, presented in Figure 6.5, shows that ND is consistently and appreciably lower than LD, with a slight tendency to divergence in the two measures. This gap between ND and LD in the humanities writing is accounted mainly by the consistent, and register-appropriate, use of non-metaphorical lexis.

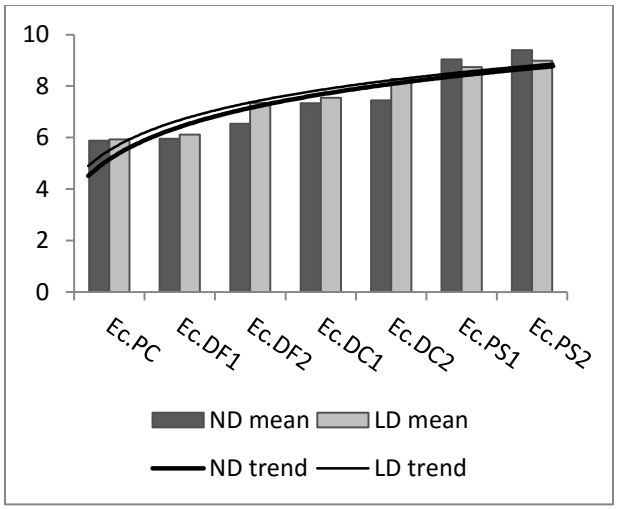


Figure 6.4. . Nominal density and lexical density in two economics (Ec) students' writing

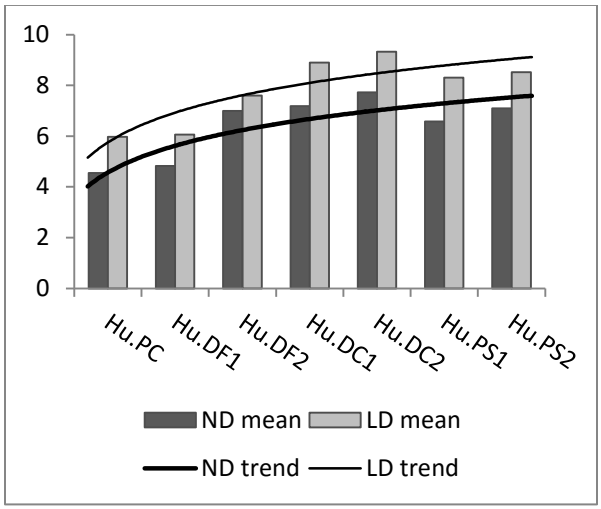


Figure 6.5. Nominal density and lexical density in two students' writing in humanities (Hu)

6.5 Comparing change in nominal and lexical density to understand individual variation

The final section of this chapter reports on the analysis of variation in individual students' use of GM. While this section serves as a segue to the focus on individual writers in Chapter 7, it also highlights the differential results from ND and LD analysis, which has emerged as an important methodological finding.

Table 6.2 shows the percent change in the ND and LD between the PC text and the last piece of writing assigned in Writing I, the final draft of the PS of the four focal subjects. The table presents several results worth highlighting, the first of which confirms the results from

other analyses, that both ND and LD increased in the writing of the four students. More importantly, the results of the contrastive analysis of the early and late texts confirm the findings reported from Figures 6.2–6.5, that nominal density analysis is more sensitive to changes in abstraction in the writing than LD analysis. As can be seen, for all students except Haru, the ND measure shows a greater percentage of change (increase) in the writing than does the LD measure.

Table 6.2. Percent change in ND and LD between first and final writing tasks

	Nominal Density	**Lexical Density**
Yoshi	+102%	+74%
Taka	+31%	+25%
Haru	+20%	+21%
Sotty	+101%	+67%

Also, this analysis confirms an important observation from the analysis of three students' pre-course writing assignment, which was reported in section 6.3 above. Taka's PC text was found to be appreciably more abstract than Yoshi's, indicating that the level of abstraction of Taka's writing was already bearing on a threshold (i.e., ceiling effect) beyond which scholarly abstraction would risk becoming a hindrance to comprehensibility and meaningful exchange in the EAP writing course. Thus, in accordance with the affordances of, and constraints on, abstract meaning-making in this context, the gain in abstraction between Taka's first and final writings (+31% in ND) is appreciably lower than that of Yoshi's (+102% in ND). Although the circumstances are rather different between the humanities scholars, a parallel finding emerges from their data. Sotty's writing began relatively congruently and Haru's relatively metaphorically; thus, Sotty's writing gained appreciably more in abstraction (+101% in ND) during the course than did Haru's writing (+20% in ND). This finding informs the analysis of more specific features of the students' respective trajectories in GM use, the results of which are reported in Chapter 7.

6.6 Distillation

The descriptive statistical analyses confirm and extend the findings from the analysis of the aggregated data and the parallelized difference analysis in important ways. A key finding reported in this chapter is that the levels of abstraction increased in the aggregated data for the four focal subjects, including with each revision of the individual assignments. Another key finding is of disciplinary variation, as evidenced for example by the nearly overlapping trendlines for ND and LD in the economics writing and their divergence in the humanities writing. At a more granular level, the analyses also begin to reveal the different trajectories taken by students in the respective disciplines, a focus of Chapter 7.

The final, brief analysis of change in ND and LD between the first and final written texts sheds light on the disciplinary variation in GM use: even as, within disciplinary pairs, writers used GM in relatively similar ways, rather different levels of change in ND and LD took place *within* the respective disciplinary pairs, with Yoshi in economics and Sotty in the humanities showing appreciably greater gains in ND and LD than their disciplinary peers, Taka and Haru, respectively, whose early course writings were already bearing on the threshold of contextually-appropriate abstraction at the beginning of the course.

Furthermore, the instances of congruence in the early writing of Yoshi and Haru was associated not with personalization of this text as predicted by one of the purposes of this text as a scholarly self-introduction but rather with the speech-like informality and, specifically, the casual and imprecise logico-semantic relations with which ideas were linked. This finding highlights important aspects of these students' socio-semantic dispositions at that juncture in their scholarly apprenticeship. It is possible to speculate that, in the domain of interpersonal positioning, their early course writing appears to be largely well-calibrated for the purposes of research-based academic writing practices. It is primarily in the domain of ideation – both its experiential and logical aspects – and within each of these, the degree of ideational abstraction as centrally mediated by GM, that their writing stood to benefit from more disciplined scholarly practice.

It was important in presenting the general results in this chapter to illustrate the cogenetic relation between GM use in students' writing and the students' socio-semantic dispositions,

especially in relation to disciplinary variation. The qualitative analysis of the early course writing by three students provides clues to the nature of specific learner trajectories. For example, the relatively high degree of abstraction of Taka's first text helps explain the relatively small gain in abstraction in his writing during the course, while Yoshi's relatively congruent and speech-like construals in his first text left plenty of room for register-appropriate abstraction to develop. Related to this, the qualitative analysis showed evidence of students' socio-semantic dispositions coming into play in both their felicitous and infelicitous uses of GM. In relation to the latter, the analysis indicates that students may have been prone to GM-related errors – such as in text coherence as expressed in digressiveness – as they moved away in their writing from the semantic domains familiar in their fields, such as when Haru moved from construing logics of time and order that are central in philosophy to those of space and place, which are less central.

The analyses also points to the relation between text-type, on the one hand, and disciplinary discourse and abstraction on the other. For example, while the potential for construing valued ideas in the short, pedagogical problem-solution text-type provided an accommodating context for economics scholarship, the construal of valued scholarship within the constraints of this text-type posed challenges for the apprentice philosophers. Predictably the variable semantic distances between the students' disciplinary discourses and the text types introduced in the course emerged as a key feature of the context, a feature reflected in the kinds of challenges students faced in their writing as well as their perceptions of some of the course writing tasks.

Text-type was also highlighted in relation to intersemiotic complementarity (Royce, 2007) as the figure in the data commentary texts appears to have an important role as a source for ready-made linguistic abstractions. This effect raises various questions about the text-type itself, such as preferred reading paths across semiotic modalities, and its instruction in the writing course.

As for the methodology, it was learned that the ND instrument reveals variation in the degree of abstraction construed through GM that is not revealed by LD analysis. This affordance provides insights into the nature of longitudinal changes in abstraction in students' writing not previously observed. However, LD, in addition to providing a useful and relatively simple proxy measure of abstraction, has also been shown to be valuable for highlighting disciplinary variation when analyzed comparatively with ND. These affordances of ND analysis, alone and in

coordination with LD analysis, are added to the direct link it provides to GM use: ND is a direct measure of linguistically-mediated abstraction that offers insights into the genesis of abstraction in writing at various scales. As such, ND analysis can be applied as needed where the aim is to understand the functions of language, and specifically GM, in mediating knowledge construction. These empirical and methodological findings will be useful to bear in mind in Chapter 7, which focuses more closely on the use of GM in the writings of Yoshi and his peers, and the unique trajectories in academic writing shaped by their use of GM.

Chapter 7: Grammatical Metaphor in the Writing of an Economics Student and his Peers

7.1 Introduction

Drawing on the methods and findings reported above, Chapter 7 focuses on the analysis of grammatical metaphor in the writing of Yoshi, the 4th year undergraduate student of economics, and three of his peers in the Writing I course. As nominal density is a direct measure of GM and is sensitive to the degree and dynamism of abstraction in discourse, as shown in Chapter 6, the analysis will rely mainly on this instrument. However, as lexical density (LD) and grammatical intricacy (GI) are highly complementary to ND in investigating GM and abstraction, the results from their analysis are also reported where relevant.

The affordances of the ND analysis will be useful in understanding the overall characteristics of GM-enabled abstraction that characterize the writing of individual students as well as specific sub-functions of GM, notably aspects of the textual, logical and experiential subfunctions of GMs. In this chapter, each focal student's use of GM across the course writings is reported, providing perspective on the nature of the trajectory. In accordance with the heuristic value of ND analysis in identifying areas of analytic focus, this system-to-instance perspective indicates points of interest in the students' construals of abstraction worthy of highlighting. For example, while the use of GM across Taka's writings has been observed in the ND profile for his corpus to increase relatively incrementally, the trajectory of Yoshi's use of GM is marked by rapid rises at the beginning and end of the course with a long stretch of incremental decrease in the use of GM through the middle of the course.

The rationale for focusing on Yoshi's writing begins with his discipline, economics, which, as a social science, can be grouped with the overwhelming majority of the disciplines students of the Writing I course were associated with. Related to this is that my experience as an instructor and analyst of disciplinary discourse is more extensive in economics than in either bioethics or philosophy. The choice of Yoshi rather than Taka (in development economics) was determined by the more dynamic and potentially interesting trajectory in Yoshi's use of GM during the Writing I course. As noted in Chapter 6, Taka's use of GM changed less over the Writing I course.

ND analysis also affords insight through instance-to-system analysis, as in comparative qualitative analysis of instances of GM use in students' texts, which can indicate where higher-

scale ND analysis may be relevant. For example, it was observed in the analysis of Taka's and Yoshi's PC text openings reported in Chapter 6 that Yoshi's writing very early in the course was relatively congruent. Qualitative analysis of an extended section of congruent discourse in the DF1 text indicates that Yoshi construes logical relations explicitly and relatively congruently in accordance with conventions in multisemiotic mathematical economics; revisions of this section in the DF2 indicate developmentally-relevant adaptation in his writing to the actual non-mathematical context of the writing assignment. The nature of this change could only arise with qualitative analysis, which in turn helps explain wider quantitative results.

The analysis also provides insight into sub-functional variation associated with GM use. The interesting nature of Yoshi's use of GM in the course – especially a dramatic rise in the second draft of the extended definition text – indicated potential relevance of a longitudinal analysis of the relative distribution of ND in the Themes and Rhemes in his writings. The specific rationale is that the increase in ND in the DEF2 text comes at a time in the Writing I course when the focus of instruction was not on nominalization but on Theme, Given-New information order and other aspects of text organization. Therefore, this analysis of the textual subfunction of GM is useful in understanding the role of Yoshi's resourcefulness with GMs in relation to text organization and, possibly, its instruction.

Two other subfunctions of GM that are worth reporting in coordination with students' general trajectory in GM use are the experiential and logical functions, which together account for all GM types in Halliday's ideationally-framed typology. An interesting longitudinal perspective is gained from investigating changes that took place during the writing course in the relative distribution of logical and experiential GMs of each of the four focal students' writings. Each text has a particular balance of logical and experiential GMs. Interestingly, the trajectories of individual students in this relative distribution are found to vary to some extent according to discipline: the trajectory of the two apprentice economists over the Writing I course is marked by a shift from greater reliance on logical metaphors in construing abstraction to more reliance on experiential metaphors, while the two apprentice humanities scholars tend to rely more on experiential GMs, with logical GMs predominating in contexts of registerial experimentation and the writers' adaptations to assigned text-types that are unconventional in the discipline.The results of this analysis therefore extend the findings on disciplinary variation reported in Chapter

6 towards better understanding of discipline- and function-specific developments in GM use for the focal cases.

In sum, this chapter builds on the general results presented in Chapter 6 by detailing trajectories of GM use in the course writings of the focal subjects, including developments in the distribution of logical versus experiential GM in the overall construal of abstraction. Yoshi's writing receives additional attention with respect to various aspects of GM use for the dynamic and non-linear trajectories in the construal of abstraction instantiated in his writing. For lack of space, the same attention cannot be given to the writing of his peers, the results of which are presented after those for Yoshi's writing. This chapter closes with an overview in Section 7.4 of the sixteen kinds of analysis conducted , including analytic instrument, functional focus, text and corpus, and summary of key findings.

7.2 Grammatical metaphor and abstraction in Yoshi's writing

The results of ND, LD and GI analyses in Yoshi's writing corpus are shown in Figure 7.1. In comparison with the aggregated results for the four focal subjects shown in Figure 6.1 at the beginning of Chapter 6, Yoshi's results present two interesting features. The first is evident from comparing the ND values. While the ND aggregated for the group begins at ND 4 and rises steadily to 8, Yoshi's use of GM in the course is marked by a wider scope of nominality and an

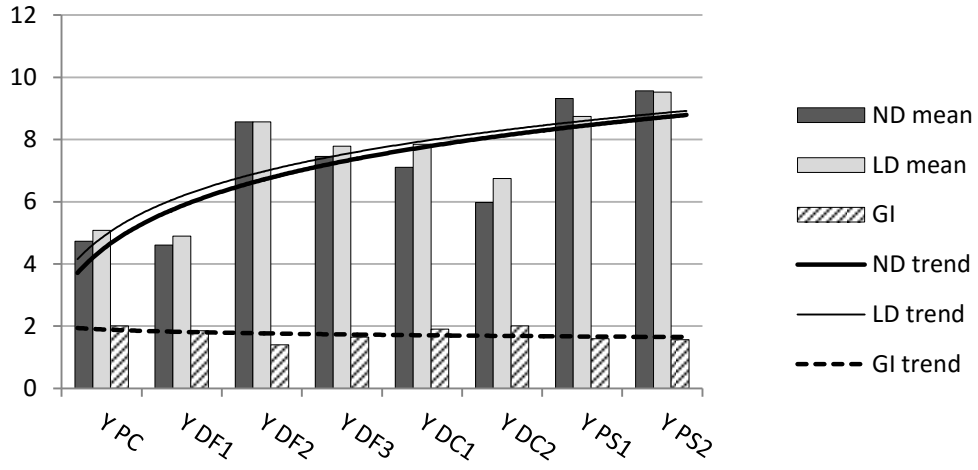


Figure 7.1. ND, LD & GI in Yoshi's writings

alternating, non-linear pattern of increase and decrease in ND. The relative congruence of Yoshi's PC text noted in Chapter 6 is seen to continue, with very similar levels of ND, LD and GI in the first course assignment, which is the first draft of the extended defintion (DF1). This level of abstraction in the early texts may be seen to express Yoshi's unconscious socio-semantic orientation towards abstraction in recontextualized economics at the beginning of the course. In the DF2, Yoshi's use of abstraction rose dramatically. The spike in abstraction in DF2 is followed by a slight reduction in abstraction in the final draft (DF3). Absraction continued to decline from the DF3 levels with the DC text drafts. A unique pattern in Yoshi's writing of the DF and DC texts, therefore, is that revision did in some cases entail a decrease in GM use. After the DC texts, the use of GM jumped to its highest levels in Yoshi's corpus in the problem-solution texts. While Yoshi's use of GM did rise significantly during the Writing I course, as did that of his peers' course writing, the trajectory is marked by a highly variable pattern of GM use. In written comments added to his drafts (discussed further below), Yoshi did not comment on his use of 'nominalization' or 'grammatical packing' or 'unpacking'; however, he did demonstate increased awareness of the features of published economics research writing which he was reading for his graduating project, explaining that his findings for text organization and logical reasoning accorded with the feedback he had been receiving, and that his revisions reflected these findings.

Interestingly, the trendlines for ND and LD in Yoshi's writings tend to converge as the course progresses. It was established in Chapter 6 that the separation of ND and LD is associated with the high ratio of congruent content lexis in the humanities writing, while in the more technical, economics writing, ND and LD tend to overlap. Thus, the convergent pattern in the two trendlines indicates that, as the course progressed, Yoshi tended to construe fewer non-metaphorical entities in his writing. By way of analogy, it is possible to say that he moved further from writing like his classroom peers Haru and Sotty in the humanities. Although a relatively high divergence between ND and LD is characteristic of his least successful texts, the PC, DF1, and DC drafts, the ND and LD also diverged in a successful text, the DF3, which was assessed as competent Masters-level recontextualized economics writing. Also deemed successful was Yoshi's much more abstract PS text. This set of findings confirms the intuition that recontextualized mathematical economics writing can be viable within the range of

metaphoricity construed in Yoshi's writing. Within that range, it would appear that the success of these writings in context is associated with more specific functions of GM. More specific functions of GM in Yoshi's DF texts are explored in the next subsection, 7.2.1, in relation to Yoshi's socio-semantic disposition and writing instruction. Section 7.2.2 reports on analysis of the relative distribution of logical and experiential GM across Yoshi's writing corpus.

7.2.1 Grammatical metaphor across drafts of Yoshi's extended definition text

As noted above, Yoshi's use of GM changed dramatically across drafts of the DF text. The changes motivate closer examination of two aspects of GM use across the drafts. First, the ND profiles of the three drafts are examined and compared. Specifically, the construal of economics is examined in light of waves of metaphoricity, that is, of alternating congruency and metaphoricity. The implications of this are briefly discussed for Yoshi's semiotic resourcefulness, socio-semantic disposition, and academic literacy development. The second area of investigation into the drafting of the DF assignment also bears on these aspects of Yoshi's writing practice but in relation to the timing of the dramatic increase in GM use in the DF2 and instruction on the text-organizational, thematic function of nominalization. Perspective on the role of GM in topical Theme in Yoshi's corpus is provided by analysis of the relative distribution of ND in Themes and Rhemes across Yoshi's corpus. Two key findings are that the nominality of Themes in Yoshi's writing increased signficantly after instruction on Theme and that, after various changes to the relative distribution of ND in Themes and Rhemes, Yoshi appears in the final drafts of his successful writing (as assessed in the course and by the disciplinary reader) to have settled on a relatively consistent distribution of abstraction in Themes. The relevance of this connection for the socio-semantic dispositions in play (both for writer and the readership construed in the writing) is significant, as Theme assigns textual prominence to elements that serve to orient readers locally in interpreting the message.

7.2.1.1 Nominal density in definition text drafts: Tension in recontextualizing economics

The ND profiles of the three drafts of Yoshi's extended definition text are shown in the three Figures 7.2 (DF1), 7.3 (DF2) and 7.4 (DF3). The increase in the ND between the DF1 (which has an ND of 4.61) and DF2 (ND 8.57) is easy to perceive: the DF1 is longer; the bars show few clusters of higher density writing punctuated by extended sections of very low- and

mid-density writing. In contrast, the DF2 is significantly shorter and denser, with two sustained, lower-density dips around clauses 7 and11. The remainder of the clauses are high or very high in nominal density. Compared with the DF2 (ND 8.57), the DF3 (ND 7.46) shows more variation in nominal density including a relatively regular wave pattern of high-, mid-, and low-nominality. The DF3 was the text that was read and evaluated by the disciplinary expert as competent at the early Masters level, above Yoshi's actual level.

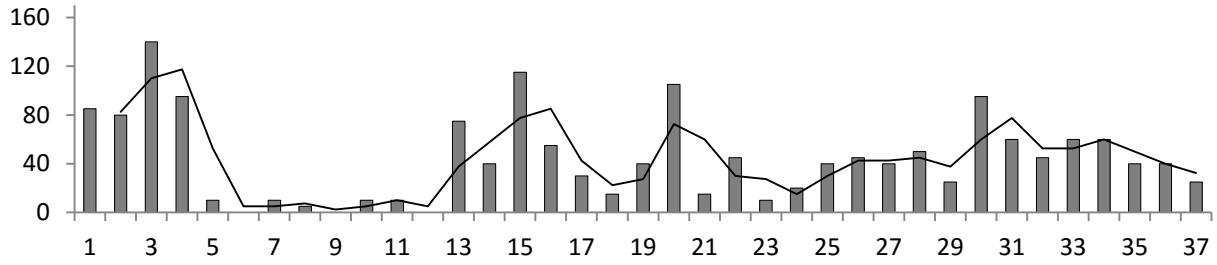


Figure 7.2. ND of DF1

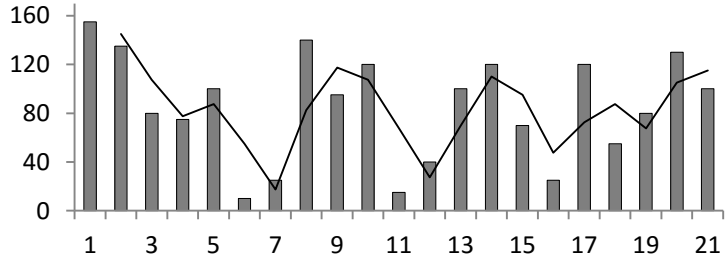


Figure 7.3. ND of DF2

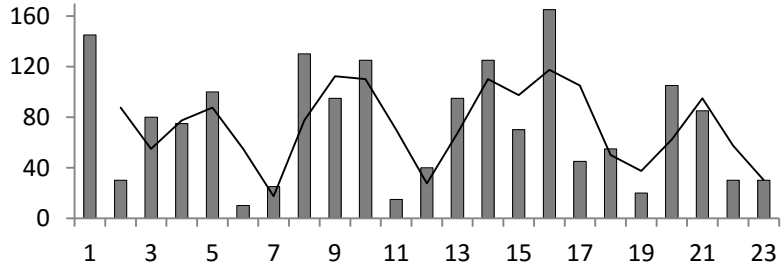


Figure 7.4. ND of DF3

Figures 7.2, 7.3 and 7.4. Nominal density in drafts of Yoshi's extended definition (DF) text

The figures also track GM use of each text in trendlines. In this series of figures, the trendline is a running average; while the running average does smooth out the ND values, its basis in the average ND values of adjacent clauses allows greater clause-by-clause variation in

the writing to emerge. The advantage of this kind of trendline is especially noticeable in the constrast between the DF2 and DF3, where the trendline for the DF2 shows only two relatively sustained dips in nominality. In the DF3, four such dips are evident, around clauses 7, 12, 19 and 23. Also, DF2 begins with a sustained, elevated level of abstraction, including a couple of the most abstract clauses in the text; this pattern suggests the potential of a text opening that is overloaded theoretically. Both the DF1 and DF3 begin with more variability in levels of abstraction.

In fact, many of the general contrasts between the three texts that have been highlighted are evident within the first ten or so clauses of each; as these sections of the texts also provide rich insights into GM use, they will be analyzed more closely. The primary functional foci in the following analysis of the opening sections of the drafts will be on logical reasoning and choices of Theme.

Here is the opening of the first draft of Yoshi's extended definition (DF1) text:

> (1) The foreign[6a] exchange[5a] rate[4n] [between[13e] the Japanese yen and the U.S. dollars] has recently been changing[9n] so drastically [[that it has brought[9n] fortune to some investors]]. (2) Therefore, investors have been increasingly concerned about the prediction[2b] [of[13a] the foreign[6a] exchange[5a], or FX[5a], rate[4n]]. (3) The portfolio[13c] approach[3n]„ is [one of] the basic[7n] theories [[that explain[9n] [[how the FX[5a] rate[4n] is determined[9n] in[10n] the exchange[5a] market]]]]].
>
> (4) An important[7n] assumption[2b] [[which lies in[10n] this approach[3n]]] is [[that investors prefer not to take[9n] high[6a] risk[2g]]]. (5) Thus, they diversify[9n] their assets (6) to minimize[9n] the risk[2g] among[10n] their investment[2a]. (7) Assume[9n] (8) that you are a Japanese[13c] investor (9) and possess two types [of assets], (10) one is paid in[10n] yen (11) and the other is paid in[10n] dollars. (12) Here, suppose (13) that the two assets are maintained[9n] in[10n] a certain[5c] balance[4n] [[which minimizes[9n] the risk[2g]]]. (Y.DF1.1-13)

Yoshi opened well with the rationale for focusing on predictions of the foreign exchange (FX) rate; however, the reasoning itself is problematic given that elevation in the rate of change in the FX market does not itself imply elevated gains for investors. For this reason, the explicit causal logic of the conjunctive adjunct "Therefore" that opens clause 2 does not hold. Yoshi went on to define the portfolio approach as a "theory" for predicting the FX rate; however, the approach is more accurately a method. The technicality of clauses 1-4 is construed through elevated nominality. Between clauses 5-12, the grammatical intricacy increases significantly. Logical reasoning was construed in this section at various levels of metaphoricity, from metaphorical (in

the noun “balance”, processes such as “diversify”, “minimize”, “Assume” (i.e., if x, then y) and circumstances such as “in yen” and “in dollars” (i.e., paying in yen/dollars, we get x) to congruent (“Thus”, “and”). As the basis of extending the definition of the portfolio approach, these choices help explain the assumptions of the approach.

The reasoning is complemented interpersonally by commands with mental processes such as “Assume” and “suppose”; together they comprise a conventional move in presenting a theoretical framework in mathematical economics. It is also conventional in mathematical economics writing for the writer to extend the explicitness of causal reasoning that goes into the theoretical model to the extent possible in language; clauses 7-11 are central in realizing this. In this case, the explicitness involved isolating specific, abstract economic entities such as “assets” and economic processes such as “paid in yen” and “paid in dollars”; these set out the choices facing the economic agent theorized in neoclassical economics (investors, in this case) as *rational* (McCloskey, 1994). Such construals of economic phenomena set up the economic entities for statements and calculations in mathematical semiosis, which is evaluated as the theoretically valid form for the precision of formal logical reasoning it affords (O’Halloran, 2005).

To understand this series of conventions in economics, it is important to appreciate that the most explicit construal of logical reasoning that is linguistically possible is achieved by the use of conjunctions (e.g., *if* X, *then* Y) (Halliday & Matthiessen, 2004). The traceability of logical relations in clause complexes serves neoclassical economics by making a statement directly translatable into mathematics. In the intersemiotic translation between language and mathematics, what O’Halloran (2005) calls “intersemiotic metaphor”, the linguistically-realized experiential concepts (often nominalizations, e.g., *utility*, *wealth*, *FX*) are typically treated as variables (e.g., *U, x, y*); the logical relation between the variables is construed in language using conjunctions (e.g., *if/when*, *so*, *because* and so on), which are read as symbols of mathematical operations (respectively, ⇔, ∵, ∴, and so on).

Thus, congruent construals of logical reasoning in language often occur before an intersemiotic shift to construal of logical reasoning by mathematical symbolism, which realizes mathematical logic through the use of highly formalized mathematical axioms and theorems (O’Halloran, 2004). However, the writing assignment was not to include mathematics. While it is arguable that Yoshi’s retention of the unrecontextualized move from in-group economics in

explicating a theoretical framework is still functional for non-expert readers, it does appear to slow the reasoning unnecessarily and changes the interpersonal footing in unexpected ways for readers who neither expect nor invite mathematical semiosis.

For these reasons, this section of Yoshi's DF1 is interpreted as functional economics discourse that is nonetheless inappropriately recontextualized for its context in the English for academic purposes (EAP) writing course. This, indeed, was the rationale behind my feedback on this section of Yoshi's DF1. In the feedback I focused on the thematic choices in clauses 5-12, in accordance with the focus on text organization at that juncture in the Writing I syllabus. To help Yoshi with the revision, the instruction was to "pack into the themes more information that you can assume the reader knows".

There is supplementary data from the course that are relevant to this instance of instruction. In their revisions, students were asked to choose and explain the rationale for four specific revisions. Yoshi did comment on his choice of Theme in his revision of the DF1. Among Yoshi's four comments submitted with his heavily revised DF2, the following two are especially relevant:

> While I used "you" to involve readers to establish assumption in the previous drafts, I avoided using "you" to involve readers reflecting sensei's [the instructor's] suggestion. In addition to this, I tried "packing" several ideas so as to implement what I learned in the class.

> Focusing on the given/new structure, I tried not to use many transitions. Reading several academic research papers, I indeed find a [sic] little conjunction is used.

In combination, Yoshi's comments indicate that he revised his choices of Theme in the DF1 towards greater use of nominalization, motivated mainly by conventions of an objective interpersonal orientation and information ordering. It is also worth noting in this relation that, already early in the course, Yoshi uses pedagogical metalanguage and student-led discourse analysis of model disciplinary writing to help him gain independent control of his writing.

More general observations can be made about Yoshi's engagement with instruction such as his use of feedback. Yoshi's writings and reflections indicate that instruction had a role in his subjective (conscious and unconscious) regulation of his socio-semantic disposition as instantiated in his writing. In fact, in his post-course reflection, Yoshi reflected that, in the

writing course, he should have relied less on instructor feedback and more on his own judgement about how to improve his writing. His statement bears repeating here:

> I am regretted that I focused too much on revising the parts the teacher commented because there were still rooms for improving the problem of CONTENT and ORGANIZATION, which I failed to taking into account.

An important implication of this statement for understanding of Yoshi as a recontextualizer of international economics within the academic writing course is the primary role he ascribed to the meanings *he* wished to convey as an apprenticing economist, and his recognition of the writing instructor's limited access to those meanings. Yoshi's reflection indicates he was prepared to self-regulate. This preparation is evidenced by the internalization of instructional interaction implied in the use metalanguage. From the perspective of instruction, while he expressed a disposition towards improving his writing independently of specific feedback from his writing instructor, he did so with the metalanguage that he had gained from instruction based in a functional view of language in writing. The external, pedagogical interaction had been internalized; crucially, the constant in this shift from external to internal mediation is language.

Yoshi revised the definition extensively. Here are the first twelve clauses of the DF2:

> (1) The prediction^{2b} [over^{13a} the random^{6a} movement^{2a} [of^{13a} the foreign^{6a} exchange^{5a}, or FX, rate^{4n}]] is well known to be a major^{7n} concern^{2b} [of^{13a} investors]. (2) The portfolio^{13c} approach^{3n} provides a theoretical^{6a} explanation^{4n} for^{10n} the determinants^{4n} [of^{13a} the FX^{5a} rate^{4n} [in^{13e} the market]].
>
> (3) This approach^{3n} presupposes^{9n} risk-averse^{7n} investors and diversification^{4n} [of^{13a} the investment^{2a}]. (4) In^{10n} other words, a postulated^{7n} strategy^{3n} [for^{13a} all investors] is risk^{5g} minimization^{4n}. (5) For^{10n} simplification^{4n}, assume^{9n} a Japanese^{13c} investor 2 [[who maintains^{9n} a portfolio [[consisted of two types of assets, one [[paid in^{10n} yen]] and the other [[paid in^{10n} dollars]]]]]. (6) This portfolio is supposed to balance^{9n} two assets (7) to minimize^{9n} risk^{13c} exposure^{2g}.
>
> (8) Under^{10n} these assumeptions^{4n}, the portfolio^{13c} approach^{9} examines the effects^{4n} [of^{13a} 'market^{13c} volatility^{1a},'] and 'market^{13c} supply^{2a} [of^{13a} the asset'] on^{13e} the FX^{5a} market. (9) These are considered to be the two underlying^{7n} determinants^{4n} [of^{13a} the currency^{13c} exchange^{5a} rate^{4n}]. (10) For^{10n} example, sudden^{6a} increase^{9n} [in^{13a} the risk^{2g} [of^{13a} dollars [[resulted^{9n} from^{13e} higher^{6a} market^{13c} volatility^{1a}]]]] encourages^{9n} the Japanese^{13c} investor to abandon the asset [[paid in^{10n} dollars]] (11) and acquire the asset [[paid in^{10n} yen]] (12) in order to eliminate the increased^{7n} risk^{5g} exposure^{2a}. (Y.DF2.1-12)

There is much commendable economics writing here. However, much of the writing would appear to be sensible to a non-expert only with effort and the suspension of questions about the background of the concepts and claims. The opening would appear more suitable to a readership of economists (who would expect the claims to be expressed mathematically); as shown in Figure 7.3, the first clause has the highest nominal density of any clause in the text. In this extract, and also as shown in Figure 7.3, only clauses 7 and 11 are low in ND. The high density prevails especially in the opening and closing sections. Especially problematic is the opening clause, which assumes the reader is prepared to engage intellectually with the Theme "The prediction[2b] [over[13a] the random[6a] movement[2a] [of[13a] the foreign[6a] exchange[5a], or FX, rate[4n]]]". As Yoshi's choices of Theme are of interest for several aspects of the drafting of the DF text and Yoshi's writing, the analysis will turn to the distribution of ND in Themes.

7.2.1.2 Nominal density and topical Theme in Yoshi's writing

This subsection reports on four aspects of the relationship between ND and Theme in Yoshi's writing. The first extends the above analysis of Yoshi's revisions of the extended definition text by focusing on the distribution of ND of Themes across drafts of this assignment. This section also touches on Yoshi's revision of the text-framing title and closing statement (i.e., macro-Theme and macro-New) of this assignment. The second analysis follows up on the positive developments in Yoshi's use of Theme across the DF text drafts to the middle of the course by reporting on his use of Theme at the end of the course. Specifically, the analysis considers Yoshi's use of Theme for signalling problems and solutions in the PS2 text. The final subsection expands the scope of the thematic ND analysis to longitudinal changes in the relative distribution of ND in the Themes and Rhemes across Yoshi's course writings.

The primary relevance of Theme is in establishing the point of departure of the message which, in academic writing, strongly favours ideas that the reader is assumed to know and that will orient the reader in interpreting the message. As a textual channel for ideational and interpersonal meaning, the system of Theme in English entails various textual, interpersonal and ideational subsystems; in accordance with the focus on abstraction in knowledge construal, Theme in the analysis is understood to be *topical* Theme, which is identified as the first transitivity constituent in each ranking clause (Halliday & Matthiessen, 2004).

7.2.1.2.1 Nominal density of Themes across drafts of the definition text

The per-clause distribution of ND in Themes in the DF1 and DF2 is shown in Figures 7.5 and 7.6 respectively. The overall ND of the Theme per clause is represented by the entirety of the bar. The overall increase in ND between the DF1 and DF2 texts (as seen, for example, in Figure 7.1) is also reflected in the increase in the role of Themes in managing abstraction through GM. This increase is evident in the far greater density and height of the bars in DF2, shown in Figure 7.6.

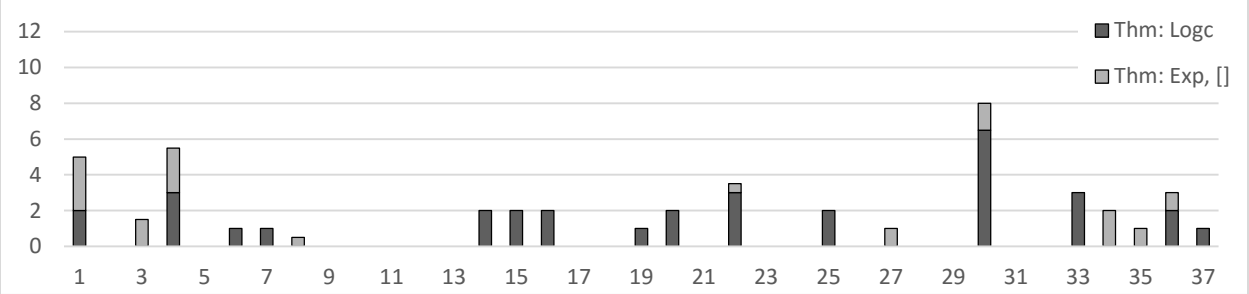


Figure 7.5. Thematic ND in DF1

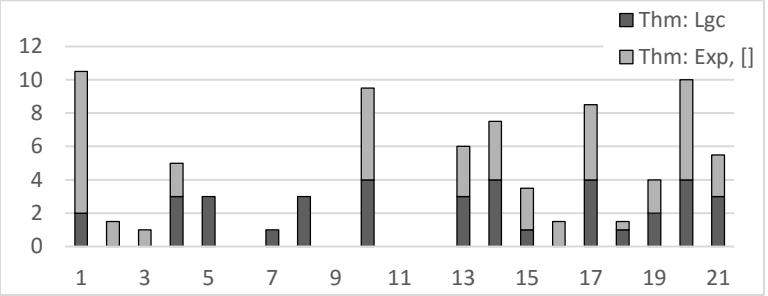


Figure 7.6. Thematic ND in DF2

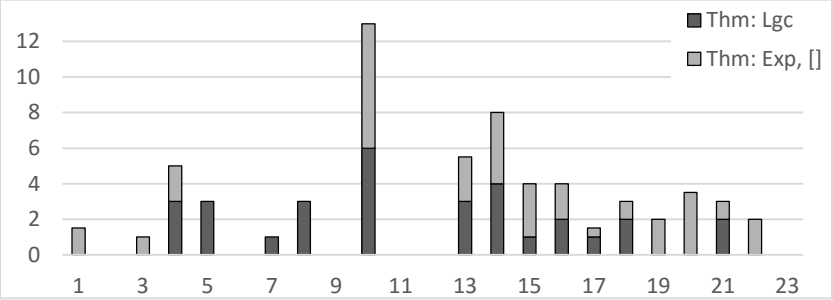


Figure 7.7. Thematic ND in DF3

Figures 7.5, 7.6 and 7.7. Thematic nominal density in drafts of Yoshi's extended definition (DF) with ratio of ND in individual Themes by logical GMs versus experiential GMs and embedding

Effectively, the DF2 construes a reader with more background knowledge from the start and through the whole text while the DF1 makes far fewer demands of the reader across its development. The pattern of consistently low nominality in the Themes of the DF1 suggests that not many of the ideas presented as New information in the clauses are recycled and packed as Given information in subsequent Themes. As this pattern diverges from the convention of constructing knowledge based on what is known, even without reading the text itself, it is possible to perceive a problem with the thematic development of the DF1, which indeed qualitative analysis confirms.

The analysis reported in these figures also considered the relative distribution of two general subtypes of GM that contribute to the total ND of each Theme: the light grey, upper portions of the bars show the contribution to thematic ND of experiential GMs and embedding; the dark grey, lower portion of the bars show the contribution to thematic ND of logical GMs. Experiential GMs are abstractions of human experience such as material processes, participants and circumstances. These experiential abstractions can be inaccessible to the uninitiated either in their congruent form or as technical or abstract ideas. Logical GMs are abstractions of reasoning that, in congruent form, construe no experiential meaning; however, when logical reasoning forms a semantic junction with the semantics of lower-rank structures such as processes and entities, the reasoning takes on the functions of abstract experience. As such, logical GMs typically construe aspects of theory, methods, procedures and other reifications of logical orders of reasoning. This analysis of the relative distribution of logical and experiential metaphor in the Themes of Yoshi's defintion drafts previews a more comprehensive analysis of the same relative distribution across the corpus of Yoshi's writing. in section 7.2.2, and of his peers in section 7.3.

The differences between Figures 7.5 and 7.6 show that the increase in Themes in the DF2 can be largely attributed to an increase in Themes realized by means of experiential GMs (as shown by the greatly increased proportion of grey in the thematic ND bars). This pattern of increase in the use of experiential GMs in Themes was maintained in the DF3. These results accord with the qualitative and quantitative analysis presented in Chapter 6, which implicated experiential GMs in the increase of ND across student writing, particularly in the increasing roles students found for abstract entities realized by complex and extended nominal groups. This phenomenon advances our understanding of the increasing role of experiential GMs in the Themes of the two latter drafts of Yoshi's DF text.

The role of logical GMs in the Themes of the DF2 and DF3 also increases, although much less dramatically than that of experiential GMs. This increase even in the use of logical GMs in Themes is sensible since the overall ND of the texts increased very significantly with the revision from the DF1 to the DF2. Thus, it can be expected that any of the GM types would contribute to the overall increase in ND.

Experiential GMs are the main contributors to the ND of the Theme of clause 1 in the DF2. However, while the thematic development of the DF1 is problematic for not recycling known information back into the Themes, the Theme choice in clause 1 of the DF2 is problematic for packing in too much information. Predictably, this Theme is problematic; its high ND implies a good deal of front-loaded abstraction as the reader's point of departure into the text. The main difficulty with the Theme arises in the technical nominal group "the random[6a] movement[2a] [of[13a] the foreign[6a] exchange[5a], or FX, rate[4n]]]", in which experiential GMs predominate. This extent of information packing in the opening Theme of the text is a reminder that not all construals of abstract entities using complex nominal groups advance the academic writer's rhetorical aims. In sum, the generally very abstract opening of Yoshi's DF2 itself opens with a highly technical Theme; this front-loaded technical abstraction appears inappropriate in a context of non-expert readership. The high levels of abstraction in the opening of the DF2 are apparent in the initial cluster of high ND clauses shown in Figure 7.3, and the high distribution of abstraction in the opening Theme, shown in Figure 7.6.

The choices of Theme in the DF2 text are in some instances problematic, as just discussed, and in others, productive. The increase in the role of Themes in construing abstraction from the DF1 to DF2 occurs largely in the latter half of the DF2. This is a positive development for the text (and potentially for Yoshi's writing) as it indicates that knowledge introduced earlier in the text is built up and assumed known by the reader in the latter part of the text. At the beginning of the DF2, however, the Theme of clause 1 became over-ambitious in its abstraction. Thus, the DF2 is inconsistent in how readers are oriented locally in interpreting the message. When the analysis of Theme is extended to the second clause of the DF2, another problematic use of Theme is observed in "The portfolio[13c] approach[3n]". This thematized technical entity assumes the reader is prepared to interpret the concept; however,the concept had not yet been introduced or defined in the text. While this problematic Theme is not high in ND, it is nonetheless highly specific and technical. Yoshi's challenges with Themes in the DF2 are

interesting considering Yoshi's comments on this revision about "Focusing on the given/new structure". At this point in the course, therefore, Theme and information ordering – which are crucial for orienting readers to the organization of the text – remained areas of difficulty for Yoshi. It is encouraging for Yoshi's writing development, therefore, that the Theme of the first clause in the DF3 has significantly lower ND and the "portfolio approach" was revised into a more considerate thematic pattern for readers, while the DF3 maintains a productive balance of more robustly nominalized Themes in the latter half of the text.

This example serves as a reminder of the need for complementary qualitative analysis to ascertain the appropriateness in context of the nominalization; of course quantitative ND results alone, and clearly not just cases of extreme metaphoricity or congruency, are insufficient for this. The case of the nominal group "The portfolio[13c] approach[3n]" illustrates how a lightly nominalized concept can have important, register-wide functionality in a highly technical text.

7.2.1.2.2 Nominalization and textual signals of moves in Yoshi's problem-solution text

The question of L2 writers' use of nominalization in Themes arises in Flowerdew's (2008) corpus-based study of the problem-solution text-type. Although she does consider nominalization in the study, it is not highlighted in the relation between Theme (also considered) and signals of the respective problem and solution moves in this text-type (see e.g., Swales & Feak, 2004; Hoey, 2001). Flowerdew notes that the signals of these two obligatory moves (i.e., textual signals of the start of an expected stage in the organization of a text) written by more accomplished writers tend to entail nominalization; however, she found that L2 writers are far less likely to use nominalization in the respective signposts of the problem and solution moves.

The present study provides a suitable context to consider Theme, nominalization and textual signals together. The above analysis of Theme in Yoshi's drafts of the definition text, the DF1 and DF2, showed that he had some difficulties with Theme early in the course. His use of Theme in this assignment had improved by mid-course, in the DF3. Near the end of the course, in the PS2, his use of nominalized Themes in signals for the problem and the solution was highly competent. The extracts below show interesting variation in the coordination of these three resources:

The problem in Yoshi's PS2: Signalling of the problem underlined; Theme in italics:

(10) *The previous[7n] discussion[2d]* suggests
(11) *that those evaluations[2g] [on[13a] the effectiveness[4n] [of[13a] NPV[7n,6a,5b] rule[2g]]]* are possibly inflated[9n] due to[10n] its negligence[1a] [of[13a] irreversibility[1b] [of[13a] business[13c] investments[2a]]].
(12) *This limitation[4n] [of[13a] the NPV[7n,6a,5b] framework[3n]]* can be surmounted[9n] by[10n] "the real options[5b] approach[3n] (ROA)" [[introduced in Dixit and Pindyck (1994)]].
(Y.PS2.10-12)

The solution in Yoshi's PS2: Signposting of the solution underlined; Theme in italics:

(12) *This limitation[4n] [of[13a] the NPV[7n,6a,5b] framework[3n]]* can be surmounted[9n] by[10n] "the real options[5b] approach[3n] (ROA)" [[introduced in Dixit and Pindyck (1994)]].
(13) *This new approach[3n]* considers the firm's[13c] ability[2g] [[to delay[9n] the irreversible[5g] investment[2a]]] as[13e] an "option[2b]" [[analogous[7n] to a financial[13c] call[13e] option[2b]]].
(Y.PS2.12-13)

The excerpts show that, for both the problem and the solution, Yoshi signaled the move not in a singular word or phrase but rather as a cohesively linked set of evaluative lexis that works in a graduated way to initiate the new semantic domain construed by the text. In both cases, the move was first introduced in the Rheme, corresponding in the unmarked case such as this to the domain of New information, which was subsequently picked up in the Theme of the clause that immediately follows (the Theme of course very typically being the domain of Given information).

Nominalization is implicated throughout these organizing and knowledge-building functions. The problem, for example, was first construed in the Rheme of clause 11 with the tokens of negative evaluation "inflated" (a logical GM) and "negligence" (experiential GM), which were subsequently summarized in the next Theme as a "limitation" (logical GM). The problem-solution text-type appears indeed to be a useful context for understanding the relationship between nominalization, Theme and the organization of texts and text-types. Furthermore, the analysis shows that such signals may well be achieved not by single lexis but

discursively through coordinated grammatical choices. These observations shed additional light on the grammatical complexity of textual signalling in the problem-solution text-type. As such, the observations highlight a limitation of strictly lexical and phraseological approaches to the study of textual signalling.

It is useful to reflect on some of the assumptions that corpus-based methods may engender. While the link between nominalization and Theme is clear, the link between nominalization and the notion of signalling of moves is less so if signalling is to be understood as a generalizable function in discourse outside of relatively predictable text-types such as the problem-solution. It appears the generalizability of the link between nominalization and signals can be challenged by a universal feature of discourse, intepersonal positioning. When the move in a text-type is distinguished primarily by a change in interpersonal footing, nominalization would appear to become a less productive source for signalling.

Such a move is identified in the DC text that the students produced in the Writing I course. The three classic moves of the DC are indicative summary^highlighting statement^interpretation/discussion (Swales & Feak, 2004).What identifies the transition in a DC text from the highlighting statements (extracting salient features from the data in the figure) to the interpretation of the highlighting statements is the more speculative interpersonal footing for the author's claims in the latter. Yoshi's DC2 provides a suitable extract:

> **Highlighting and interpretation moves in Yoshi's DC2**: Signposting of interpretation move in DC underlined; topical Themes in italics; ellipsis in curly brackets:
>
> (6) *the change*^{2a} *[in*^{13e} *China]* ranges^{9n} from^{10n} -0.59% to 6.63%, (7) while *{the change} [in*^{13e} *Japan*]{ranges} from^{10n} -1.68% to 0.7%, (8) and *{the change} [in*^{13e} *Korea]* {ranges} from^{10n} 2.09% to 4.14%.
> (9) *This higher*^{13d} *CPI*^{13c,13d,13c} *volatility*^{4n} *[in*^{13e} *China]* <u>suggests</u> (10) that Chinese^{13c} economy^{3a} seems to be less stable^{7n} [than Japan and Korea]. (11) *This volatility*^{4n} *[in the Chinese*^{13c} *CPI*^{13c,13d,3a}*],* << (12) causing9n either economic13c bubble4n or stagnation4n,>> could negatively affect^{9n} its domestic^{6a} economy. (Y.DC2.9-11)

The author's shift in footing from the highlighting statements to the interpretation move in the DC is evident in the change from a unmodalized claim in clauses 6-8 of a change in the economy

that “ranges” to an interpretative stance on the highlighted result, which “suggests”. The cautiousness of the claim realized by “suggests” does not entail nominalization. The interpretive footing continues with the modal “could”. This brief analysis shows that nominalization is not necessarily a feature of signals of moves in all academic registers, and would appear more likely in some than others. This observation may help explain the relatively peripheral place of nominalization in Flowerdew’s (2008) methods of analyzing such signals.

The above extract from the DC2 text provides additional evidence that the functional grammatical analysis of signals can generate interesting questions for further investigation. And from this view, nominalization does appear to have a relevant role. An experienced reader of Yoshi’s DC2, coming upon the richly nominalized, anaphoric Theme in clause 9 after reading the unhedged highlighting statements in clauses 6-8, would likely predict authorial commentary or some other shift in interpersonal footing in the forthcoming discourse. There is, at least, a *gradation* in signalling at work here whereby the process “suggests” coalesces the shift lexically but the anaphoric nominalized Theme that precedes this signal has already raised an expectation of a change in interpersonal footing. The notion of graduated signals was also illustrated in the thematic patterning of signals shown in Yoshi’s PS2. This question would appear to be worth further attention.

Not forgetting the guiding purpose here of understanding Yoshi’s use of GM, it is possible to confirm that, based on the DC2 extract, by the middle of the course Yoshi had gained laudable control of nominalization as a resource for thematic development. The thematic pattern between clauses 9 and 11 is constant (the Themes realize very similar ideational meanings); however, in the second instance of the Theme, Yoshi avoided repetition of the first instance while also building technicality of the focal aspect of “volatility” by further nominalizing the thematized semantic configuration. The choices indicate careful regulation of textual and ideational meanings in a recontextualized data commentary in economics.

7.2.1.2.3 A revised macro-Theme and macro-New in recontextualizing economics

An important feature of the system of Theme is the scalability of its function as the orienting point of departure for a message. The concept of Theme operates at higher scales of discourse than the clause, especially as understood through the overlap in the unmarked case between Theme and Given information, on the one hand, and Rheme and New information on

the other. Predictably, thematic choices at the higher scales of academic writing have important implications for knowledge construal, including text organization and positioning of readers. While the clause-level Theme realizes the point of departure for the message in the clause, the *hyper*-Theme does so for longer text phases such as the paragraph (as in conventional 'topic sentences'). Such features of texts as titles and thesis statements realize the *macro*-Theme, which preview the text. The scalability of Theme/Rheme extends to Given-New information ordering, such that a macro-New, for example, if one is present, is likely to appear at or near the end of the text, where it distils the ideas and positions introduced as well as potentially serving as a transition to subsequent discourse. The present sub-section considers an instance of Yoshi's revision of the macro-Theme and macro-New in his DF2 draft.

The analysis of Yoshi's revised macro-Theme and macro-New requires some background. The analysis in section 7.2.1.1 indicated that Yoshi had some challenges in his course writings recontextualizing logical reasoning that in economics is associated with mathematical semiosis. The specific instance in his DF1 was resolved in the revision. While Yoshi was likely unconscious of the mathematical reasoning by which he construed economic knowledge in language, he was clearly very conscious of the limitation on the use of mathematics in his assignments; Yoshi understood that the accepted formal definition of a method or theoretical entity in neoclassical economics is one that is expressed mathematically. The linguistic rendering of formal claims in this field is typically labelled *intuitive*.

In his revision of the DF1, Yoshi changed the title (macro-Theme) of the definition by specifying and limiting the definition as "intuitive": from ""Portfolio[13c] Approach[3n]" [in[13a] Foreign[6a] Exchange[5a] Market]: An Extended[7n] Definition[5c] Text" (Y.DF1.T) to "Intuitive[6a] Definition[2c] [of[13a] 'Portfolio[13c] Approach[3n]']: An Extended[7n] Definition[5c] Text" (Y.DF2.T). An important complementary revision occurred at the opposite end of the DF2 text. The coordinated revision is a good indicator of Yoshi's use of Theme at the scale of the text. After a summary of the definition (clause 20), Yoshi added a macro-New. In clause 21, he contrasted the intuitive (linguistically-construed) definition of the portfolio approach that was presented with the formal, mathematical definition, which the reader was encouraged to pursue in the reference cited:

> (20) The impacts[4n] [of[13a] both the market[13c] volatility[1a] and the supply[2a] [of the asset] over[13e] the currency[13c] exchange[2a] rate[4n] are revealed through[10n] the portfolio[13c] approach[3n]. (21) In[10n] contrast[4n] to the intuitive[6a] definition[2c] [[introduced in this paper]],

> Ogawa and Kawasaki (2007) provides a strict[6a] mathematical[13c] definition[2c] [on[10n] this approach[3n]].4 (Y.DF2.20-21)

The macro-New is well-executed as it reviews the contribution of the portfolio approach, identifies the definition provided in the assignment as nonetheless limited, and directs readers to the valued definition in economics. In this way, it provides a strong cohesive tie between the title and the closing of the text. Importantly, the effectiveness of both the summary and the reframing of the definition is achieved in concise moves in which GM has key roles. Among his comments on revisions submitted with the draft, Yoshi included the following: "I added 'intuitive' in the title because the definition in this text is indeed intuitive, and I want to briefly introduce the mathematical definition as a hyper-new. Is [Does] it work?". It does indeed.

In his question, Yoshi demonstrates his engagement with the concept of the macro-Theme and macro-New (in the Writing I course, the macro- and hyper- prefixes were conflated to "hyper-", which explains Yoshi's use of "hyper-New"). He appears to have successfully rescaled his understanding of clause-level Theme and Given information to the text phase and whole text levels. This instance of revision provides another example of Yoshi's self-regulated application of his knowledge of economics, the context of the assignment, writing instruction and metalanguage to increase the likelihood of engaging intersubjectively through his writing.

In my feedback on Yoshi's DF2, I responded to this revision with "good" and no other positive remark of his well-considered choices. Perhaps for the lack of more fulsome positive feedback, or possibly for the reasons indicated below, in the third draft, the DF3, Yoshi revised the macro-New he had written in the DF2. His attention to this move both in the revision process as well as in the pedagogical discourse about his writing clearly indicate the high value he attached to this move. In the revision, he maintained the gist of the macro-New as a recontextualizing bridge between non-mathematical and mathematical construals of his research, but unpacked the reasoning, rephrased the contrasting evaluations "intuitive" and "strict" with the more objective, taxonomic qualifiers "qualitative" and "quantitative":

> (21) Though the previous[7n] discussion[2d] is limited[5c] to the qualitative[6a] research[2a] [of[13a] the portfolio[13c] approach[3n]], (22) the quantitative[6a] analysis[2a] is possible[5g] (23) by[10n] introducing the mathematical[13c] definition[2c], such as the one [[provided in Ogawa and Kawasaki (2009)]]. (Y.DF3.21-23)

This revision is relevant on several counts. Yoshi removed the qualifier "intuitive", which he may have deemed potentially derogatory; in neoclassical economics, an intuition is merely an initial point of reference. He also unpacks the circumstance in the DF2 "In contrast to…". He does this by explicitly taxonomizing the methodologies in play, classifying the two types of analysis as qualitative and quantitative. Quite masterfully, he then describes his extended definition of the portfolio approach as "limited to the qualitative research…", which at once shows his ideas to be disciplined and focused by recognizing their limitations, while also indirectly negatively appraising the approach as "limited". However, he carefully qualifies the "*discussion*" [my italics] as "limited", not the approach; in this clause, qualitative research was subtlely set aside as non-nuclear, in a circumstance. In contrast, quantitative research was construed in a full participant in the following clause, one that "is possible". The metaphorized Attribute "possible" construes an experientialized suggestion, indicating at once Yoshi's interest in advancing his research and sensitivity to readers' alternative interests and preparation.

Analysis of the ND of the original and revised macro-New moves shows an ND of 10 for the move in the DF2 and ND 4.7 for the move in the DF3. In reporting this decrease, it is important to emphasize that the careful reconstrual of the move is nonetheless still realized by such nominalizations as "limited" and "possible," which have a crucial, if hidden, role in the writing's success; congruent construals of these ideas would not have afforded the same possibilities ideationally or interpersonally. So, while nominalization has, overall, a reduced role in the revised version of the move, nominalization continues to have a crucial role in how the context is successfully mediated through language.

7.2.1.2.4 The distribution of nominal density in Themes and Rhemes in Yoshi's course writings

Several of the above analyses have detailed the rapid rise in abstraction that occurred in Yoshi's writing near the beginning of the course. Discussion of that development in the writing have implicated interactions between instructor feedback and the changes in degree and functions of abstraction of Yoshi's extended definition drafts. Indeed, one of the more interesting implications of the rapid initial increase in abstraction in Yoshi's writing comes from what is known of semiotic mediation through instruction in this context. This case provides an opportunity to consider further the relationship between Yoshi's GM use and the pedagogical context.

While instruction up to the point in the course when students revised their first DF text had involved some general description of the functions of abstraction in academic writing, there had yet been no extended, explicit instruction on nominalization. The rise in the abstraction in Yoshi's DF drafts occurred soon after the early unit in the syllabus focusing on improving flow through practice in thematic patterning and Given-New information order.

This background suggests that the dramatic increase in the use of GM in the Themes of the DF2 assignment (as seen in Figure 7.1) drew largely on semiotic resources Yoshi already possessed at the beginning of the course in possible combination with explicit instruction and instructor feedback on text organization. This hypothesis can be further queried by referring to the analysis of the relative distribution of ND in the Theme and the Rheme in clauses across Yoshi's course writings. It will be recalled that Theme assigns textual prominence to elements that serve to orient readers locally in interpreting the message; also, Theme and Rheme are concepts that co-function significantly in texts with Given and New information order.

Figure 7.8 shows the average relative distribution of ND in the Themes and Rhemes of the clauses in each of Yoshi's texts. That is, the relative distribution of ND in Themes and Rhemes of individual clauses in each of Yoshi's drafts was calculated, and this distribution for all clauses in each text was aggregated and averaged into a single figure for the text. Also, the aggregated distribution for all texts were averaged for the entire corpus, producing the first result in the top bar of Figure 7.8, which shows that across Yoshi's course writings, 37% of the total ND was distributed in Themes (the dark band), with the remaining 63% in Rhemes (the light band).

The data in Figure 7.8 show that, in the early PC and DF1 texts, the Themes in Yoshi's writings accounted for a relatively small proportion of the overall GM-construed abstraction in the Theme portion of his clauses, at 25% and 28% respectively. With the DF2 text, at which point the instructional cycle on clause-level organization had been complete and Yoshi had received some individualized instruction on the use of Theme to review known information, the ratio of ND in the Theme nearly doubled to 45%. While the overal ND of Yoshi's writings also doubled with the DF2 draft, what is noted here in connection with instruction is the additional doubling of the *proportion* of the overall ND in the Themes of this draft. Thus, on average, the Themes of Yoshi's DF2 text are approximately four times more nominally dense than those of

his DF1 and PC texts, with half of this increase accounted for by the overall increase in ND across the drafts and half by a redistribution of clausal ND from Rhemes to Themes.

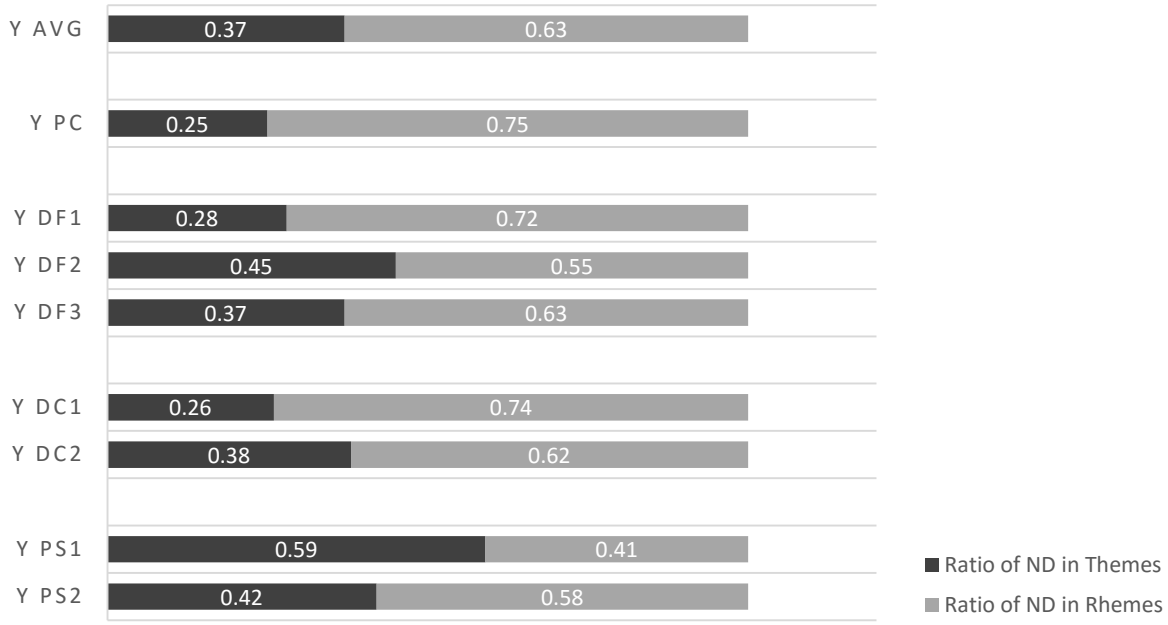


Figure 7.8. Ratio of thematic to rhematic nominal density (ND) in Yoshi's writings

While the ratio of ND in Themes does return to 26% in the subsequent text, which is the first draft of the DC, at the final draft of every assignment, the ratio of ND in Themes is between 37%-42%, which is also the average ratio of ND in Themes for all of Yoshi's writing. In investigating the nature and timing of the dramatic increase in the use of GMs in the themes of the DF2, two important findings emerge. First, the overall increased use of GM by Yoshi during the Writing I course can be partially explained and differentiated metafunctionally by pointing out the increased role of Theme in establishing abstract points of departure to orient readers.

The second finding relates to the nature of the increased role of Theme. Within the registers in play in the Writing I course, Yoshi appears to have achieved a new steady-state in the use of GM in Themes, with the Themes in his more mature writing construing, on average, 10-15% more abstraction that the Themes in his writing at the beginning of the course.These findings indicate that Yoshi's increased use of GM soon after the beginning of the Writing I

course drew largely on meaning-making resources he already possessed in possible combination with instruction on text organization.

This concludes the focus on GM and Theme in Yoshi's writings. In combination, the results indicate that Yoshi's use of Theme as a resource for organizing texts improved after an unsteady start in the first couple of texts written in Writing I. The analyses show, furthermore, that with this improvement came an increase in the ND of Themes and in the distribution of ND in Themes relative to the ND of Rhemes. These findings draw attention to Yoshi's reflections on his revisions in the course, which touch on aspects of his writing related to Theme: "In addition to this, I tried "packing" several ideas so as to implement what I learned in the class." And, "Focusing on the given/new structure, I tried not to use many transitions." It may be recalled that he submitted these reflections with his DF2, which contained significant problems in use of Theme. As indicated by the much improved use of Theme in the DF3, DC and PS texts, his focus on the Given-New information order appears to have benefitted his later writings.

7.2.2 Distribution of logical and experiential grammatical metaphor in Yoshi's writing

As part of the investigation of the functions of thematic abstraction in Yoshi's writing, section 7.2.1.2.4 reported on the changing relative distribution of experiential GMs (along with embedding) and logical GMs in the Themes across drafts of Yoshi's extended definition text. It was noted in the discussion that the increasing role of experiential GMs in the Themes across the drafts reflected a more general pattern across Yoshi's corpus of an increasing incidence of experiential GMs. The present section reports on the relative contribution of experiential versus logical GMs across Yoshi's writings. Extending this overview is a more delicate comparative analysis of the first and last classroom assignments, the DF1 and PS2; this analysis illustrates the change in relative distribution of ND from predominance of logical GMs to the predominance of experiential GMs.

For the analysis of the distribution of logical and experiential grammatical metaphors, it will be useful to clarify for readers the nature of this distinction. Figure 7.9 shows the typology of GM introduced in Chapter 4 adapted to show, at the lower centre, the distinction between logical and experiential GMs. Logical GMs are semantic junctions that join the relator function of a conjunction with a sub-function of a figure or element. As can be seen in the calculation of nominal density values, logical GMs involve shifts of either a single rank (GMs 9, 10 have a ND

value of 1) and two ranks (ND value of 2); the latter, GM types 4 and 7, involve the highest degree of abstract construal in the ND system, which is from a conjunction to a nominal group element. Experiential GMs are evaluated at either ND 1 or 0.5, depending on whether the semantic shift spans one rank, from clause to nominal group (ND value of 1), or spans elements within the nominal group (0.5). This figure does not account for embedding, which nonetheless

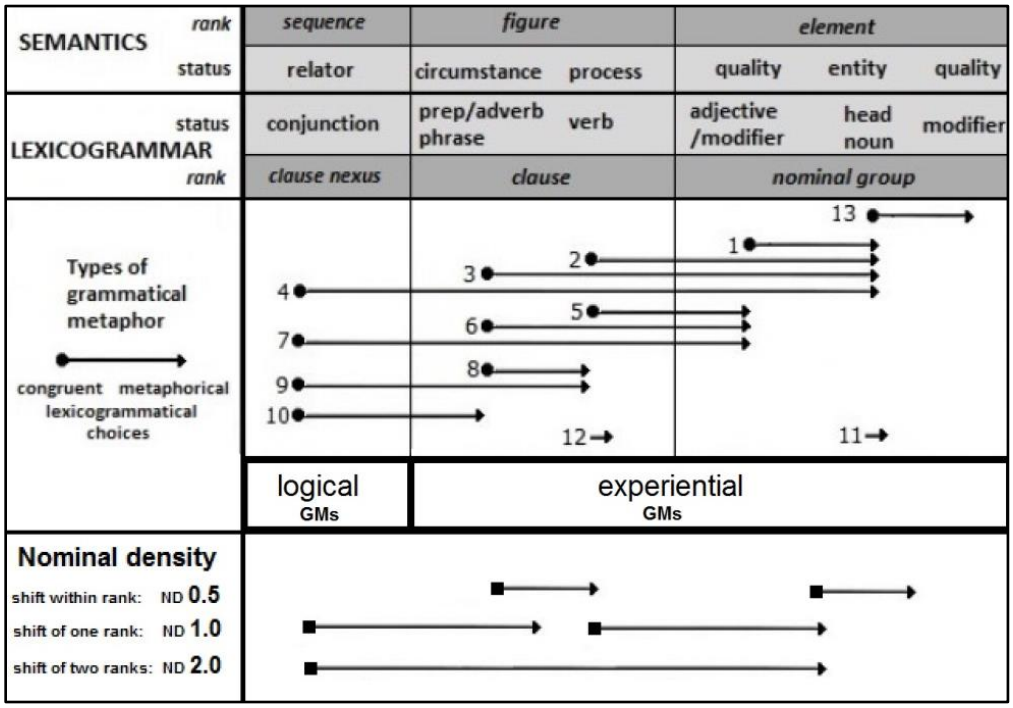


Figure 7.9. GM types with logical and experiential GMs & ND values distinguished (adapted from Halliday, 1998)

is treated as a sub-type of experiential GM. All GMs, either alone or in collaboration, lead to a greater functional role for the nominal group and the construal of entities. While experiential GMs realize greater nominal density within the construal of human experience, logical GMs are distinguished by a deeper semiotic shift of serial logical meaning to experiential meaning, such as when causal relations between claims are construed as processes, circumstances, and entities.

The three types of ideational GM that contribute to nominal density – logical GM, experiential GM and embedding – were analyzed for the relative contribution of each to the ND

of clauses, texts and corpora, and thus to the construal of abstraction at these scales. Figure 7.10 shows the ratios of ND that are attributable to these GM types in Yoshi's writing.

The solid logarithmic trendline for logical GM (LGM) shows that Yoshi's reliance on logical GM for construing abstraction began high and decreased relatively dramatically early on and then more gradually towards the end. Correspondingly, his use of experiential GM (EGM) increased steadily. In reviewing these results, it is important to note that while the *ratio* of LGMs

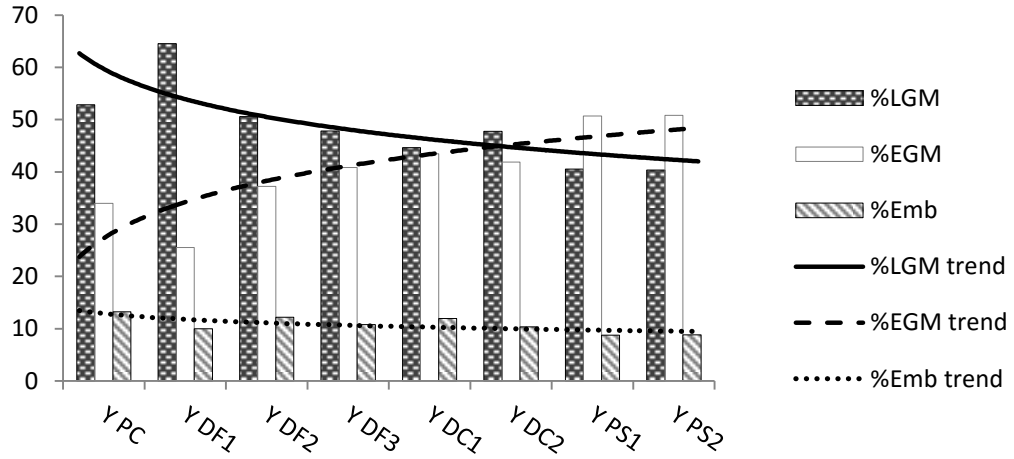
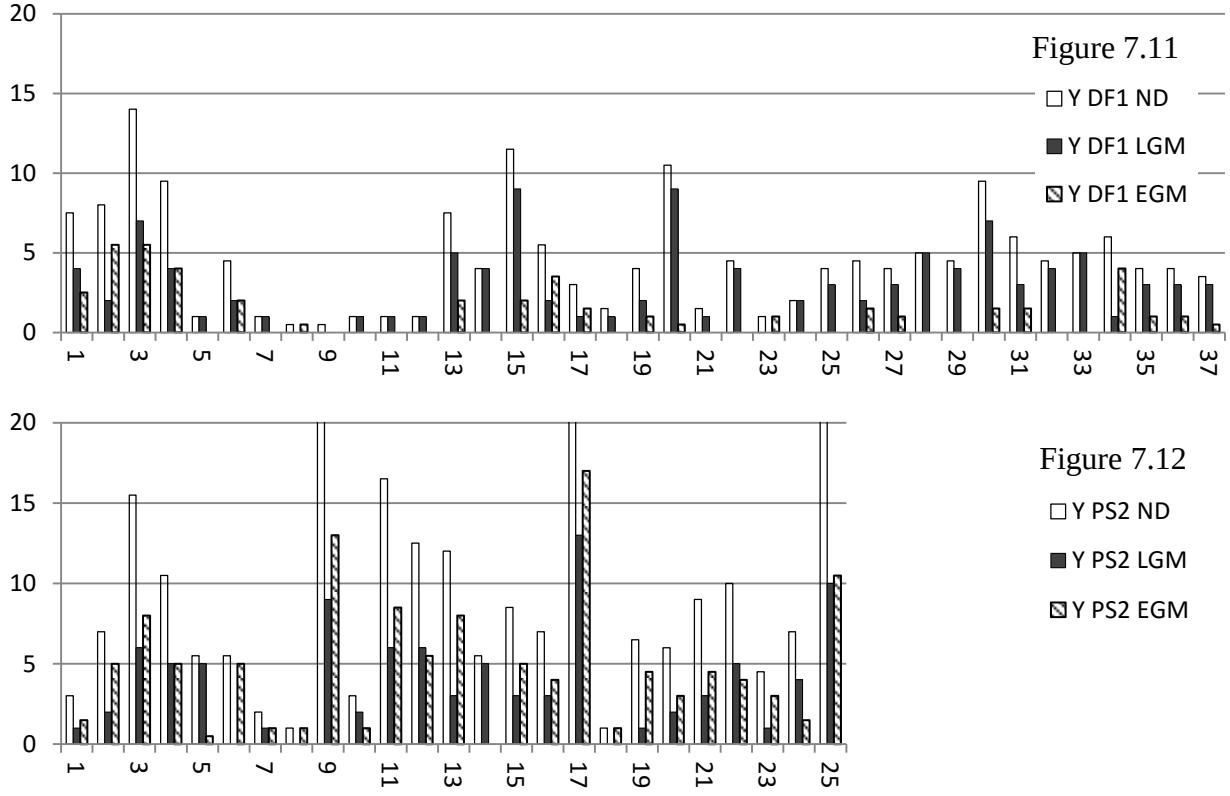


Figure 7.10. Ratio of nominal density attributable to logical GM, experiential GM and embedding in Yoshi's writing

decreased during this time, the overal use of LGM *increased* by 30%; the focus at present is on the *ratio* of logical GM and experiential GM in the ND of the writing. It follows that the texts with the highest percentages of logical GM are the first two. In Yoshi's first in-course text, the first draft of the DF1, logical GM accounts for 65% of the abstraction, a figure that decreased to 40% by the end of the course in the PS drafts. As shown in the dashed trendline, experiential GM accounts for only 25% of the abstraction in the DF1 text, a number that doubled to 50% in the final text.

7.2.2.1 Distribution of logical and experiential GMs in Yoshi's first and final course writings

A closer look at the distribution of logical and experiential GM in the DF1 and PS2 text helps in understanding further the functionality of this variation across the corpus of Yoshi's writing. Figures 7.11 and 7.12 show the clause-by-clause measures of ND, logical GM and experiential GM in the first draft of the DF1 and the second draft of the PS2 texts respectively. The total ND score for each clause is shown along the x-axis, in a white bar. To the immediate right of the white bar is a black bar showing the relative contribution of logical GM to the total ND of the clause; and to the right of the black bar is a striped bar showing the relative contribution of experiential GM to the ND of the clause. As the contribution of embedding to ND is relatively stable, it is not shown in Figures 7.11 and 7.12.



Figures 7.11 and 7.12. Nominal density, logical GMs and experiential GMs per clause in Yoshi's extended definition draft 1 (DF1) and problem-solution draft 2 (PS2)

The difference in overall ND scores in the two texts is dramatic. In the PS2 text, shown in Figure 7.12, clauses 9, 17, and 25 have respective ND scores – which run off the chart – of 25, 33 and 22. In contrast, as seen in Figure 7.11, the clause in the DF1 text with the highest ND is #3, with an ND of 14. The difference between these texts in the ratio of logical to experiential GMs is also clearly evident. In the DF1 text, the black bars of the LGM score dominate over the striped bars of the EGM score. In contrast, in the PS2 text, the striped bars of EGM dominate, accounting for a much higher ratio of the ND.

Of course, the main interest is with how this change in preference for logical or experiential GMs is functional in the writing assignments. The trajectory of relatively rapid change early in the course followed by a slower rate of change in the middle and until the end is similar to the dynamics of ND in Yoshi's writing in the course. Given that embedding changed little, the general pattern that emerges is that, as the ND of Yoshi's writing increased, he increasingly relied on experiential GMs. While his use of LGM between these two texts increased significantly by 30%, his use of EGM increased massively, by 310%, a figure which helps account for the increasing functional load of EGM across the corpus.

Knowing the typical functions of EGM in scholarly economics writing, it is possible to predict that, over the course of Writing I, the functional load of abstraction construed in Yoshi's writing shifts from conventional paths of logical reasoning guided largely by mathematical economic theory and methods – with logic being a primary affordance of mathematics – to the construal of highly specific technical and abstract entities within taxonomies of knowledge of the economic world. This general hypothesis is examined in the following quantitative and qualitative analysis of excerpts from the DF1 and PS2 texts.

As the DF1 instantiates a higher proportion of metaphors of logical reasoning such as relations of cause, condition and order, this text – more specifically the excerpt from clauses 14-16 – is useful for illustrating the functions of this type of GM. The DF1 instantiates a factorial explanation (Martin & Rose, 2008); specifically, it explains the assumptions that inform the defined technical term in the assignment, the "portfolio approach", which is a theoretical framework for managing finances (Markowitz, 1952). Given that a key challenge of the extended definition task was for students to be purposeful in how they would *extend* the definition, Yoshi's choice to explain the assumptions behind the portfolio model was appropriately strategic in extending a technical definition in economics for non-expert readers.

The results from the DF1 in Figure 7.4 show that clauses 14-16 have a relatively high level of ND for this text. Although this is not a representative sample of the text in relation to level of ND, this level is necessary in the present analysis to provide sufficient tokens of GMs for illustration. The sample does, however, illustrate how the construal of abstraction of a student's academic text can be dominated by logical GM, with relatively little experiential GM. The bars in the figure show that clause 14 has an ND of 4, all of which is realized by logical GMs; clause 15 has an ND of 11.5, also almost all of which is achieved by logical GMs. Clause 16 is the outlier in the sample as its ND score of 5.5 is realized mainly by experiential GMs. Here is the extract:

> (14) This balance[4n] is defined to be the optimal[7n] one. (15) This model[4n] introduces two chief[7n] factors[4n] [[that influence[9n] the F[6a]X[5a] rate[4n]]]. (16) The first[7n] one is the F[6a] X[5a] market[6a] volatility[1a]. (Yoshi.DF1.14-16)

In transitivity terms, the extract comprises three relational clauses, including two of the identifying type (14, 16) and one attributive type (15); thus, the extract is mainly about identifying and describing abstract entities, centrally the quality of "balance" in the portfolio model. Since none of the processes are metaphors and there are no accompanying circumstances, all the logical GMs contribute to the construal of participants, specifically, three pairs of abstract participants that are related to each other through relational processes of identification or attribution. In this extract, the average ND of the six construed participants is 3.6; this relatively high level of abstraction can be attributed in large part to the presence of logical GMs 4n and 7n – metaphorical shifts of two grades, from relator to a nominal group element – in all the participants but the Value in the final clause, 16. Notably, clause 16 involves more experiential GMs than the two previous clauses.

In clause 14, the logical GM (4n) "balance" refers to the hypothesized *mix* of foreign exchange (FX) investments (that this is a logical GM is evidenced by the unpacking, e.g., investors can buy x *when* they sell y). This mix is maintained by investors in the interests of maximizing the utility of their investment. The clause claims this "balance", introduced in the previous clause, is "optimal" for minimizing risk of loss. The concept is distilled from a series of cause-conditional reasoning that Yoshi laid out in more congruent wording in clauses 7-13 of the text:

(7) Assume[9n] (8) that you are a Japanese[13c] investor (9) and possess two types [of assets], (10) one is paid in[10n] yen (11) and the other is paid in[10n] dollars.(12) Here, suppose (13) that the two assets are maintained[9n] in[10n] a certain[5c] balance[4n] [[which minimizes[9n] the risk[2g]]]. (Yoshi.DF1.7-13)

This lead-up to the technical term "balance" informs readers that investors "possess" investments which are reasoned about with a view to minimizing risk and thereby "maintained" in an abstract circumstance of "balance". This extract of relatively congruent construals was analyzed in section 7.2.1 for how, in Yoshi's process of drafting and revising the extended defintion assignment, he gradually comes to successfully recontextualize mathematical reasoning by means of the resources of GM.

The extract of clauses 14-16 illustrates the extent to which economics relates various reified construals of logical reasoning to each other, a practice that may by-pass human experience altogether. The functionality of other logical GMs in this extract are also of interest. Within the relational clause 14, the Value "optimal" is a logical GM that unpacks to a sequence of concessive and causal reasoning such as 'Exchange activity *X* carries risk *r* <u>while</u> activity *Y* carries risk *r*+1 <u>so</u> activity *X* should be undertaken'. The focus on abstract reasoning continues with "model" in clause 15, which refers to the theoretical model behind the portfolio approach; this abstract entity implies many layers of logical reasoning realizing an extended mathematical and content-free procedure. Thus, "model" is a logical GM (also recovered from a previous clause), as of course are "factors" and "influence". Another logical GM in the extract is "chief", which evaluates and classifies the focal factors in a comparative logical relation with other factors.

Thus, in this passage, Yoshi construed just the theoretical essentials, which in this disciplinary context derive from the formal logical procedures that construe the theoretical model that in its unrecontextualized and most valued form (for economists) is mathematical. It is also important to note what is *not* in the discourse; the meanings here are realized with minimal experiential detail and organizational intervention. The lack of experiential meaning is such that the clauses "(14) This balance[4n] is defined to be the optimal[7n] one. (15) This model[4n] introduces two chief[7n] factors[4n]" (with part of the closing nominal group removed) construe an almost perfectly non-material, semiotic world. The lack of reference to technical or abstract entities,

including those involved in generating cohesive links (which often integrate metaphorical construals of experience in nominal groups) means that logical GMs dominate the practice of abstraction in that part of the excerpt.

Clause 15 introduces the logical GM "factors", which are the basis for extending the definition by explicating the assumptions, that is, "factors" behind the defined model. Near the end of clause 15 – in the typical domain of New information – experiential metaphors come into play in the post-modification of factors with "F" (foreign, a metaphor for the circumstance *(to be) from elsewhere*) and "X" (exchange, a metaphoral classifier unpackable to the process *exchange*). In clause 16, the experiential GMs dominate, with "market" (a metaphor for the circumstance of location, *in the market*) and "volatility" (a de-adjectival nominalization from *volatile*). The shift from logical to experiential abstraction in this case is characterized by a general-to-specific shift from the construal of procedural reasoning to specification of the entities about which economists reason.

7.2.2.2 Distribution of the most dynamic GM types across Yoshi's course writings

The redistribution of the functions of abstraction that occurs across Yoshi's writings can be traced through quantitative analysis of tokens of individual GM types. Table 7.1 presents the twelve GM types that were observed to change most dynamically between the DF1, DF3 and PS2 texts, including whether they increased or decreased and by how much. A GM type was included in this analysis if the net increase or decrease in its use was over 150%. These three texts represent samples from the course at the beginning, middle and end of the Writing I course.

As can be seen in Table 7.1, of the most dynamic GM types, a far higher number of GM types increased in use compared to those that were used less. The main finding is interesting, if predictable given the above analysis: all the GM types that were used more often are experiential GMs whose use generally increased drammatically while both the GM types that were used less are logical GMs whose use decreased relatively mildly. These results confirm and further detail the finding of an overall increase in GM use. This general finding frames specific features of the data that are worth highlighting. In Halliday's typology of GMs, all experiential GMs except GM8n (cirumstance to process) and GM12n (metaphors such as the process exist without a congruent precedent) contribute directly to the "thinginess" of discourse (Halliday, 1998) as elements of the nominal group. Indeed, the dynamism in experiential metaphor in this context is

concentrated in experiential GMs that realize the nominal group, with all main elements of the nominal group represented: premodifier, head noun, and postmodifier.

Table 7.1. Twelve most dynamic GM types in Yoshi's texts at the beginning, middle and end of the course.

Types of Grammatical Metaphor grammatical (semantic) shift: congruent ⇢ metaphorical	**DF1**	**DF3**	**PS2**	
GMs used more		**tokens**		**net change**
1b: modalized adjective (quality) ⇢ noun (entity)	0	0	6	**+**
2a: verb (material process) ⇢ noun (entity)	4	8	13	**+325%**
2b: verb (mental process) ⇢ noun (entity)	3	1	16	**+533%**
3n: adverb/prep.phrase(circumstance) ⇢ noun (entity)	5	6	11	**+220%**
5b: verb (mental process) ⇢ adjective (quality)	0	3	19	**+**
5g: verb (modalized process) ⇢ adjective (quality)	1	2	6	**+600%**
6a: adverb/prep.phrase(circumstance) ⇢ adjective (quality)	7	11	13	**+186%**
13a: noun (entity) ⇢ noun post-modifier (qualifier)	5	15	16	**+320%**
13c: noun (entity) ⇢ adjective (quality)	5	17	19	**+380%**
13e: adverb/prep.phrase(circumstance) ⇢ noun post-modifier	1	6	10	**+1,000%**
GMs used less		**tokens**		**net change**
9n: conjunction (logical relator) ⇢ verb (process)	26	15	18	**-163%**
10n: conjunction (logical relator) ⇢ adverb/ prep.phrase (circum; conj./comment adj.)	21	17	12	**-175%**

Furthermore, these GMs build nominality from a broad base of experiences, including processes (verbs), circumstances (adverbs and preposition phrases), qualities of entities (adjectives), and elements of entities (nouns, post-modifiers etc.). However, the nominal group elements generated by these GM types that increased were not generated from logical relators (conjunctions). Indeed, none of the GMs whose use increased involve two downgradings (valued at ND of 2) from a conjunction at the nexus of a clause-complex to an element of the nominal group. All the GMs that emerged as dynamic represent either a single downgrading valued at ND 1) or shift within the (nominal) group rank (valued at ND 0.5). This finding supports several others reported above that a high proportion of the change in the use of GMs across the course can be attributed to a high number of smaller-scale metaphorical shifts.

Two other tendencies that emerge are worth noting. It is perhaps surprising to see the prominence in this data of the experientialization of modality. While it can be expected that with greater abstraction Yoshi's discourse would shift to a more objective interpersonal footing, and this was indeed observed in drafts of the definition text, the GMs that implicate modality such as 1b and 5g are relatively infrequent in the overall raw totals for GM types. These metaphors reconstrue explicitly interpersonal meaning (i.e., whereby the social subject *enacts*) as experience (whereby the social subject *reflects*). GM1b is a nominalization from a modalized adjective; a possible semohistory may be *may explode* (modalized verb) to *volatile* (modalized adjective) to *volatility* (noun), as in "the inappropriate[6b] calculation[2b] [of[13a] its volatility[1b]]" (Y.PS2.22).

A greater rise (from zero to 19 instances) was seen in the use of GM5g, which is the shift from a modalized verb such as *cannot reverse* to a modalized adjective *irreversible*, as used in the nominal group "the investment[13b] decision[2b] [of[13a] the firm [[facing irreversible[5g] investment[5a] expenditure[2a] [under[13e] uncertainty[5b]]]]]" (Y.PS2.9). This result indicates the possibility of a relatively disproportionate development in functional sub-systems involving GM and modality whereby the writer cultivates his disposition for reconstruing interpersonal meaning as experience.

Another relatively specific functional subsystem that was increasingly activated is that of mental processes, as in GMs 2b and 5b, both of which were used much more often across the samples. This development in the use of metaphors of mental processes is predictable, especially given the adaptations that were observed across drafts of Yoshi's definition text towards less mathematical and congruent representations of reasoning. The centrality of the *rational* economic agent in neoclassical economics has been described above, with the occurrence of such mental processes as *assume*, *decide*, and *choose* being relatively frequent in accordance with congruent linguistic construals of economic reasoning which buttress the central, mathematical construals of reasoning.

It is possible to hypothesize that at least some of the increase in the use of these metaphors of mental processes is associated with the experientialization of mathematical reasoning. An example is the shift from the mental process *prefer* as in the DF1,

(17) If the risk[2g] [of[13a] dollars] increases[9n],

(18) you may prefer the asset [[paid in[10n] yen]]

(19) to avoid[9n] [[taking[9n] the risk[2g]]]" (Y.DF1.17-19).

This extract shows the tendency in Yoshi's early writing towards conventions of unrecontextualized economics discourse, such as explicit reasoning and congruent construals of the economic agent's internal processes. In such construals, linguistic meanings serve to set up the central claims expressed in explicit, mathematical reasoning by approximating such reasoning to the extent possible in language. At the time of writing the PS2, however, it appears that Yoshi had adapted his discourse to construe economic knowledge linguistically. While the most valued reifications are still mathematical in their theoretical framing, the recontextualization of mathematical economics involves substantially more than removal of the mathematics. Rather, these later texts instantiate a register of mathematical economics recontextualized for an educated, non-specialist reader. As such, the conventions of more general written academic registers come into play in discourse such as the nominal group in clause 9 from the PS2, quoted in the previous paragraph, whose central elements are "investment[13b] decision[2b]".

As noted in section 7.2.1.2.2, this fundamental shift from the more procedural, congruent reasoning associated with mathematical economics towards metaphorical construals of reasoning occurred in parallel with Yoshi's independent revision of the title and closing statements of his definition text to ensure that mathematical semiosis would not be abandoned. However, rather than having his readers enact and reason through mathematical meaning in some deeply compromised way, he construed logical reasoning as experience, while adding a citation for those readers interested in the mathematical definition.

As for the GMs that decreased in use, the increase in GM type 10n is both expected and unexpected, with this variability appearing to reflect the operationalization of GM10n. This GM type encompasses the shift from a logical relator realized by a conjunction to various metaphorized semantic domains including especially circumstances but also conjunctive and comment adjuncts. The shift to circumstance is conventional in GM studies. The shifts to adjuncts were evaluated as metaphors of logic for their function in redirecting discourse by

compact, non-conjunctive means (additionally, any experiential elements such as *result* in *as a result* were also operationalized as ideational GM).

The decrease in GM10n was unexpected because the circumstantiation of reasoning tends to be regarded as an important resource for reducing grammatical intricacy (e.g., Schleppegrell, 2004b). Correspondingly, it was surprising to see the decrease in this GM10n because in both fronted instruction and feedback, I emphasized the value of packing two or more clauses joined by conjunctions into a single clause with one or more circumstances (recall Yoshi's report on his exploration of published economics writing for the use of conjunctions, which he found were not often used). However, even though the ND of Yoshi's writing increased dramatically, his reliance on this particular GM decreased, as shown by the revision of a circumstance of manner/comparison in the DF2 to a full clause with conjunction in the DF3:

- In[10n] contrast[4n] to the intuitive[6a] definition[2c] [[introduced in this paper]], (Y.DF2.21)
- Though the previous[7n] discussion[2d] is limited[5c] to the qualitative[6a] research[2a] [of[13a] the portfolio[13c] approach[3n]], (Y.DF3.21)

In the case of this revision, Yoshi was compelled to make explicit the details of the particular point of contrastive logic. Like any specific textual instance of revision, this one is highly complex in its functional implications (discussed in the analysis in section 7.2.1.2.2). However, it can be assumed that the same general rationale – an interest in making claims and reasoning more specific – helps explain the decrease in the functionality of GM10n.

In contrast, the decrease in the other function of GM10n, as a conjunctive adjunct, was expected. Instruction in the writing course also encouraged the improvement of flow by replacing the signposting function realized by conjunctive adjuncts, where these are unnecessary and off-register, with careful thematic progression. The following revision is illustrative:

- *As*[10n] *a result*[4n], more yen than dollars will be demanded[9n] in[10n] the market. (Y.DF1.22; italics of adjunct mine)
- *This surging*[7n] *demand*[2g] *[over*[13a] *the asset*[4n] *[[paid in*[10n] *yen]]]* triggers[9n] yen's appreciation[4n] [against[13e] dollars]. (Y.DF3.13; italics in Theme mine)

Of course these extracts are better understood with reference to their respective contexts; however, it is possible to perceive a development in the writing here from the rather step-wise presentation of an economic process to an experientially richer construal in which the semantics of "result", previously construed as a signpost, are now construed as a clause-nuclear causal process, "triggers". The revised Theme now construes in summary form the factor that "triggers" (the factor is itself a metaphor of phenomena described earlier in Yoshi's DF3 text). It was this kind of revision – removing signposts and revising for thematic progression – that Yoshi explained he was compelled to make in response to instructor feedback and his reading of published economics research which showed relative scarcity of "signposting", i.e., textual Themes.

7.2.2.3 Transitivity across Yoshi's course writings

The findings for the definition and problem-solution texts from the analysis of ND, and the distribution of logical and experiential GMs in Themes and across the corpus can be cross-examined from the perspective of transitivity. The findings of greater experiential abstraction in Yoshi's writing predict an increased role for processes and clauses that construe relations between abstract entities.

Table 7.2. Percentage of process type per text in three texts spanning the course

Transitivity: Process Types	DF1	DF3	PS2
	% of all processes in text		
Material	55	39	32
Verbal	2	4	8
Mental	11	13	12
Identifying Relational	13	17	12
Attributive Relational	19	26	36
Total Relational	32	43	48

Table 7.2 shows the changes in the main process types as a ratio of all processes (that are clause-nuclear in ranking clauses) in each of the DF1, DF2 and PS2 texts (thus sampling from

the beginning, middle and end of the course). As can be seen, the ratio of all types of Relational Processes increases steadily from one third of all the processes in the DF1 to almost one half in the PS2. Among types of Relational Processes, it is the Intensive Attributive Relational Processes that increase the most in relative frequency; thus, of the entities construed in Yoshi's writing, an increasing ratio are Carriers of Attributes, such as in clauses 3-4 of the PS2:

> (3) Much of the theoretical[13c] and empirical[13c] literature [[dealing[8n] the NPV[7n,6a,5b] rule[2g] [such as[13e] Jorgenson (1963)]]] proves[9n] its effectiveness[4n] [[in[13e]explaining[9n] corporate[13c] investment[5a] behaviors[2e]]]. (4) This NPV[7n,6a,5b] rule[2g] is based[9n] on an assumption[4n] [[that investment[2a] is reversible[5g]]]. (Y.PS2.3-4)

The extract highlights a paradox of logical GMs in Yoshi's writing; while the ratio of logical GMs decreases relative to experiential GMs, their raw frequency increases. Given the increase in logical GMs realizing Attributive Relational Processes in Yoshi's writing, it is possible to ascribe the overall decrease in the ratio of logical GMs in Yoshi's writing mainly to *other* types of logical GMs; this, indeed, is what was found and discussed in Section 7.2.2.2 above with regards to the logical GM type that decreased most dramatically (by 173%), GM 10n, which realizes the shift from a logical relator to a circumstance or conjunctive adjunct.

The changes in the ND of the Yoshi's writing are also reflected in the decrease in Material Processes. While Material Processes account for 55% of all clause-nuclear processes in the DF1 text, the ratio for this type by the end of the course in the PS2 text is 32%. This change represents a 42% decrease in the construal of Actors (including abstract Actors) in transitive and intransive contexts (i.e., with and without Goals). Predictably, while the total ratio of Material Processes decreases, the ratio of *abstract* Material Processes realized by logical GMs, such as (from the PS2) "fail," "can be surmounted," "are inflated," "overcome," and "developing" remains relatively stable. Given the overall rise in abstraction and logical GMs, the fact that abstract Material Processes such as these would continue to have a role is understandable.

The increase in Verbal Processes also shows how an ostensively congruent process advances abstract semiosis. In the Verbal clauses in the PS2, the Sayers are abstract semiotic entities, including "rapidly growing literature" and "The previous discussion". The brief analysis of changes in transitivity in Yoshi's writing provides an important additional perspective on the semantic shifts towards greater abstraction and maturity in Yoshi's writing. Especially central in

this shift is the rise of relational transitivity. From the view of transitivity, then, the description of economic entities, rather than, for example, the reporting of economic activities, is a key means by which Yoshi recontextualized international economics.

7.3 Nominal density and the ratio of logical and experiential GMs in the writing of Yoshi's peers

This section briefly presents the general ND, LD and GI results for the writings of Yoshi's peers, as well as the ratio of ND attributable to the two main general types of GM. As such this section extends our understanding of these students' use of GM to mediate the context of their writing assignments, extending what was learned in Chapter 6. This section also provides additional context for the changes observed in the writing of the focal student in this section, Yoshi. Given this focus, the analysis of the results for the writing of Taka in economics and Sotty and Haru in the humanities is oriented towards comparison with what has been found for Yoshi's writing. The results of these analyses are briefly illustrated from the writing and connected to findings for these students' writing that were reported in Chapter 6.

7.3.1 Nominal density and the ratio of logical and experiential GMs in Taka's writings

The analysis begins with the writings of Taka, Yoshi's disciplinary peer in economics. Taka is a first year Masters student in the subfield of development economics. Figure 7.13 shows the changes in ND, LD and GI in Taka's corpus. As noted in Chapter 6, Taka's early texts were already quite elevated in ND so, while the increase in ND and LD shown in Figure 7.13 is notable, it is mild compared to that seen in Yoshi's corpus, especially early in the course. Another point of variation is in the use of non-metaphorical content lexis, which Yoshi relied upon with decreasing frequency in his course writings. This development in Yoshi's writing is apparent in the converging ND and LD lines shown in Figure 7.1. In Taka's case, the lines overlap consistently across all course writings, indicating that Taka did not use much non-metaphorical lexis in his writings, and this practice did not change during the course. A feature of Taka's use of GM that corresponds with the relatively mild increase in ND and LD is the almost negligible decrease in GI, as shown by the GI trendline.

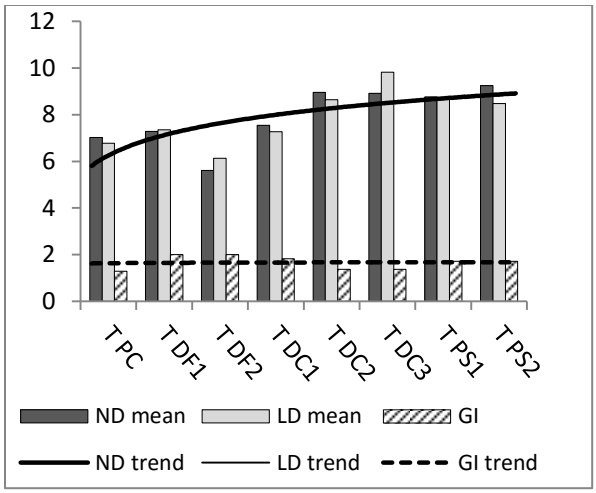


Figure 7.13. ND, LD & GI in Taka's writing

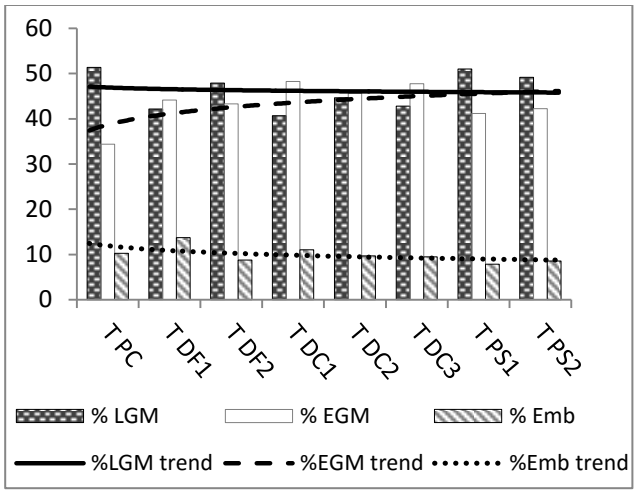


Figure 7.14. Ratio of ND by GM type in Taka's writing

Also notable is the marked decrease in ND from the first to the second drafts of the DF text, a development that constrasts with the sharp increase in ND across Yoshi's DF drafts at the same time. This variation shows the relevance of the register of the first draft of the text in determining the direction of revision, which, in turn, has a determining effect on the relevance of the instruction on text organization. In Taka's case, as indicated by samples analyzed in Chapter 6, the thematic development of his early writings was already quite functional in recontextualizing his research.

Unlike Yoshi's case, with Taka there appears to have been no particular contextual pressure from instruction, disciplinary discourse, or his own rhetorical interests to adjust up the levels of abstraction for readers in the points of departure for his messages. In fact, Taka was compelled to *un*pack the Themes of his first DF draft. A salient and productive revision in this direction was carried out in the opening clause, from "*The selectivity*^{4n} *[of*^{13a} *aid*^{5a} *distribution*^{2a}*],* << >> has recently drawn^{9n} attention^{2b} for^{10n} two key^{7n} reasons^{4n}," (T.DF1.1; italics in Theme are mine) to an opening Theme that, on several functional grounds, is appreciably more considerate of the non-expert reader, "*In*^{10n} *development*^{2a} *studies*^{2a}, the selective^{7n} aid^{5a} distribution^{2a} is a strategy^{3n} [for poverty^{1a} reduction^{2a}] (T.DF2.1; italics in Theme mine). Interestingly, while this pattern of unpacking over-nominalized discourse occurred from Taka's DF1 to DF2, the same pattern took place between Yoshi's DF2 to DF3; this is because Yoshi's trajectory began with a level of abstraction inadequate for his message before

the apparent over-compensation with over-nominalized discourse. The third draft was crucial for Yoshi to adjust his writing in a number of functional domains that provide wide scope of variation.

The changes in the ratio of ND attributable to logical GM and experiential GM in Taka's writing, shown in Figure 7.14, differ markedly from those in Yoshi's writing. An important initial observation is of the almost flat trendline for logical GMs (noting that the logarithmic trendline shown in this figure *emphasizes* rate of change). This result may be partially explained by the already high level of abstraction of Taka's early texts relative to Yoshi's, and the correspondingly milder increase during the Writing I course in Taka's use of GMs in general, as observed in Table 7.1. The change in the proportion of experiential GMs is also relatively mild, with the proportion of this type at its highest in the middle of the course, in the DC texts.

Additionally, the proportion of embedding decreases a small but notable amount in Taka's writing relative to that of Yoshi's writing. Predictably, the high proportion of embedding in Taka's writing is observed in texts which focus on highly specific abstract entities whose qualities are realized by means of extensive nominal group post-modification, such as the DF1, which is a short text focusing on "a strategy^{3n} [of^{13e} aid^{5a} distribution^{2a} [for^{13a} efficient^{7n} reduction^{2a} [of^{13a} poverty^{1a} [in developing^{7n} countries]]]]" (T.DF1.2). It would appear that, relative to Yoshi's international economics, the contrual of economic entities such as this in development economics require downgrading and nominalizing processes to nominalizations such as "distribution", "reduction", and "developing". Downranked congruent processes are also functional, as evidenced in embedding used in two key clauses of Taka's DF1 to construe Value, that is, a full participant in relational clauses such as the following, with the Value shown in italics (mine):

> Another reason^{4n} is *[[that the fiscal^{13c} challenges^{2a} [of^{13a} developed^{7n} countries] [[brought^{9n} by global^{6a} recessions^{4n}]] made^{9n} them to quest an efficient^{7n} distribution^{2a} [of^{13a} the aid^{2a} [with^{13e} limited^{6b} resources]]]]* (T.DF1.6).

It appears that development economics finds a greater need to maintain material processes in semantic tension than does international economics; the higher incidence of such processes as nominalizations and in embedding may reflect the more empirically focused nature of development economics compared to international economics.

A different pattern of variation in the ratio of ND attributable to logical and experiential GMs emerges in Taka's writings from that in Yoshi's writing. While the ratio of logical GMs to experiential GMs in Yoshi's writings change in a relatively smooth, linear trajectory of decreasing LGM and increasing EGM across the corpus without clear variation between text-types, the pattern for the proportion displayed in Taka's texts can be described as varying markedly by assignment or text type. As shown in Figure 7.14, each of the four text-types presents a somewhat unique pattern, with the DF texts showing a relatively even distribution, the DC text showing slightly higher proportion of experiential GMs construing abstraction, and the ratio of abstraction of the PS texts attributed to logical GMs being higher. Interestingly, this variation is not evident in the raw ND scores for these text-types; for example, as seen in Figure 7.13, the ND and LD of Taka's DC and PS texts are quite similar.

7.3.2 Nominal density and the ratio of logical and experiential GMs in Sotty's writings

The ND, LD and GI of Sotty's writing is shown in Figure 7.15. As can be seen, Sotty wrote relatively congruently in these first two texts, increasing the nominality of his writing dramatically in the second draft of the extended definition text. This pattern of GM use early in the course is the same as Yoshi's. Also, as with Yoshi's DF1, Sotty's DF1 received feedback on the desirability of more robust Themes and better-linked thematic progression. Sotty was also advised to reduce grammatical intricacy. The instruction may explain the dramatic change observed in Sotty's DF2, which stands out from his other writings in several ways: the ND and LD rise dramatically; uniquely in the humanities writing, the ND exceeds the LD (a pattern that was associated with technical writing of economics); and, as seen in Figure 7.16, logical GMs accounted for slightly more of the ND of Sotty's DF2 than did experiential GMs, which is also a pattern associated with the economics writing in the course. However, while the DF2 is clearly anomolous in Sotty's corpus, it is apparent in his final text, the PS2, that some tendencies towards the patterns seen in the DF2 return, such as a smaller gap between ND and LD (Figure 7.15) and a closer balance between logical GMs and experiential GMs.

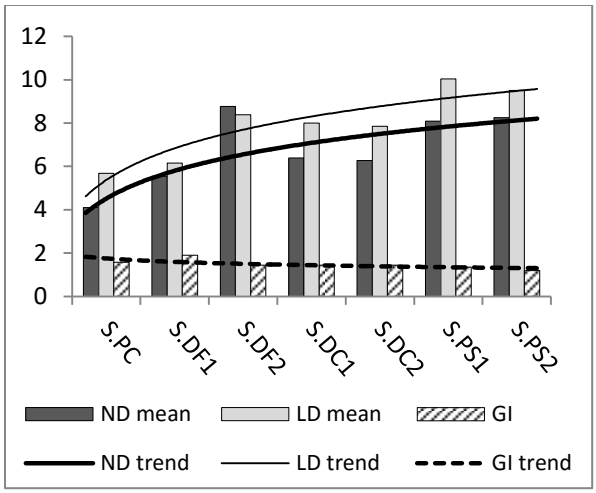


Figure 7.15. ND, LD & GI in Sotty's writing

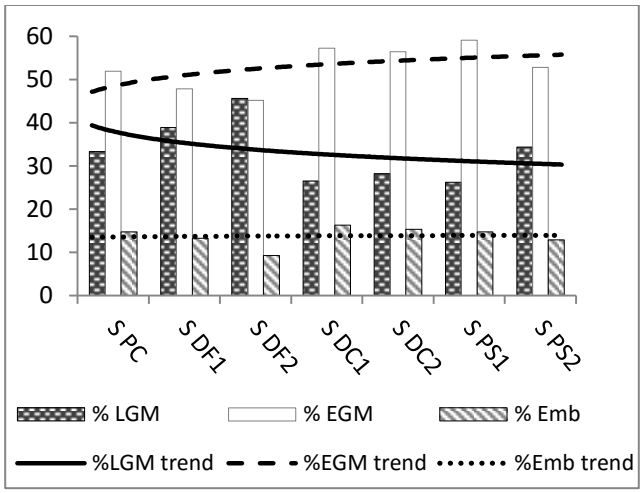


Figure 7.16. Ratio of ND by GM type in Sotty's writing

The congruency of Sotty's PC and DF1 texts can be attributed to the relatively low incidence of abstract nominal groups, high incidence of congruent content lexis (as shown by the separation between the ND and LD trendlines), and higher grammatical intricacy. While these features alone – perhaps especially the lack of abstract nominal groups – only indicate the potential of problems with the register, the two texts in fact had some problems.

While Sotty showed good command of the topic, the exposition was weak on several accounts such as the digressiveness and weak reasoning in clauses 7 and 8:

> (6) Thanks to[10n] this advanced[7n] medical[13c] technology[3n], more and more women have been able to conceive a baby than before. (7) In[10n] fact[11n], AID[6a,5a] was first[7n] operated at the Keio University's Hospital in 1950s (8) and hundreds of children are said to be born in Japan every year. (S.PC.6-8)

The expert reader identified weak argumentation as a feature of Sotty's writing that qualified it as "unapprenticed". Similar issues arise in the DF1. At the start of this text, Sotty's analogy for autonomy shows his effort to provide a bridge to his focal field of bioethics but, in so doing, digresses significantly:

> (1) Autonomy[1b],<< >> refers to the freedom[1b] [for[13a] a country, a region or an organization[2a]] [[to govern itself individually]]. (2) <<which originally comes from

> Greek auto[6a] and nomos,>> (3) For[10n] example[11n], it is used for[10n] Tibetan[13c] spiritual[13c] leader, Dalai Lama, to express (4) that Tibet does not want independent[1a] [from[13e] China] (5) but wants autonomy[4n]. (6) In[10n] the context [of bioethics[2g]], however, it means [[that a person should be free [[to make [9n] decisions[2a]]] [[and the ability[1b] [[to act and behave]] should not be forced or controlled by anyone else]]]]. (S.DF1.1-4)

As with Yoshi, Sotty's revision of the DF1 resulted in a very different opening in the DF2. With the revision, the opening, especially clause 2, was now too dense with information.

> (1) The concept[2b] [of[13a] autonomy[4n]] is considered a main[7n] principle[4n] [in bioethics[3n]]. (2) The important[7n] position[3n] [of[13a] autonomy[4n] [in[13e] ethical[6b] topics such as genetic[13c] testing[2a], in vitro[6a] fertilisation[2a] (IVF), assisted[5a] reproductive[5a] technology (ART) and organ[13c] transplant[9n]]] does not preclude[9n] the need[2g] [for[13a] further[6a] discussion[4n]].

The readability is also hampered by unexpected lexical metaphor and wordy description, such as that of the "position of autonomy in ethical topics". The logically dense metaphorical process "does not preclude", which implies a double negative, has the potential to disorient further.

The apparently strong relationship shown in this context between these students' revisions of first drafts for Theme and the increase in nominality of the writing confirms, at least for this context, the links between the textual and ideational functions of written academic registers. While Sotty did not revise the now over-dense DF2 text a second time, in Yoshi's case, a third draft was productive in achieving a more felicitous balance between congruence and metaphoricity.

While near the end of the course Sotty still lacked control of some areas of lexicogrammar and his academic sub-culture, he appears to have gained some additional control of abstraction through choices of GM. Here is the opening of the first draft of his PS1:

> (1) In[10n] the discussion[4n] [of[13a] an organ[13c] transplant[9n]], a donor's[13b] living[5a] will[2g] has played an important[7n] role[3n] in[10n] bioethical[13c] decision[13c] making[9n]. (2) In[10n] general[3n], the living[5a] will[2g] is defined as a legal document [[stating patient's[13b] wishes[2g] [on[13e] health[13c] care[2a] [in[13e] cases of [[being[2c] incapacitated[7n]]]]]]. (Y.PS1.1-2)

This PS1 excerpt illustrates the moderately increased level of ND that is achieved in Sotty's writing at the end of the course. This level of abstraction seems well-managed and appropriate.

As can be seem in Figure 7.16, by the end of the course, Sotty's writing seems to have also settled at a relatively high proportion of experiential GMs to logical GMs, implying that his writing tended to re-construe aspects of human experience rather than reified forms of reasoning. This result indicates that the relatively high level of logical GMs of the DF2 was something of an experiment. The fact that it shares many qualities of economics writing is indicative of a potential mismatch with reader expectations in bioethics. (Sotty's DF2 text, as an outlier in his corpus, was responsible for skewing the results from the parallelized differences analysis towards greater similarity between Sotty's and Yoshi's use of ND and LD than for other pairs of students in different disciplines.)

However, even as Sotty's writing stabilized towards the end of the course to a balance of experiential and logical GMs that the data suggest would suit the expectations in bioethics, the generally weak argumentation in the final texts (as illustrated in the extracts above and identified by the expert reader) remained a challenge in his apprenticeship in bioethics writing. Further exploration of the implications of GM use for these challenges in Sotty's writing remain for future study. What is clearer is that the co-genetic lexicogrammatical and semantic aspects of Sotty's socio-semantic disposition as instantiated in his writing in English – including of course the use of GM for construing abstraction – required time and attention to meet Sotty's and his peers' expectations for his engagement in bioethics as a soon-to-be published apprentice scholar.

7.3.3 Nominal density and the ratio of logical and experiential GMs in Haru's writings

The results for Haru's use of ND, LD, and GI in her course writings are presented in Figure 7.17. These show the increase in, and expected variation between, ND and LD. As with the writing of her peer Sotty in the humanities, Haru's writing does not show convergence of these two lines, which indicates that the increase in the construal of metaphorical entities does not replace the construal of congruent entities. This pattern constrasts to some extent with Yoshi's, whose increased use of GMs occurred with a decrease in congruent discourse. Thus, while Haru's writing became more abstract during the writing course, it maintained a constant congruent base.

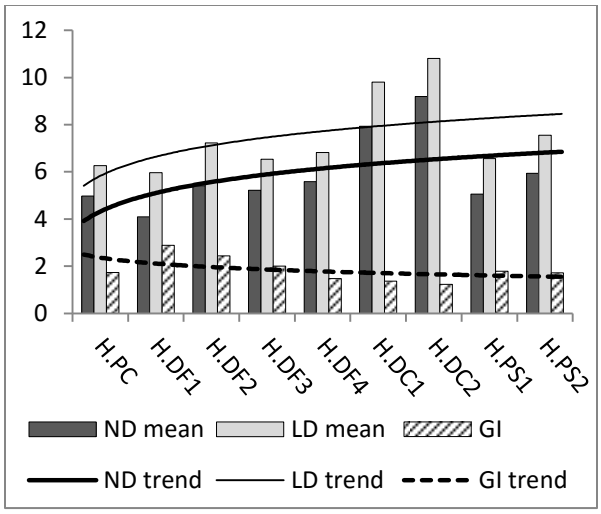


Figure 7.17. ND, LD & GI in Haru's writing

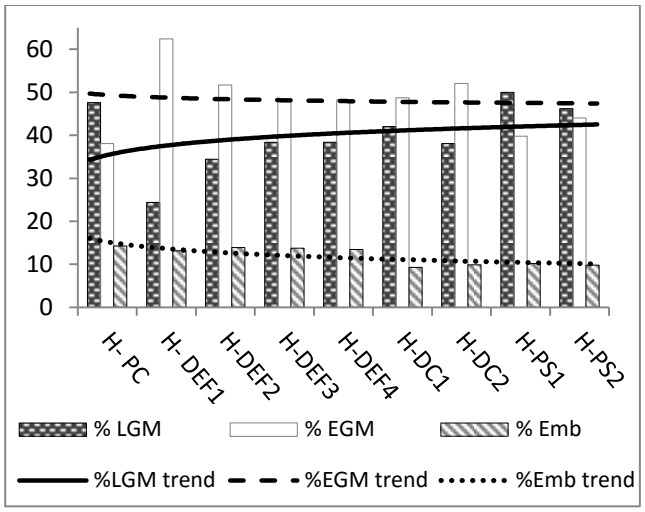


Figure 7.18. Ratio of ND by GM type in Haru's writing

Another general feature of Haru's use of GM that emerges from Figure 7.17 is variation by text-type. In Haru's corpus, variation is observed in the respective ND values for each of her assignments, the DF, DC and PS. While the raw ND levels of the DF and PS texts are very similar, their difference is evident in the ratio of logical to experiential GMs of these two texts. The ratios of logical to experiential GMs in the DF and the PS texts are shown in Figure 7.18, where they can be seen to differ appreciably. The DF texts are functionally weighted in abstraction towards reifications of experience, as shown by the following excerpt in which Haru describes the concept from Plato of epistemological illumination:

> (8) According to[10n] this, knowledge[2b] [of[13a] necessary[5g], immutable[5g] objects and truths[1a]] (such as [['what is square']] or [['what is virtue']]) requires[9n] the activity[2a] [of[13a] a kind [of intelligible[5g] light,]] (9) illumining objects [[that are purely intelligible[5g]]],(10) thereby making[9n] them 'visible'[5g] to[10n] our mind. (H.DF2.8-10)

This excerpt has an ND of 5.2, the majority of which is accounted for by clause 8; this is slightly below the ND for the text, 5.4. While it is rich with experiential abstraction, the number of nominalizations of logical reasoning is moderate. The PS text, on the "Populist Evangelicalism Movement in the United States", constrasts with this by being more explanatory, with a corresponding need for logical GMs to frame the factorial explanation. The extract below is

illustrative, with an ND of 6.8, which is higher than the 5.9 average for the text and higher than that of the above extract from the DF2:

> (3) A major[7n] reason[4n] [for[13e] this 'success'[2a] [of[13a] evangelicalism[1a]]] is regarded as its profound[7n] interaction[2a] [with[13e] surrounding[5a] culture]. (4) While advocating some traditional[6a] Christian[13b] values[2g], (5) evangelicalism[1a] adapts[9n] to broad[6a] popular[6a] trends[4n] [in culture]. (H.PS2.3-4)

As observed in the opening Theme in this section, "A major[7n] reason[4n]", the PS2 embeds its experiential construals within a more explicitly drawn explanatory framework in which logical GMs have a key role. In such ways, the DF and PS texts have similar levels of nominality (5.4 and 5.9, respectively) but the nominality realizes different distributions of functions and hence helps realize different registers.

A final note on register variation and Haru's and her peers' writing practices is relevant. While Haru complained about the poor fit between philosophy discourse and the pedagogical problem-solution text-type, according to her subsequent explanation in class, she found good use for the PS text as a sample of writing for her application to graduate school in religious philosophy in the US, which was her long-term goal (although it was not confirmed whether she in fact used the PS text for this). Her interest in recontextualizing the writing course assignment draws attention to her disposition within the wider socio-cultural context of the Writing I course. In accordance with their socio-semantic dispositions, Haru and the three other focal students in this study (and perhaps many of their classmates) carried out these pedagogical tasks as pieces that they actively integrated into their forming socio-semantic dispositions as professional academics.

Furthermore, the data reveal that, in at least some cases, what was intergrated in students' academic dispositions went beyond the practice and the products of the writing course to include new cognisance about writing and language that was explicitly linked to strategies for mediating meaning-making for the social roles to which they aspired. This is evident in Haru's data but emerges most convincingly with Yoshi's. Their practices indicate that they intended not merely to improve their academic writing in English for an imagined future, but that, through these assignments, they were actively writing their academic futures. Haru concluded her explanation of the context of the problem-solution text in class by noting that she chose to write about

evangelicalism in the US as a strategic compromise between her scholarly interests and those of potential reviewers. Such resourcefulness is implicated in Haru's success in the writing course, and beyond. At last contact, Haru had entered the doctoral program in The Graduate School of Arts and Sciences at a very high-ranking U.S. university, studying Augustine philosophy.

7.4 Overview of empirical findings

While ND analysis extends from the analysis of ideational GM, it can be carried out in conjunction with analysis of any of the metafunctions that contribute to the realization of context-specific variation of language. And, as noted in Chapter 5, ND measures can be calculated at the scale of corpus, text, text section, clause, and functional grammatical structure within clauses. The study indeed exploited many of the possible combinations of instrument, language function, and corpus within this range; while all of the sixteen kinds of analysis carried out in Chapters 6 and 7 benefitted from the ND analysis, ND had only a supplementary role in the analysis of nominalization and textual signals of moves in Yoshi's problem-solution text (7.2.1.2.2) and the distribution of transitivity across Yoshi's course writings (7.2.2.3). Table 7.3 below provides an overview of the instruments, functions, corpora and key findings of the analyses.

Table 7.3. Summary of analyses of GM: Methods and findings

Analysis			Summary of Findings
Instru-ment	**Function**	**Text /Corpus**	
6.2 Results for GM use aggregated from the writing of the four focal subjects			Group's use of GM increased rapidly at first, then more slowly; it increased with each new assignment and each revision; correlations are found between ND and LD, LC, and GI.
ND, LD, LC, GI	Ideational	Writing of all students aggregated by text drafts	
6.3 Three students' use of GM in the pre-course text, early in Writing I			Students varied considerably in how much and type of GM used at beginning of the course; discipline-specific uses of GM are discernable from ND analysis; the further the student is from the home discipline, it appears the more likely GM-related errors arise; GM provides a semantic domain in which students may mistakenly conflate different uses of the same lexical lemma; writing with low GM not necessarily subjective in interpersonal positioning.
ND,IGM, EGM, LGM	Ideational; inter-personal	Opening moves of three students' pre-course texts	
6.4.1 Parallelized difference in pairwise comparisons of students' writing			The statistically-determined relationship between ND and LD in the students' writing provides a robust means of identifying disciplinary variation between economics and humanities writing; in the relationship between ND and LD, the writing of students in different disciplines is significantly different, while in the same discipline there is no significant difference.
ND, LD	Ideational	Aggregated writing of individual students	
6.4.2 Nominal density and lexical density aggregated by discipline			ND analysis of writing aggregated by discipline reveals disciplinary variation and longitudinal changes in nominality that LD analysis does not show; the extent of non-metaphorical content lexis used is key determinant of general disciplinary variation between economics and the humanities.
ND, LD	Ideational	Writing of disciplinary pairs aggregated and compared	
6.5 Comparing change in ND and LD to understand individual variation			Use of GM at the beginning of the course strongly affects the overall shape of the students' writing trajectory and overall degree of change in measures of nominality; ND shows greater variation in nominality than LD.
ND, LD	Ideational	The first and final course writing by each student	

Table 7.3. Summary of analyses of GM: Methods and findings (cont'd)

Analysis			Summary of Findings
7.2 Grammatical metaphor and abstraction in Yoshi's writing			Yoshi's use of ND and LD increase markedly in the course; GI decreases slightly; the trajectory of Yoshi's use of GM is nonlinear, with spikes in and retreats from nominality as the course progresses; Yoshi's use of GM varies by text-type in both extent and function; convergence of ND and LD trendlines indicates Yoshi uses less non-metaphorical content lexis with time.
ND, LD, GI	Ideational	All of Yoshi's writing; supplementary data	
7.2.1.1 Nominal density in definition text drafts: recontextualizing economics			Yoshi's first draft is personalized and betrays mathematical thinking in its linguistically explicit logical reasoning and interpersonal positioning that are off-register for the EAP context; next draft over-nominalizes, especially in front-loading abstraction; third draft finds appropriate middle ground in nominality and indicates the functionality of a pattern of regular waves of ND in academic writing with peaks, shoulders and dips in nominality; instruction in Theme with feedback on links between Theme choices and nominalization associated with significantly revised writing; at the end of the course, Yoshi identified need for more independent revision based on his knowledge of economics, writing, and language.
ND: EGM; LGM	Ideational; experiential & logical; inter-personal	Drafts of Yoshi's definition text; supplementary classroom data.	
7.2.1.2.1 Nominal density of Themes across drafts of the definition text			Themes in DF1 tend towards low nominality; nominalized Themes in DF1 favour logical GMs; this pattern changes in DF2, with greater thematic ND which is constituted, furthermore, by a balance of experiential and logical GMs; the increase in nominality of Themes is accounted for almost entirely by experiential GMs; however, qualitative analysis shows some Themes in DF2 still problematic while others are productive; in DF3, issues of Theme are largely resolved; results of thematic ND in texts useful in showing general patterns of Theme use.
ND; Theme; EGM; LGM	Ideational; textual	Three drafts of Yoshi's definition text	
7.2.1.2.2 Nominalization and signals of moves in Yoshi's problem-solution text			Yoshi is found to have used nominalization in highly sophisticated ways to signal the problem and solution moves in his PS text; the signals are shown to span clauses in a graduated manner in a careful thematic pattern; signals that realize changes in interpersonal footing are less likely to involve nominalization, as in Yoshi's DC text; however, nominalization may be involved in the prefacing or graduation of signals by means of reviewing a stretch of text whereby the nominalized anaphor prepares the reader for a new move.
GM, Theme	textual; inter-personal	Textual signals of moves in Yoshi's PS2 and DC2	

Table 7.3. Summary of analyses of GM: Methods and findings (cont'd)

Analysis			Summary of Findings
7.2.1.2.3 Revised macro-Theme and -New in recontextualizing economics			A key revision Yoshi carried out to his DF is in re-framing it with a macro-Theme and macro-New, a change that at once bridges from the non-technical (and less valued) definition Yoshi wrote for the EAP class to the mathematical definition that is valued in economics; his subtle and interpersonally highly strategic revision that advances his interests while recontextualizing the economics involves careful use of nominalization.
ND; Theme; Macro-Theme& -New	Textual; ideational	Three drafts of Yoshi's definition text; supplementary data	
7.2.1.2.4 Distribution of ND in Themes and Rhemes in Yoshi's writings			The overall increased use of GM by Yoshi during the Writing I course can be partially explained and differentiated metafunctionally the increased role of nominalized Theme in establishing abstract points of departure to orient readers; within the registers in play in the Writing I course, Yoshi appears to have achieved a new steady-state in the use of GM in Themes, with the Themes in his more mature writing construing, on average, 10-15% more abstraction that the Themes in his writing at the beginning of the course.
ND; Theme-Rheme	Textual; ideational	All of Yoshi's writing corpus	
7.2.2 Distribution of logical and experiential GMs in Yoshi's writing			Yoshi's reliance on logical GM as part of the total ND began high and decreased relatively dramatically early on and then more gradually towards the end; at the same time, his use of experiential GM (EGM) increased steadily; this indicates he construed less theoretical, methodological and other logical procedures and more reifications of actions and things; the ratio of embedding in total ND decreased slightly.
ND; EGM; LGM	Ideational: experiential and logical	All of Yoshi's writing corpus	
7.2.2.1 Distribution of experiential and logical GMs Yoshi's first & final texts			The ratio of logical GMs as part of the ND of Yoshi's first course assignment – DF1 – was high and decreased significantly by the final text of the course, the PS2, in which experiential GMs accounted for much of the ND; Yoshi's writing moved from construals in which the reification of forms of reasoning – just theoretical and methodological essentials - dominated nominalization to construals in which the reification of human experiences had a more dominant role; however, the raw number of logical GMs also increased during the course.
ND; EGM; LGM	Ideational: experiential and logical	Yoshi's first and final course writings (DF1, PS2)	

Table 7.3. Summary of analyses of GM: Methods and findings (cont'd)

Analysis			Summary of Findings
7.2.2.2 Distribution of the most dynamic GM types across Yoshi's course writings			The increase in the use of experiential GM as a proportion of total ND is confirmed as all of the most dynamic GM types in writing at the start, middle and end of the course are experiential GMs, which increased dramatically; all GM types that increased the most contribute directly to the nominal group; these included GMs that experientialize interpersonal meaning; the GMs to decrease the most in number are logical GMs; logical GMs were in part reduced due to Yoshi's decreased reliance on signposts (conjunctive adjuncts), which he replaced with thematic progression; Yoshi explained that his revisions were made in response to instructor feedback and his observation of the relative scarcity of signposting phrases in published economics research.
ND; GM types	Ideational: experiential and logical	First and final draft of Yoshi's definition and final problem-solution draft	
7.2.2.3 Distribution of transitivity across Yoshi's course writings			In texts sampled from across the course, Yoshi's writing uses 42% fewer Material Processes, while Relational Processes increase in use by 50%; Attribtutive Relational processes dominate; thus, a key means by which Yoshi recontextualizes economics in clauses is by characterizing abstract entities, often through metaphorical processes of cause-conditional reasoning as fits the expository function of much Yoshi's writing.
Process types	Experiential; transitivity	First and final draft of Yoshi's definition and final problem-solution draft	
7.3 ND and the ratio of experiential and logical GMs in Yoshi's peers' writing			The ND of all students' writing increased but trajectories varied considerably; Sotty's, like Yoshi's increases more, mainly due to the relative congruence of their early texts; Haru's and Taka's increase less dramatically given that their initial texts were already abstract; in the writing of both economists, the relative proportion of logical GMs decreases while that of experiential GMs increases notably; the ratio of logical GMs increases in Haru's writing while it decreases slightly in Sotty's; Sotty experiments with a high proportion of logical GMs but retreats from this to a much higher proportion of experiential GMs; in Haru's writing, experiential and logical GMs tend towards an even balance at the end of the course, with logical GMs picking up and embedding decreasing.
ND, EGM; LGM	Ideation	All of the writing of Taka, Sotty and Haru	

This chapter has extended the methods and findings presented in Chapter 6 to highlight individual variation in GM use and socio-semantic dispositions of the four focal subjects, with special focus on Yoshi. Key aspects considered were the trajectory of GM use, the balance of metaphorical and congruent construal of entities, the ratio of experiential to logical GMs in the nominal density of the writing, and, for Yoshi's writing, the functions of abstraction in Themes.

The trajectories in GM use taken by the students in their course writings highlights how, from the localized dynamics of meaning-making, a portrait begins to emerge of the individuals' orientations to human experience, reasoning, interpersonal positioning, and text-organization in the context of the EAP course. The analysis of the use of ideational GM provides insight into all the major functions by which academic texts and and their contexts are cogenetic. Furthermore, the observations of individual variation also provide insight from the instantial perspective on socio-semantic variation at higher scales of human organization. The evidence from the analysis of Yoshi's and Haru's writing indicates socio-semantic dispositions shaped by their respective disciplinary practices.

Chapter 8: Discussion

8.1 Introduction

The aim of this study is to better understand L2 writers' use of GM as a resource for regulating the functions of abstraction in university academic writing. This aim was pursued by examining the use of GM in the writing assignments of four Japanese first-language users who were at late undergraduate to early graduate levels in their respective disciplines: Yoshi and Taka were apprentice economists, while Haru and Sotty were junior scholars in the humanities. The writing was carried out in context of an introductory, EAP, research-based writing course, Writing I. This chapter discusses the findings and contributions in the context of the framework, limitations, and implications of the study.

Following this introduction, Section 8.2 briefly reviews and comments on this research as a case study of L2 academic writing by educationally successful students. Section 8.3 presents the contributions of the methodology to L2 academic writing research and social research more generally. These initial subsections provide a basis for reviewing and discussing both the specific and general findings in Section 8.4. While this major section of the discussion identifies key limitations of the study, these are described more fully in Section 8.5.

8.2 EAP writing in a national university in Japan

Besides their first language and the EAP writing course, the four focal subjects had other experiences in common that qualify this study in important ways. The four students were considered very successful in their education, especially as assessed by widely-held social and cultural values in Japan. They were students of a highly selective national university in Tokyo and thus well-positioned in Japanese society in general and the labour market in particular. Evidence from some of the students of Writing I, including Haru, indicates that the competition to enter the university had been intellectually, emotionally and otherwise personally trying. In contrast with some reports about the lack of commitment and effort among Japanese university students after they had entered university (McVeigh, 2002), the four focal students and their classmates in the studied context were found to be generally focussed and productive in the course. This level of commitment was predicted and similar to that of groups I had taught in the same context for over four and a half years previous to data collection for this study.

Another characteristic shared by the group is that they all had plans to pursue graduate studies to a doctoral level with the aim of becoming professional scholars. The writing and associated practices of the four focal students, such as conference presentation, research-intensive work in government and industry, and graduate school application, accord with the students' intentions as stated in their needs surveys.

It is also worth noting that, as English-speaking apprentice scholars with graduate-level education in a prestigious national university, this group represents apprentice professionals targeted by the Japanese national policy of internationalization, or *kokusaika*. This policy identifies graduate schools in prestigious national universities for the development of citizens who would advance the knowledge base and economy of Japan and export Japanese cultural values overseas through the use of English. Evidence from the writing shows interesting variation in this respect. Evidence of nationalistic tendencies in the research was noted for Sotty's research (which seeks to include Japanese cultural values in bioethical debates) as well as Yoshi's (the nationalism of which was tokenistic and less justifiable in view of the economic framework he used). Taka's research advanced the policy in its engagement with international economic development in accordance with Japan's official position on economic development. Haru's research in Augustine philosophy was found not to have an identifiable nationalistic tendencies, although her long-term plans for international academic engagement were the most clearly articulated for the group.

While the study did not specifically pursue the national cultural and policy aspects of the cases, these are important features of the context that resonate in the purposes and other qualities of the writing, including the nature of GM-construed abstraction. Evidence for this emerges in the subjects' strong intent on becoming internationally mobile scholars in affiliation with powerful international institutions such as overseas development agencies, internationally-ranked universities, and global investment banks. These aims are consistent with the general aim in the course to support the development of students' professional academic writing through instruction and tasks focused on recontextualizing specialized knowledge for non-experts.

While this is a multiple case study, it would nonetheless be reductive to explain the students' practices as apprentice scholars in the course with reference to national policy, previous educational success, or professional ambitions. As discussed below, their professional aims, disciplinary engagement, efforts towards meaningful exchange through academic writing, as well

as the challenges they experienced in such activities, are discursively constructed practices that are usefully understood as expressions of their socio-semantic dispositions. Like the use of language, the students' socio-semantic dispositions can be viewed in their dynamic, individualized aspects as well as from the view of the complex social groupings that are instantiated through the students' discursive practices. In this respect, the study has provided insight into the ways specific features of students' writing assignments aggregate in the students' individual trajectories across the Writing I course, and, how these trajectories in turn aggregate in identifiable social groups. The social grouping evidenced by GM analysis of the students' writing is that of general academic discipline.

The multi-scalar perspective of the study provides insight for reflection on the nature of academic apprenticeship. Some paths in academic discourse socialization will be more common than others. The apprenticeships of the four focal students may be labelled conventional, first for the central role of powerful traditional institutions and then for the students' focus on disciplinary specialization. However, the multi-scalar perspective on the students' trajectories shows that behind this arguably conventional process are unique paths through the myriad of potentials for social and scholarly advancement. The students were shown to make choices (largely unconscious) from various scales of socio-cultural systems in play, for example, from the choice of affiliation with nationalist policy to that of nominalizing or not an action represented in their writing. In every case, the trajectory of socialization is at once a unique instance of social practice and also an apprenticeship in identifiable social groupings. This understanding is afforded by a well-theorized, probabilistic perspective on the ways instances of socio-discursive practice aggregate in social systems (e.g., Byrnes, 2006).

Additionally, as a study of language use and especially of students' choices in recontextualizing specialized knowledge for non-experts, the study underlines that academic socialization involves the students' practice of agency. While some L2 writers go to considerable lengths to articulate and assert their interests (Duff & Doherty, 2015) – consider as an example Haru's initial resistance to the problem-solution text-type as a context for valued philosophical knowledge – language users inevitably position themselves in relation to others and the other aspects of context relevant to the local (im)balances of power, whether the positioning is subject to conscious reflection or not. Such positioning is inherent in the tenor of the context of situation, realized in choices of interpersonal grammar. This claim arises from Halliday's (1978)

linguistics, which treats language as a social semiotic, a socially-evolved system that, through its inexhaustible meaning-making potential, in as much as this is internalized, serves as a foundational resource for individuals in negotiating social activities. By means of internalized, socially-evolved language systems and their expression in externalized as well as inner speech, such meaning-making activity amounts to intrapersonal forms of socialization (cf., the notion of self-socialization in Duff & Doherty, 2015). These aspects of the study may hold interest for research in L2 language socialization (Duff, 2010a, 2010b).

This study is primarily concerned with students' use of ideational GM in mediating meaning in the context of the EAP writing course. An achievement of the study has been to confirm that ideational GM analysis reveals students' socio-semantic dispositions textually, ideationally, and, to a lesser extent, interpersonally (Halliday, 1998; Schleppegrell, 2004b). The associated findings are discussed below. In seeking to address this empirical question in the theoretical context of semiotic mediation and socio-semantic disposition, the study produced some methodological innovations, notably the concept of nominal density and instrument of ND analysis. The contributions associated with this instrument have necessarily been objects of reflective commentary in the previous chapters, especially in rationale for various analyses central to the study. The next section distils the gist of those discussions to summarize the methodological contributions.

8.3 Methodological contributions

The methodological contributions of the study stem from a view of language as a meaning-making resource. An important feature of language in this respect is the tension that its use generates in social context between its lexicogrammatical and semantic aspects; lexicogrammatical choices do not simply 'express' social contexts, but rather do so through the socially-evolved meanings in play in context, that is, through semantic systems. Halliday's (1985) contribution in identifying GM was to claim that the meanings in play in context are derived not only directly or congruently from human experiences and interpersonal acts, but also from the semantic resonances of grammatical structures that people rely on to construe experience and take interpersonal action. This theoretical development from SFL is sensible in view of the reliability in social contexts of, say, the selection of a noun realizing the semantics of an entity and a verb realizing the meaning of process. GM makes it possible for a noun to realize

the meaning of an entity as well as the meaning of a process that is imported, thus producing a complex semantic junction, in this case, an entity with semantic properties of a process. The overwhelming majority of GMs in academic writing join the semantics of either verbs, adverbs, conjunctions and nominal group elements such as adjectives with the entity meaning of a noun, contributing to the reconstrual of experiences, forms of reasoning, and interpersonal positions as abstract, semiotic entities that are at the heart of scholarly – especially scientific – knowing (Halliday, 1998; Halliday & Matthiessen, 1999). In essence, academic writing in particular requires thinking by means of the implicit grammatical structures afforded by our socio-discursive evolution, what Teruya (2006), researching in a context of advanced L2 learning, has called "grammatical thinking" (p. 112).

A foundational innovation in this study is the clarification about what should be taken to be a GM. Specifically, the choice was made to include all metaphorically-derived abstractions, including technical terms that have become naturalized in context of in-group discourse, as GMs. While the tendency of textually and culturally functional metaphors to become naturalized intellectual tools provides a basis for their more conventional classification as dead metaphors (i.e., no longer GMs) (e.g., Halliday & Martin, 1993), it is precisely the need to understand the semiotic history and productivity of such metaphors in social and especially pedagogical contexts (including their sociogenesis as intellectually functional abstractions) that motivates the decision to treat them along with all metaphorically-derived technical terms as GMs.

A good example of the relevance of this methodological choice of taking technical terms as GMs arises in Yoshi's use of metaphorically-derived, pedagogical metalanguage to identify functional areas needing attention in his writing (e.g., "ORGANIZATION" in "I am regretted that I focused too much on revising the parts the teacher commented because there were still rooms for improving the problem of CONTENT and ORGANIZATION, which I failed to taking into account."). Yoshi used this term productively to understand specific choices for ordering information, pre- and reviewing ideas and so on; his productive use of the term requires him to unpack "organization" to its congruent forms in relation to specific choices for organizing ideas in his writing. Thus, while "organization" is a technical term that has become naturalized in its context, its productive use in understanding knowledge construction requires the ability to unpack the term when faced with writing tasks.

This study has been developed to account for such capacities that social subjects, and writers in particular, bring to knowledge construction. By such means, the study is better able to account for the social genesis of knowledge construction in general and abstractions in particular. In the preceding example, the technical term arose in the social context of the Writing I course as an intellectual tool for analyzing and understanding one domain of writing. The data suggest that Yoshi subsequently internalized not just the name of the tool, but its social provenances in particular actions taken (or not taken) by him and others in writing (noting that Yoshi had also analyzed the choices made by economists in organizing their writing in published papers). The interest in accounting for the semantic tension maintained by the social subject between, in this case, the entity "organization" and the congruent actions of organizing ideas in writing reflects the emphasis in this as a project of educational linguistics. As such, the project reflects an interest in the educational dissemination of reliable and valid knowledge of language that serves to empower learners as they navigate – by enhanced means of semiotic mediation – their social course.

The interest in the social functions and genesis of abstraction led to other methodological choices. Yoshi's reflection also provides a good example of the value of including embedding and lexical reformulation as aspects of GM that deserve attention. While the nature of embedding as a kind of nominalization is well established, this study has emphasized its value as an intellectual tool in disciplinary apprenticeship. "CONTENT" in Yoshi's reflection is of course the pedagogically recontextualized equivalent of the experiential function, that is, the function of representing experience. The pedagogical definition in the Writing I course of the "content" function (from the lecture PowerPoint slide) was "Content is [[how writers represent human experience]]" (square brackets showing embedding added). Embedding was shown to be a crucial resource in definitions, as well as other fundamental functional domains in academic writing (notably, in nominal group postmodification, as in "…the parts [[the teacher commented]]…"). Interestingly, embedding stood out across all four students' writing as the least dynamic general kind of GM, consistently accounting for approximately 10%-13% of the nominality, decreasing very slightly across the course as other forms of GM tended to increase appreciably. By including embedding, the study has been able to distinguish not only the function but also the dynamism of different kinds of GM in context of Writing I. In this relation, the study highlights downranking (associated with embedding) as a distinct form of downgrading

(associated with other GM types), serving to distinguish these as distinct intellectual tools that developed differently in this context; for example, downgrading appears to have been the more responsive of the two resources to instruction and change in students' practice.

Another aspect of the analysis that is conventional in the study of GMs but tends to receive little explicit attention is lexical reformulation. Yoshi's reflection helps to illustrate the centrality of this resource in GM studies of teaching and learning disciplinary discourse as well. Yoshi referred to "CONTENT" as a functional domain of his writing that he also wishes he had taken more independent control over. The local semiotic history of the term is implied in the metaphorical and lexical reconstruals of *represent,* vis-à-vis the nominalization *representation,* as "*content"*; the recontruals via lexical reformulation occurred first in the writing syllabus and then in Yoshi's independent mediation of this domain of writing practice. By these means, it is possible to appreciate that, in addition to derivational morphology, lexical reformulation is an important resource for social subjects in generating and using abstractions associated with GM.

A more particular and substantial contribution of this study is in the development of the concept of nominal density and the associated instrument, ND analysis. As illustrated in the quantitative analysis, the tension associated with GM is generated in semantic junctions, technically, the scope of downgrading of rank associated with GM. The scope of semantic junctions ranges from the relatively short shift between semantic elements of a nominal group to the extended semantic distance between the logical relator at the nexus of two clauses and a nominal group element (as shown in Figure 7.9). The quantitative measure of the semantic junctions as realized by types of GM has been formalized as a new instrument for analyzing GM-enabled abstraction, ND. For the study of semantic variation in social groups, register variation in texts, language and literacy development, and indeed for a broad range of questions in discourse-based social research, the crucial affordance of the ND extension to Halliday's GM typology is quantitative analysis. The quantification of GM in discourse – and thus, of nominality and GM-enabled abstraction – using the ND instrument is the main methodological contribution of the study. With the ND tool, Halliday's statement that all scientific discourse is characterized by waves of abstraction – "[e]very scientific text, however specialized and technical, contains a mixture of levels of wording, from most congruent to most metaphorical, right up to the end" (Halliday, 2004/1999, p. 121) – is clearly described and illustrated; additionally, this is achieved for discourse in the humanities.

The methodological developments presented in this study work together. The foundational qualitative analysis of GM in texts involves a historicized account of the mediation that has gone into knowledge formation – the microgenesis of abstract knowledge construed by GMs – is appropriate and desirable. For this, when analyzing GMs, analysts do well to account for the semantic junctions historically associated with a particular semantic configuration, in other words, the packings and unpackings from which a GM has arisen. For the theoretical and methodological validity of the GM analysis that underlies the ND extension, a comprehensive analysis of the GMs in the focal text (including technical terms, lexical reformulations, and embedding) is required.

The comprehensiveness of the resulting GM analysis allows for closely linked quantitative and qualitative analyses. The close link between quantitative and qualitative analysis is assured by the status of ND as a *direct* quantitative measure of GM. ND measures GM use directly by weighing the semantic scope of the various types of GM while the most commonly used measure for assessing GM quantitatively, lexical density (LD) analysis, is a proxy measure of GM use. Other complementary proxy measures are grammatical intricacy (GI) and length of clause (LC). As a direct, historicized measure of construals of semantic configurations in sociocultural activity, ND was shown in this study to account for more subtle variations in the nominality and abstraction of the discourse than LD. As such, ND was found to account more delicately for longitudinal changes. Importantly, with ND being a direct quantitative measure of GM, the analysis provides the opportunity to shunt back and forth between quantitative and qualitative analysis at any scope of GM use in texts and corpora. While quantification through the ND instrument is impossible without an initial qualitative study, a comprehensive, cross-functional view of patterns of GM use in discourse is very difficult to achieve in the absence of the ND-enabled quantification; indeed, the difficulty explains an important achievement of this study.

By the above reasoning, two more specific contributions of the study are the quantification of GM *proper* and a historicized qualitative account of GM-enabled mediation. It is important to recognize that the historicized account of GM has not clarified remaining issues in GM analysis. While GM is clearly a central feature of the development of knowledge across timescales, that is, in texts (logogenetic scale), social subjects (ontogenetic scale) and scholarly cultures (phylogenetic scale) (Derewianka, 2003; Halliday & Matthiessen, 1999), it remains for

the analyst to clarify to the extent of relevance for their studies *how far back* in the history of meaning-making the analysis of the unpackings of GM can and should go. The extent of the social semiotic history analyzed determines whether GM is in play and, if so, the type of GM. The question is not a trivial one, especially in a field such as SFL which seeks a comprehensive evolutionary theory of language (e.g., Williams & Lukin, 2004).

However, an important counter-balance to this doubt, and progress in addressing it, arose in the study. It is that the ND results that emerged from the various layers of analysis involved in ND analysis produced a measure of nominality for texts that was, through qualitative analysis as well as descriptive statistics and pilot inferential statistics, validated against the best current quantitative instrument for GM, LD analysis. While the ND measure was found to improve upon the delicacy of LD analysis, ND and LD were still found to correlate strongly in the corpus. By extension, and contributing to the validation of the ND measure against known features of the context, the nature of the relationship between ND and LD in individual student writing was also found to be similar for pairs of students of the same discipline and significantly different in all mixed-discipline pairs. While the results from the inferential statistical analyses of disciplinary variation associated with GM use must of course be taken with great caution, the results were confirmed in descriptive statistical analyses of ND, LD and GM. In this way, LD analysis provides both the measure that helps to validate ND and – given the greater delicacy of ND analysis – a base from which methods of discourse analysis in this area have been appreciably refined.

Thus, in combination, the selected methods for identifying and quantifying GMs provide a useful tool for understanding GM-construed abstraction. The different affordances of the two analyses also mean that they can be used in tandem, with LD applied to the corpus and ND – which is more time-consuming and painstaking – applied to focal features of the discourse. More generally, the analysis of GM and abstraction introduced in this study provides a useful basis for further refinement of the transdisciplinary sociological-psychological-linguistic analysis of discourse (Hasan, 2005/1992). Importantly, while the methods are well-suited to studies of L2 university writing, they can be fruitfully applied in any discourse analysis.

The operationalization of ND is discussed next as a basis for considering more specific methodological contributions of the study. In assessing the contributions of the methods of this study, it is important to consider the various stages of operationalization that contribute to ND

analysis. The three main methodological choices were described in Chapter 5: (1) the boundaries for wordings to be analyzed as GM; (2) the analysis of semantic junctions in the history of each GM that help determine its type with reference to a GM typology adapted from Halliday (1998) and Halliday & Matthiessen (1999), and its extensions in transitivity analysis by Jones (2006); and (3), a feature that is specific to ND analysis, the weighing of the downgradings associated with various types of GM in Halliday's typology. Thus, the main methodological contribution of the study of quantifying GM directly is undergirded by two others: the particular balance in the degree (and nature) of nominality determined by the methodological choices outlined in this paragraph, not exclusively but notably (3), and the validation of this balance in ND against the main conventional instrument for measuring nominality, LD, and against a known contextual parameter, the students' disciplinary affiliation.

By accounting for the semantic nature of GM types, the study draws attention to logical GMs that has been lacking in the literature (Teruya, 2006), which overwhelmingly focusses on experiential GMs, specifically the variously defined category of nominalization. This study draws attention to the central place of metaphors of logic in ways that previous studies have not been equipped to do. Logical GMs have been found to account for an appreciable proportion of the ND of a text (e.g., in much of the early economics writing, logical GMs account for most of the nominality). Furthermore, ND affords a comprehensive view of logical GMs that is to my knowledge unprecedented. While the same perspective is also afforded by ND analysis of experiential GMs, which, likewise, have not been comprehensively accounted for in texts or corpora to the extent reported in this study, the novelty is perhaps less apparent because experiential GMs, as nominalizations, have received much more attention than logical GMs.

A particular affinity between the gap in logical GMs in the literature and this study is in the current interest in the mediation of knowledge as a largely unconscious process, a cryptic aspect of scholarly dispositions and cultures that are instantiated through GM-enabled reasoning. Parallel cryptic forms of metaphorical mediation occur in the use of experiential GMs; however, in the case of experiential GMs, the reification is more easily tracked. As noted in Chapter 3, experiential GMs are often facilitated by morphological derivation (e.g., *introduce-introduction*) whereas with logical GMs, lexical reformulation produces a semantic disjunction between the congruent and metaphorical forms (e.g., *while-contrast*). Also, as metaphor, logical reasoning is experientialized and thereby made to appear like a reification of experience; however,

fundamentally, there is no experience in logico-semantic relations. The semantics of reasoning in the absence of metaphors of experience were illustrated in excerpts that instantiate a register of academese, such as Yoshi's, "(14) This balance[4n] is defined to be the optimal[7n] one. (15) This model[4n] introduces two chief[7n] factors[4n]…" (Y.DF1.14-15). Without a base in congruent human experience, such discourse instantiates a particularly cryptic aspect of scholarship that, if well-understood, can facilitate scholarly apprenticeship. More generally, such discourse is a potential source of difficulty in the recontextualization of specialized knowledge. Discourse studies, and by implication studies of L2 academic writing, need better accounts of logical reasoning as a feature of knowledge and apprenticeship in cultures of knowledge.

An interesting example arose in Chapter 7 in Yoshi's unrecontextualized use of explicit reasoning from mathematics in his writings. The example is interesting because the problem was that Yoshi initially construed the reasoning too explicitly and mathematically (in language) for a context in which mathematics was not used. As his recontextualization to the non-expert context was refined, his reasoning became more compact in accordance with expectations in non-mathematical scholarly writing. In this case, furthermore, the focus on logical GMs draws important attention to intersemiotic or multimodal meaning-making in scholarship (Lemke, 1998).

To an important extent, the emphasis on logical GMs in the results is an artefact of the calculation of ND, that downgrading in metaphors from relator to nominal group element, which constitute half of all logical GMs, are valued at double the ND of most other metaphors. However, as noted in Chapter 5, the calculation is theoretically defensible. Also, it is important to recognize the validation of the system of weightings developed through the ND instrument against the data and the next best instrument, LD. The proportion of nominality attributed by the ND instrument has been shown to be at least reasonably accurate. Still, the operationalization of logical GMs stands to benefit from further refinement. The first place to look for refinement might not be in the operationalization in ND analysis of the downgrading of elements through metaphor, but in the foundational GM analysis. A good potential for refinement arose in the operationalization of GM10n, which splits it into Circumstances and Adjuncts. As shown by the analysis in Section 7.2.2.2, these are two distinct functions that, correspondingly, show distinct trajectories of change in the students' writing.

In relation to methodology, while much of the innovation of the study took place in quantitative analysis of ND, this emphasis should not overshadow the centrality of qualitative analysis. The foundational analysis of GM is of course qualitative; and to illustrate from the more specific end of the spectrum, the finding of Yoshi's improved use of Theme for organizing his texts emerged from close, qualitative analysis. However, in such discussions, it is important not to dichotomize qualitative and quantitative analyses, since the two – as carried out using the ND instrument – represent complementary perspectives on the same phenomena. It should be clear that the quantitative instrument of ND emerged from the qualitative analysis of GM. In turn, the results of the quantitative results allow not only for easier and more confident generalization but it also helps the analyst interested in specific functions of writing to locate potentially relevant domains of text (clause elements (e.g., Theme), clauses, text segments, or corpora). This facility was demonstrated in the study for logical and experiential meanings, as well as Theme and Rheme. In short, the results of ND analysis provide a quick view of scholarly and potentially other kinds of meaning-making.

By representing GM use directly, ND helps generate insights for specific functions of writing in the data without (necessarily) analyzing the entire dataset for those functions. An example of ND analysis used as a map of potential areas to look in a text in preparation for more delicate and time-consuming qualitative analysis for various functions is the analysis of the distribution of Theme across Yoshi's early, mid-course, and end-of-course texts. While the analysis identifying the developments in Theme (Chapter 7, Section 7.2.1.2.2) is fundamentally qualitative, the potential for development was initially observed in the distributions shown in the quantitative results (notably in Section 7.2.1.2.1), which showed a potentially problematic distribution of nominal density in Themes in the first draft of the definition text. It is hoped that the study and these methods will help to further interest to the qualitative and quantitative analysis of L2 academic writing, including from researchers working within and beyond the five sociocultural approaches to L2 writing reviewed in Chapter 2.

While the results of ND analysis add efficiency to qualitative analysis, one kind of analysis that is arguably essential for the foundational GM analysis is that of transitivity. This is important to recognize especially as the analysis is most rewarding when, buttressed by results for transitivity, it provides a comprehensive account of the ND of the entire text and corpus. In

view of the centrality of transitivity analysis, the relative backgrounding of transitivity in Chapters 6 and 7 deserves an explanation.

Among the methodological decisions that went into this study, an important one relates to choices of whether to highlight empirical, case study findings or the novel affordances of ND analysis. Transitivity analysis is a given in GM and ND analysis; as such, it is a default choice for researchers using the ND instrument. However, transitivity was not featured in this report of the study. After carrying out sample analyses of, to my knowledge, unprecedented analyses of relative distributions within ND of logical and experiential GMs, and of Theme and Rheme, as well as calculations of median levels of nominality for texts and various other scopes writing, these more novel affordances of ND were found to be empirically productive. Correspondingly, the results of transitivity analysis were represented relatively late in the report to confirm and extend findings from the less-expected kinds of analysis (in Section 7.2.2.3). What allows such correspondences between, and choices in ordering of, various kinds of technical linguistic analysis in understanding the students' writing is the theoretical foundation of SFL, notably the notion of register.

In discussing the benefits of ND analysis, it is necessary to emphasize that the foundational GM analysis is exacting and time-consuming. However, there is a bright side to the high demands on attention and time of ND analysis. Based on my experience, the analysis becomes easier with time, experience and understanding of the registers in play. This aspect of the practice of analysis is predictable in light of the knowledge-building roles of GM and the perspective provided by GM study. The chapter now moves to review and discuss the empirical findings.

8.4 GM, semiotic mediation and the socio-semantic dispositions in EAP writing

This sub-section distils and discusses the results for the use of GM by Yoshi and his peers, closing with a distillation of the findings in relation to the research questions.

8.4.1 GM use by Yoshi

This part of the discussion considers the quality of Yoshi's writing, the nature of the trajectory taken in his use of GM, and his apprenticeship as a acedemic writer. The quality of

Yoshi's writing improved during the course in the use of GM across the metafunctions: logical reasoning, the contrual of specific entities in nominal groups, and, most demonstrably, in the organization of the text through the use of Theme. These are semantic domains in which the use of GM is deeply implicated. The analysis shows that changes in his use of GM are associated with the improvements. The developments in the writing were shown mainly through comparisons of early writings – which, while showing excellent potential in various aspects were also problematic in others – and his late writings, which were shown to have improved in their textual and logical aspects. The late texts were also assessed by an expert reader as good quality recontextualized economics writing, indicating a level of disciplinary apprenticeship above Yoshi's actual level.

Yoshi's trajectory in total GM use was non-linear across the course, characterized by abrupt change and an extended period of decrease in ND. Yoshi's writing began as relatively congruent, with both early texts in the range of ND 4.4, a figure that can serve as a baseline for his contrual of abstraction early in the course. With instruction in text organization and complementary analysis of writing in his field, Yoshi dramatically increased the use of GM in his writing in the second draft of the definition text. From this high of over ND 8, the next three drafts of his writing become incrementally less abstract. With the problem-solution texts, the ND rises again to above ND 9, double that of the baseline ND values at the beginning of the course. Yoshi's use of GM over the period is further characterized by a decreasing relative reliance on logical GM and increasing reliance on experiential GM. This development implies that an increasing proportion of the knowledge reified in Yoshi's writings were construals of people, things, actions and circumstances of human experience. In turn, the abstraction in his writing involved a decreasing proportion of nominalized logical reasoning, a domain of meaning associated with construals of theories, methods, and other formal (i.e., in neoclassical economics) and informal (largely textual) means of ordering ideas logically. In view of the improvements noted in the quality of the writing and the general shape of the changes, Yoshi's writing appears to have undergone positive, developmentally-relevant changes.

These developments may also be viewed from the (short-term) longitudinal perspective of Yoshi's recontextualizing economics for non-expert readers. A complementary explanation for at least some of the maturing in Yoshi's writing arises from the understanding that, over the course of Writing I and his assignments, Yoshi built up his readers' knowledge of economics

through his writing. As the course assignments progressed, Yoshi was able to assume more about what his readers understood and increase the specificity of what he chose to recontextualize in economics. In this view, the increased technicality and specificity of his writing is understood to have occurred in coordination with his apprenticing of his readers in economics during the course. This perspective is supported by Yoshi's commitment to – indeed, instistence on – providing as theoretically principled an apprenticeship for his readers as the context allowed, despite the challenges of doing so; this commitment came into focus early in the course with the first revision of the extended definition text, a development that occurred in parallel with the near doubling of GM-enabled abstraction.

This increase in experientially-construed abstraction in Yoshi's writing was identified in various changes in more delicate language systems. There was an increased reliance on and capacity for lower-rank semantic shifts involving the nominal group. Indeed, this development in the use of nominal groups was evidenced in the list of the GM types – all directly contributing to the nominal group – whose use increased most dramatically between Yoshi's first and final course assignments (Section 7.2.2.2). These changes accord with the finding from transitivity analysis of an increase in the ratio of Relational Processes, construals that put functional weight on relations of identity or attribution of abstract entities realized by nominal groups.

In coordination with this finding, it was found that the increased use of GM in Yoshi's writing was accompanied by a decreased incidence of Material Processes and congruent construals of experience. These also appear to be positive developments for the context appropriateness of the texts. Another functional domain that matured with the register across the course writings was the use of Theme, which showed that Yoshi's writing improved in text progression, including the tracking of entities and orientation of readers to the message at the scales of clause and whole text. This change appears closely associated with Yoshi's improved use of GM. These are considered generally positive developments towards more valued construals from L2 academic writers (Schleppegrell, 2004b).

At the same time, Yoshi's writing showed notable and positive increases in the experientialization of modality, which is associated with the writer enacting a more objective orientation in making his claims while still, through the semantic tension afforded by GMs, making his opinions known. Another subsystem development was in the nominalization of the mental processes of economic agents, a development in recontextualizing processes of reasoning

that in expert economics research are often construed explicitly and congruently in accordance with mathematics (O'Halloran, 2004). The increased nominalization of mental process indicates a move from construing economics using the explicit mathematical reasoning modelling mental processes of rational economic actors to its construal for a more general academic readership.

In fact, the recontextualization of the mathematical features of economics discourse was shown to be an important source of register variation in Yoshi's writing in the EAP course. As such, mathematical semiosis emerged as a useful site for observing Yoshi's writing development. The effects of the shift towards greater nominal density and a greater proportion of experiential GMs on Yoshi's economics writing involved more than a shift in the use of mental processes. His initial writing was found to be poorly adapted in important respects to the EAP course context. The register dominating the first draft of the definition was characterized as conventional economics research writing with the mathematics removed, a compromised discourse that would satisfy neither economists (for the lack of mathematics) nor non-economists (for the unexpected choices of text progression, logical reasoning and technicality). By the third draft, the text evolved to instantiate a more bespoke and coherent register of mathematical economics for Yoshi's educated non-expert readers. At the same time – and importantly for Yoshi in view of his interest in advancing theoretically defensible economics – the revised text provided a more explicit and coherent defense of neoclassical economic theory.

In Yoshi's definition texts, the net increase in ND and proportion of experiential GMs was eventually accompanied by successful recontextualizaiton of mathematical reasoning in language. His reflections showed recognition that mathematical semiosis could be construed and defended experientially in language to a degree sufficient for the context. In this way, Yoshi found a way to defend mathematical meaning-making as an identifying feature of economic knowledge despite its absence as a contributing semiotic mode in his texts. Furthermore, the purpose of the text was increasingly clarified as a definition of a technical term that would serve as a bridge for non-expert readers between intuitive and mathematical definitions in economics. If critical practice in L2 academic writing in a context of power imbalance is taken as a point of reference (c.f. Ivanič, 1998), this development in Yoshi's recontextualization of mathematical semiosis may be viewed as an expression of agency at a general and, in Yoshi's profession, significant level of practice. This aspect of the study, as well as various other findings, holds special interest for academic literacies scholarship such as that of Ivanič (1998), whose studies

have shown interest in the roles of nominalization and draw directly on analysis of students' texts.

Thus, as shown by Yoshi's questions and comments on specific revisions in the drafts, the development in recontextualizing neoclassical economics occurred in a context of increasing awareness of the meanings he wished to share, his purposes for writing, the expectations of his writing in the contexts he wrote for, and use of linguistic metalanguage for mediating choices about writing. These phenonomena in conjunction with the improved quality of his writing during the course indicate that Yoshi developed an increased capacity to self-regulate his academic writing practices in English. These developments are predicted to support his continued apprenticeship as an economist and address the associated challenges that remain in his professional writing.

8.4.2 GM use by Yoshi's peers

The primary interest in this study was in learning about how the use of GM by individual students varies. The variation among the four students' use of GM is notable. Yoshi's and Sotty's writing began relatively congruently, increasing very drammatically in abstraction with the second draft of the definition text. The sudden increase in abstraction occurred in a complex context of explicit instruction, individualized instructor feedback and, as noted above for Yoshi, greater apparent clarity about the purposes and potentials of the writing. The total ND of Yoshi's writing decreased significantly before it increased towards the end of the course; in contrast, the ND of Sotty's writing decreased mildly after the DF2 and then increased incrementally until the end of the course. Their peer Haru began with what for the group was a median level of abstraction; the level peaked in the middle of the course and dropped with the final assignment. Taka's first text was already significantly abstract so, while there was a net increase in GM use, the increase was appropriately modest. In all cases, the changes in levels of abstraction occurred between drafts of the same text and in transitions between the different assignments.

As for developments in ratio of experiential to logical GMs as a proportion of ND, there appeared to be some disciplinary variation. The writing of the apprentice economists presents a different pattern in the distribution of logical and experiential GMs from that of the humanities scholars. Yoshi's and Taka's writings began with a higher proportion of logical GMs than experiential GMs. This phenomenon appears to be associated with their emphasis in their early

writings on establishing the logical orders of economic theory and methods. This proportion tended to reverse by the end of the course with an increased reliance on experiential GMs and the construal of specific empirical entities of interest to these economists.

As in Yoshi's case, Taka's increasing reliance on experiential GMs may reflect a shift in his socio-semantic disposition towards experiential meaning, with an elevated propensity to perceive, recognize and use these resources in specific contexts of situation, as well as the increasing refinement and specificity of the economics he recontextualized for his readers across the course assignments. However, unlike the evidence for this interpretation provided for Yoshi's writing, the analysis of Taka's writing and supplementary data did not allow for further exploration of this question.

The results for the distribution of experiential and logical GMs in the writing of Haru and Sotty in the humanities show relatively small but interesting changes. They both maintained a generally higher ratio of experiential GMs, which would appear predictable given the emphasis on abstract but largely non-technical construals of human experience in humanities discourse (e.g., Christie, 2002). However, Sotty experimented once, in his DF2, with a higher ratio of logical GMs, a strategy he quickly abandoned in all his subsequent writing, returning to a proportionally greater emphasis on the reification of human experience in bioethics. Haru's writing at the beginning and end of the course (i.e., the PC and PS texts) shows a greater proportion of logical GMs than experiential GMs. In Haru's case, the change appears associated with the particular registers instantiated in the different pedaogogical text-types. The problem-solution text-type, notably, was unfamiliar to her as a context for philosophy discourse, which helps explain the departure from the more common variation in her writing of a higher proportion of experiential GMs. Also, Haru's construals of religious philosophy in the PS text-type, with four distinct moves linked by causal logic, invovled an elevated use of logical GMs. Such developments hold specific interest for genre-based approaches, notably Swales' ESP approach (1991), the Sydney-school (Martin & Rose, 2008), and rhetorical genre studies (e.g., Bazerman, 1988, 2013).

Haru's writing practice and reflections in relation to the problem-soltuion text-type, disciplinary discourse, and register variation revealed an interesting and important development. While her initial response to the PS text during explicit instruction of this pedagogical text-type was to reject it as a context for mature writing in philosophy, she eventually adapted the text-

type to her changing circumstances, recontextualizing the assignment for a high-stakes context that demanded a more empirically engaged philosophy than was her scholarly focus. In this way, Haru managed the predicament of a mismatch between disciplinary discourse and pedagogical text-type by expanding the potential relevance of the course writing for her interests and, correspondingly, expanding her registerial repertoire in philosophy. Predictably, this development is evidenced in her changing use of GM and abstraction.

As reviewed above, ND analysis is exacting and time-consuming; however, the payoffs in empirical findings appear to make the analysis worthwhile. The next section draws on the above reports and discussion in addressing the research questions.

8.4.3 Distillation of findings for the research questions

The questions guiding the study are:

(1) What are the functions of GM as a mediating resource in students' writing for regulating the nature and extent of abstraction in the construal of valued academic knowledge?
(2) How do patterns of GM use in student writing change during the writing course?
(3) What is the relationship between the patterns of GM use and the sociocultural functions of the registers of students' texts?

The questions ask about similar phenomena from various perspectives, with the first question emphasizing the general, abstract functions of GM that emerged in the students' writing. Essentially this question asks to what extent the study confirms the functions of GM heretofore identified in the literature. The second question takes account of the systemic perspective emphasized in Question 1 as a backdrop for an instantial, dynamic perspective on the students' practice to consider the changes within and between functions over time; as such, this question draws attention to the role of semiotic mediation (of course, a metaphor of the dynamic processes of mediating contexts by means of language) and the associated processes of forming socio-semantic dispositions. The third question encompasses the system-instance scope of Questions 1 and 2 but with particular attention to the semantic aspects – what these students mean.

To start, then, the study confirms Halliday's (1998) description of the general pay-offs of GM that are particular to academic writing: (a) the construal of abstract and technical entities; (b) the compacting of dynamic logical reasoning; (c) the organization of discourse into coherent

texts; and (d) the experientialization of modality that allows writers their opinions while enacting an objective orientation; this pay-off was discussed in Section 8.4.1. Developments in the remaining three general pay-offs of GM are highlighted below.

In relation to (c), good examples arise in Yoshi's writing, where he exploited Theme in conjunction with nominalization to masterfully signal new rhetorical footings in his problem-solution text. Additionally, he engaged instructed knowledge on macro-Theme and macro-New to re-frame his definition of an economic term in the DF text to better identify the text as a recontextualized definition while at the same time provide a bridge to the mathematical definition, which better satisfies his interests and well-apprenticed, socio-semantic disposition as a neoclassical economist. Yoshi explained in one of his reflections that, based on his analysis of published economics writing, he revised out unnecessary signposts, substituting these with more careful thematic patterning.

The centrality of experiential function indicated by (a) is also well supported in the study by the massive functional load on nominal groups in the corpus. In relation to disciplinary discourse, the consistently higher proportion of experiential GMs than logical GMs in the humanities writing shows the greater focus (relative, for example, to mathematical economics) on reconstruals of human experience.

Abstraction was also observed to occur in the logical metafunction (b), with logical GMs accounting for an important proportion of the nominality in the corpus over-all. In the writing about economics research, where relatively procedural mathematical reasoning is central, it was interesting, therefore, to observe the decreasing proportion of logical GMs over the writing course. This phenomenon was explained in Yoshi's writing in part by Yoshi's substitution of signposts that integrate logical GMs for the more mature form of text organization by means of thematic patterning. The decrease in logical GMs is also explained by the increasing empiricism – that is, interest in human experience – in the writing of both economists, a development that appears consistent with the writers' apprenticing their readers across the Writing I course towards more specific knowledge, from a more general base in the reasoning behind economic theories and methods.

It is useful to address the second and third research questions with explicit reference to the theoretical framework and the findings. In this study, the use of GM in the students' writing is understood using the complementary concepts of semiotic mediation and socio-semantic

disposition. Semiotic mediation is the use of language as a socially-shaped, meaning-making resource in mediating social life (Vygotsky, 1978), and the primary phenomenon through which subjects' robustly internalized orientations to meaning in society – their socio-semantic dispositions (Hasan, 2005/1992, 2005) – are formed. The concept of socio-semantic dispositions is derived from Bernstein's (1990, 2000) sociology, in particular his concept of coding orientation. Hasan's operationalization of mediation and socio-semantic disposition is carried out through SFL theory and description of text-context relations (Halliday & Matthiessen, 2004, 1994). While individual variation in socio-semantic disposition is of course a fundamental feature of the delicate dynamics of social life, the transdisciplinary line of psychological, sociological and linguistic research advanced by Hasan (2005/1992, 2005) and colleagues was developed for the arguably more ambitious aim of identifying the aggregation of socio-semantic dispositions in higher-scale social groupings such as social class and gender.

The present research into L2 academic writing adopted the transdisciplinary framework to understand, on a case study basis, how students use GM to mediate meanings in play in EAP writing course assignments, and how this use may be understood in relation to students' socio-semantic dispositions. The case study of students' use of GM indicates that the students' use of GM to mediate abstraction in the context of the EAP course assignments tended to vary by scholarly culture. Supported by qualitative analysis of their use of GM in the writing and supplementary data (especially for Yoshi and Haru), this finding points not only to variation by user, but also variation by use, which in this case is variation at higher-scale social aggregation of users in similar scholarly cultures.

Due to the limited dataset, the case study cannot claim to prove socio-semantic variation at such a general level; however, this study provides compelling evidence for such variation. The two apprentice scholars in economics were found to use GM in similar ways to each other to generate economic knowledge while the two apprentice scholars in the humanities were found to use GM in significantly similarly in their subfields. Also, writers in different disciplines were found to use GM in appreciably different ways.

Some of the more compelling qualitative evidence for this variation arises within and around the writing of Yoshi and Haru. Outlines of key features of their socio-semantic dispositions as apprenticing scholars, most notably in their respective orientations to mathematical semiosis and philosophical argumentation, came into perspective as these features

of their disciplinary cultures were *challenged* in the context of the multidisciplinary EAP course. In both cases the specific challenge of writing in this context – no mathematics in the economics and Haru's perception of the pedagogical text-type being too perfunctory for philosophy writing – was verbalized by the student as a challenge specifically to disciplinary practice. These tensions were the object of pedagogical exchanges outside of the writing as well as being addressed in various ways through the drafts. Eventually, they were resolved independently and, by all accounts, successfully in the final drafts of the students' respective assignments. In Haru's case, the tension was resolved through strategic changes not to the text but to the purposes and context she ascribed to it given her immediate interests (Hasan, 1996; Kress, 2003). This evidence indicates that students' writing varied by discipline and that its disciplinarity reflected the robustness of the writers' developing socio-semantic dispositions as apprentice scholars.

This set of findings provides limited but again compelling evidence for the students' internalization of pedagogical dialogues, capacity to self-regulate their writing in context, and associated developments in literacy. Yoshi's post-course reflection on his use of instructor feedback is important supplementary evidence. Demonstrating sophisticated technical knowledge of economics, the context of his writing, and the links between context and language choices, he noted that he should have depended less on instructor feedback and revised his writing more independently for "content" and "organization", terms drawn from the recontextualized linguistic metalanguage used in the writing instruction. Importantly, this reflection indicates a specific role for recontextualized linguistic metalanguage in this potentially new threshold for regulating his writing.

In such respects, the evidence indicates that Yoshi and Haru practised the transformative kind of literacy that Hasan calls reflective literacy: "Participation in the production of knowledge will call for an ability to use language to reflect, to enquire and to analyse, which is the necessary basis for challenging what are seen as facts" (Hasan, 1996, p. 408). It appears clear, furthermore, that much of this process is unselfconscious, reflecting aspects of these students' underlying socio-semantic dispositions that seemed so integral to their writing development. As Hasan (2004) notes, "[t]he crucial part played in this process [of forging a self through interaction with others] by semiotic mediation is most clearly manifested in unself-conscious discourse" (p. 162). By the quality of their engagement in reflective literacy practices, furthermore, Yoshi and Haru appeared to be better-equipped to recognize and articulate specific developments in their writing

practice and associated aspects of their socio-semantic dispositions. On an additional methodological note, while these students were capable of reflecting very insightfully on their language choices in relation to their respective contexts of writing and socio-semantic dispositions – and this capacity appears to have improved in the Writing I course, the broad functional scope and largely subconscious nature of GM use highlight the indispensable role of contextually-sensitive linguistic analysis of their texts for insights into the literacy developments that took place.

It will be recalled that Sotty also sought to clarify his understanding of his writing, notably through dialogue with me in office hours. Given some of the notable gaps in clarity of exposition that remained in parts of his final drafts, these meetings and the course as a whole were not successful in addressing the issues and activating greater reflective literacy. This may be partially explained by the difficulty Sotty appeared to have perceiving and articulating his rhetorical position vis-à-vis his discipline (notably, his interest in advancing Japanese cultural values in bioethics, pithily articulated in the needs analysis, guided several of his course writings where it was nonetheless insufficiently explicit). This of course also reflects on my work as an instructor; it appears that the help I provided with these issues, if any, did not help Sotty identify and address the issue. Sotty's challenges with exposition may be understood in combination with the comparative instability of Sotty's English language systems at the more fine-grained levels of specialized meaning-making, such as in the formation of complex nominal groups that help realize appropriately contextualized ideational and textual meanings in bioethics.

The writing of Sotty, while still showing notable rhetorical and linguistic weaknesses at the end of the course, had matured to some extent by the end of the course in its use of GM. It appears that with more attention and drafts, and more focussed instruction, his writing would have progressed to a level approaching that of his actual professional scholarly engagements of writing for publication. This is illustrated for example by the fact that his DF1 and DF2 had very similar patterns of overall GM use as the same two drafts by Yoshi, characterized by levels of nominality that were first too low and then too high for the context. Yoshi produced a third draft that was contextually appropriate in the degree and functions of GM. Recognizing Sotty's less-developed lexicogrammatical and semantic systems for construing valued knowledge in his field, it is quite likely that a third draft from Sotty would have resulted in a more balanced text.

Predictably, the data indicate that the felicitous use of GM is associated with field meanings that are more familiar to students. While Sotty's challenges with the use of GM are evident in the writing at the levels of abstraction that may be considered relatively stable in his writing, the challenges became more salient in his experimentations with greater use of nominalization, such as in his DF2. In this text, he departed significantly from the more usual profile of GM and abstraction associated with his other writings and the humanities writing in the course in its heavy reliance on logical GMs, a profile of GM use rather similar to much of Yoshi's writing in economics. A parallel phenomenon was observed in Haru's pre-course text whereby the departure from construals of reasoning more central in the scholarship of historical philosophy was accompanied by infelicitous choices of logical GM. This finding indicates that, as the writing of these apprentice scholars engaged with ways of knowing outside of the usual domains of abstraction of their respective fields, the risk of semantic and lexicogrammatical infelicity associated with choices of GM increased. These observations of the students' variable literacy practices support the claim that the quality of L2 writers' use of GM in the construal of disciplinary knowledge can serve as a useful indicator of their language, writing and literacy development.

The claims of improvement (or not) in students' writing, and the associated potentials for socio-psychological and literacy development, especially for Yoshi and Haru, may also be viewed from the perspective of the young scholars as socializers of the readers of their writing course assignments. If we are to take seriously the claims of practice-based literacy, the maturing of these students' final drafts (as indicated by analysis and the evaluations by experienced readers in the respective disciplines) construes readers with an expanding capacity to mediate discipline-specific meanings. An explanation for the apprentice scholars' apprenticing their readers lies in the efforts to draw non-experts towards fields of knowledge in which the scholars were demonstrably engaged. An excellent example of this arises in Yoshi's closing of the final draft of his definition text with a polite indication that the definition just read is limited and the understated suggestion that the interested reader pursue a mathematical definition.

The aggregated results for use of GM corroborate the understanding that while some developments probably occurred in students' writing, internalized linguistic systems, and social roles as recontextualizers of valued knowledge, these were likely to be relatively small adjustments to mediation in relation to the socio-semantic dispositions that had evolved over a

much longer period of time of often intense study in their first and second language. In support of this view, what the aggregated results of a rapid initial increase in GM appear to show is a relatively immediate initial recalibration to the registers of research-based academic writing aimed for in the course. In the writing of Yoshi, Taka, and Haru, this change involved a relatively quick dispatching with the high intricacy and loose logic of speech in the writing, followed by a slower, more incremental rise after the second or third draft of the first assignment. A number of the analyses of Yoshi's writing in Chapter 7 focussed on this rapid rise in abstraction, a development that took place in conjunction with instruction on Theme and text organization. A sensible explanation for the rapid rise of nominality in Yoshi's text, at least, is of an apprentice scholar recalibrating internalized meaning-making resources to construe a more research-focussed register that he was already relatively well-prepared to instantiate.

In this view, the internalization of language and writing tools posited above involved relatively small, incremental developments that might be expected for well-focussed advanced L2 academic writers over the relatively brief period of three months (e.g., Matthiessen, 2006). In this relation, perhaps the most compelling evidence of development of a specific, GM-enabled functional domain in writing to emerge from the study is Yoshi's improved use of Theme for organizing his texts. While this is not a trivial development, it is undoubtedly supplemented by already-developed capacities in this area in English, as indicated in the following extract from his pre-course text: "(8) Therefore, *a new viewpoint*^{3n}…is likely [[to be needed.]] … (10) However, *this perspective*^{3n} still…" (Y.PC.9-10; emphasis on Theme mine).

This discussion draws attention back to the socio-semantic dispositions of students such as Yoshi and Haru, who were well-oriented to the expectations that emerged in context for critically engaged scholarship and relatively well-prepared in relation to English language. As the course progressed, these already engaged and linguistically sophisticated apprentice scholars were prepared to make the relatively minor incremental changes that would help them realize context-relevant scholarship in the EAP course.

Within the limitations of a small dataset and small number of participants, the study finds compelling evidence for some development in at least one student's writing, Yoshi's, in one important functional domain, text organization through Theme. More general evidence emerged for the potential of register-wide improvement in the writing of Yoshi and two of his peers, Haru and Taka, while Sotty's writing showed potential for some late improvement, especially

associated with the construal of very specific abstract entities realized by nominal groups. For Yoshi and Haru, good evidence emerged for increased capacity to self-regulate their writing in context of recontextualizing disciplinary discourse. This claim is buttressed by their demonstrated capacity to internalize constructive pedagogical dialogues about writing, as shown for example in their productive use of recontextualized linguistic metalanguage. These findings are in turn supported by evidence from the analysis of significant disciplinary variation in the writing as well as variable, contextually-appropriate, incremental increases in GM use.

During the writing course, evidence also arose of Yoshi and Haru reconfiguring knowledge between social domains by "[u]sing language to configure (or reconfigure) relationships between abstract general phenomena and concrete specific phenomena, as well as between abstract entities", processes that are "central to the learning and meaning-making processes that students are expected to engaged with in tertiary study" (Coffin & Donahue, 2014, p. 22). Furthermore, these students' use of GM was shown to be heavily implicated in their success in reconfiguring knowledge and meeting expectations in the course. In their writing, reflections, and revisions these two students in particular demonstrated a heightened sensitivity to the affordances of GM as a resource for generating and recontextualizing knowledge in their respective fields. As noted by Ryshina-Pankova and Byrnes (2013), when writing students are able to recontextualize knowledge between social groups with varying orientations to knowledge, "we have evidence for knowledge creation as the academy values it, a kind of "thinking for writing" facilitated by GM" (Ryshina-Pankova & Byrnes, 2013, p. 195). The students' mediation between social domains in these ways through their writing provides insight into their socio-semantic dispositions not only as well-apprenticed scholars in their respective fields but also as scholars capable of recontextualizing their specialist knowledge for non-experts.

8.5 Limitations of the study

The study is limited in various important respects. A significant limitation that has been emphasized at several points in this dissertation is with the extent of the data collected from the four focal students, the data being limited longitudinally and cross-sectionally. While compelling quantitative and qualitative evidence was presented for improvement in the quality of academic writing across all main register variables in students' assignments, and these findings,

supplemented by the students' reflections on their writing, indicated developmentally-relevant changes in the students' writing during the three-month period of data collection, the brief time span of data collection seriously limits claims of improved general capacity for writing academically as well as increased capacity for the appropriate use of GM in academic writing. The limitation on claims extends in particular to the findings emerging from the pilot inferential statistical analyses. Additionally, while it is acknowledged that the writing was undertaken and analyzed as disciplinary discourse recontextualized by apprentice scholars for non-specialists, the writing assignments undertaken in Writing I were short, considerably shorter than much of the research writing typically undertaken by professional scholars.

Evidence of limited longitudinal data is easy to find; two brief examples are provided. As shown by the improvements in Yoshi's second revision of the DF text, a single additional draft provides a context for consequential changes in the use of GM in this early text. Initial instability in his use of GM was evident first in its under-use, then over-use. With an improved understanding of his resources, aims and the expectations in the writing course, Yoshi came to regulate his choices of GM in the DF3 (for example, with less nominality at the beginning of the text, which in the DF2 had been theoretically front-loaded). In contrast, while Sotty's DF1 and DF2 text drafts had the same respective pattern of under- and over-use of GM, he did not produce a third draft that may well have provided the opportunity for the writing assignment to come to a more appropriate steady-state of abstraction.

The benefits of longitudinal data are also illustrated in relation to more incremental, developmental changes. As indicated in Yoshi's post-course reflection, by the end of the three-month course, Yoshi had just begun to bring together his understanding of the analytical benefits of his new knowledge of writing and language, the heuristic value of instructor feedback, and his knowledge and interests as an apprentice economist to more confidently and independently recontextualize economics knowledge in the EAP writing context. With a sample of over six months, for example, the likeliness of richer insights into changes in the students' writing and the students' development as writers increases appreciably. These two examples of the benefits of a longitudinal perspective on texts and on writers, in conjunction with the recognition of these students' aims of becoming professional scholars, draw attention to the potential benefits of an even lengthier time-span for data collection extending to a period beyond their respective theses and graduating projects, ideally encompassing scholarly publication. In case study research,

longitudinal sampling is highly desirable (Duff, 2008, 2014); this is especially so in cases involving more advanced levels of L2 use, when the development of GM, writing and language is typically incremental (Byrnes, Maxim & Norris, 2010; Matthiessen, 2006; Ryshina-Pankova & Byrnes, 2013). Also incremental, of course, is the associated formation of socio-semantic dispositions.

Furthermore, the sampling of a wider cross-section of text-types, such as writing for in-group scholarly publication and recontextualized scholarship for non-experts, would likely yield useful insights into the students' use of GM. As it is, the study indicated an enticing result in the students' varying sensitivities to text-type in their GM use. Differences were noted in the variability of GM use according to pedagogical text-type, with some students changing the GM profiles between different kinds of texts more profoundly than other students. This angle of inquiry has interesting potential implications for understanding the apprentice writers' sensitivities to the contexts of various text-types as well as the emergence of relatively consistent features in the writing that may help identify emerging aspects of their socio-semantic dispositions, such as their academic voices (e.g., Fløttum, Dahl & Kinn, 2006) and orientations to pragmatism and critical practice as junior scholars in demanding institutional contexts (Pennycook, 1997).

In relation to the cross-section of the corpus analyzed for GM and disciplinary practice, a related limitation arises in the lack of reference corpora in the relevant subfields of economics, philosophy and bioethics. While references were drawn from the literature and also from the assessments of student writing by experienced readers from within the relevant disciplines, comparison of the students' GM use with those of the scholarship with which they were engaged at the time would have doubtlessly enriched the study.

It is also important to acknowledge the limited analysis of classroom interactions and pedagogical discourse more generally (e.g., Bernstein, 1999) as features of the context. As mentioned in the introduction, the data collected included materials used in instructional presentation on GM and other features of academic writing, all instructor feedback, and some recordings of student group activities. This limitation is therefore not an effect of lack of data, but of focus in the analysis as well as the time and space for satisfactory treatment of such a complex matter as writing development in pedagogical context. While explicit instruction and instructor feedback were summarized and some salient extracts described in more detail, more

analysis of this data, even if only for better understanding of the writing of the focal student Yoshi, would have enriched the understanding of the students' use of GM in the EAP context.

8.6 Directions for further research

The discussion of limitations indicates some clear directions for further research: more extensive longitudinal and cross-sectional analysis of GM use; comparative analysis of apprentice and expert use of GM; investigations of GM use across a range of disciplines; the relationship between GM, writing instruction (notably, fronted instruction, tasks, feedback and pedagogical text-types), and the registers instantiated by L2 writing students.

Given the findings for the sensitivity of nominal density analysis to meaning-making in academic discourse, the use of the ND instrument is recommended for these kinds of studies. However, lexical density and grammatical intricacy provide important complementary points of reference; in fact, important disciplinary variation was found by means of comparing measures of ND and LD using both inferential and descriptive statistics. This is a useful place to point out as well that the ND instrument itself deserves further attention. Methodological research is indicated on the operationalization of logical GM type 10n, which was shown to be too encompassing a category as operationalized in the present study. Another domain in the operationalization of GM that deserves further attention is that of embedding. While it is unlikely that changes to the operationalization of these kinds of GM would change overall quantification of GM in ND values, caution is recommended given the validation of ND in its present state of operationalization.

As noted in the literature review, GM is itself a relatively new theoretical development so a large number of potential directions for further research are needed and possible (e.g., Brynes, 2009). Review of the GM literature indicates the predominance of GM studies in English (despite important advances in the study of GM in other languages, notably Chinese (Halliday & Matthiessen, 1999)). If the need for GM research in English is elevated, then the need for research in GM in other languages is even more so; as indicated by Halliday and Matthiessen (1999), studies of GM across languages will contribute to our understanding of such fields as first and second language development and cultural variation in scholarship. This point draws attention to the potential of contrastive and intercultural aspects of GM in L2 academic writing, an issue that rose to the surface in Sotty's case.

With ND analysis, the potential for research is appreciably expanded in the direction of quantitative analysis. This feature of nominal density analysis affords systematic insight into the functions of GM and nominality at various levels of focus, from the scales of lexis, phrase, clause, text section, text and text-type to that of multiple corpora. Correspondingly, ND analysis opens new research lines in the analysis of Theme, as well as within the ideational metafunction, where the relative functional loads of experiential and logical grammatical metaphors in the overall nominality of a text was seen to highlight tendencies towards and tensions between reifications of experience and reasoning.

A potentially exciting area for combined quantitative and qualitative investigation presents itself in the dynamic systems approach advanced by Lemke (2002), which emerges from a social semiotic framework shared by SFL. Given the generally accepted view of language in social context as a dynamic system, dynamic systems theory has excellent potential for advancing a holistic understanding of L2 practice and development (e.g., de Bot, Lowie, Thorne & Verspoor, 2013; Larsen-Freeman, 2015). Yet, the small but growing body of dynamic systems research in studies of L2 development remains underserved by theories and descriptions of language that lack direct and systematic correspondence between instances of language use and meaning in context. Dynamic systems research of L2 language and writing development was suggested in the present study in various types of ND-enabled analyses, notably in proposals of initial steady states in the nature of abstraction in students' writing, and the observations of non-linear and irregular disruption and reorganization of these steady states that occurred during the course.

The advantages of the systemic functional theory of language became readily apparent in the account of the tension between wording and meaning that arises with mature language use in GM (itself an emergent feature of developmentally prior, congruent uses of language), as well as the tensions that arise between various functions of GM within the language system. The latter was observed, for example, in Yoshi's eventual reconstrual of explicit logical reasoning associated with mathematical semiosis as entities and processes – that is, reconstruing reasoning as experience – in accordance with textual and contextual constraints associated with writing for readers unfamiliar with mathematical economics (i.e., a salient attractor state in context). As Yoshi's writing was refined, his use of GM allowed him to explicitly defend the mathematical definition he sought to advance and also retain the congruent construal of mathematical

reasoning by holding it in semantic tension below the surface, hidden but recoverable within the logical GM. In exploiting the play between logical and experiential construals afforded by GM, Yoshi transcended what might have initially appeared as the formal constraints of language, disciplinary discourse, context and his own internalized language systems to achieve a rhetorically successful text. This example of developmentally-relevant practice in L2 academic writing and GM use was analyzed qualitatively and quantitatively with the aid of the ND instrument. Along such lines, the ND instrument can be usefully applied in a dynamic systems model of language as a meaning-making resource for understanding L2 and writing development quantitatively and qualitatively.

References

Abdi, K. (2009). *Spanish heritage language learners in Canadian high school Spanish classes: Negotiating ethnolinguistic identities and ideologies*. Unpublished master's thesis, University of British Columbia, Vancouver, Canada.

Achugar, M., Schleppegrell, M. J., & Oteíza, T. (2007). Engaging teachers in language analysis: A functional linguistics approach to reflective literacy. *English Teaching: Practice and Critique,* 6(2), 8-24.

Anderson, T. (2016). *Negotiating academic discourse practices, ideologies, and identities: The socialization of Chinese PhD students*. Unpublished doctoral dissertation, University of British Columbia, Vancouver, Canada.

Anthony, L. (2006). Developing a freeware, multiplatform corpus analysis toolkit for the technical writing classroom. *IEEE Transactions on Professional Communication, 49*(3), 275-286.

Anthony, L. (2014). AntConc (Version 3.4.4) [Computer Software]. Tokyo, Japan: Waseda University. Retrieved August 23, 2016 from http://www.laurenceanthony.net/

Archer, A. (2006). A multimodal approach to academic 'literacies': Problematising the visual/verbal divide. *Language and Education, 20*(6), 449-462.

Artemeva, N. & Freedman, A. (Eds.) (2008). *Rhetorical genre studies and beyond.* Winnipeg: Inkshed Publications.

Bakhtin, M.M. (1981). *The dialogic imagination*. Austin, TX: The University of Texas Press.

Banks, D. (2008). *The development of scientific writing: Linguistic features and historical context*. London: Equinox.

Baratta, A.M. (2010). Nominalization development across an undergraduate academic degree program. *Journal of Pragmatics, 42,* 1017-1036.

Barthes, R.(1990/1974). *S/Z.* (R. Miller, Trans.). Oxford: Blackwell. (Original work published 1974, Paris: Editions du Seuil).

Bazerman, C. (1988). *Shaping written knowledge*. Madison: University of Wisconsin Press.

Belcher, D. (2007). Seeking acceptance in an English-only research world. *Journal of Second Language Writing, 16*(1), 1-22.

Belcher, D., & Connor, U. (Eds.). (2001). *Reflections on multiliterate lives*. Clevedon, UK: Multilingual Matters.

Berkenkotter, C., & Huckin, T. N. (1995). *Genre knowledge in disciplinary communication*. Hillsdale, NJ: Erlbaum.

Berkenkotter, C., Huckin, T. N., & Ackerman, J. (1988). Conventions, conversations, and the writer: Case study of a student in a rhetoric Ph.D. program. *Research in the Teaching of English, 22*, 9–45.

Berkenkotter, C., Huckin, T.N., & Ackerman, J. (1991). Social contexts and socially constructed texts: The initiation of a graduate student into a writing research community. In C. Bazerman & J. Paradis (Eds.), *Textual dynamics of the professions: Historical and contemporary studies of writing in academic and other professional communities* (pp. 191–215). Madison: University of Wisconsin Press.

Bernstein, B. (1990). *Structuring of pedagogic discourse, Volume 4: Class, codes and control.* London: Routledge & Kegan Paul.

Bernstein, B. (1996). *Pedagogy, symbolic control and identity: Theory, research, critique.* London: Taylor & Francis.

Bernstein, B. (1999). Vertical and horizontal discourse: An essay. *British Journal of Sociology of Education 20*(2), 157-173.

Bernstein, B. (2000). *Pedagogy, symbolic control and identity: Theory, research, critique.* Lanham, MD: Rowman & Littlefield.

Biber, D. (2006). *University language: A corpus-based study of spoken and written registers*. Amsterdam: John Benjamins.

Biber, D., & Gray, B. (2010). Challenging stereotypes about academic writing: Complexity, elaboration, explicitness. *Journal of English for Academic Purposes 9*, 2-20.

Biber, D., & Gray, B. (2013). Nominalizing the verb phrase in academic science writing. In B. Aarts & G. Leech (Eds.), *The English verb phrase: corpus methodology and current change* (pp. 99-132). Cambridge: Cambridge University Press.

Biber, D., Gray, B. & Poonpon, K. (2011). Should we use characteristics of conversation to measure grammatical complexity in L2 writing development? *TESOL Quarterly, 45*, 5-35.

Biber, D., Johansson, S., Leech, G., Conrad, S., & Finegan, E. (Eds.). (1999). *Longman grammar of spoken and written English*. London: Longman.

Bizzell, P. (1992). *Academic discourse and critical consciousness*. Pittsburgh: University of Pittsburgh Press.

Bolton, W. (2011). *Mechatronics: Electrical control systems in mechanical and electrical engineering* (5th edition). New York: Prentice Hall.

Boulton, A., Carter-Thomas, S. & Rowley-Jolivet, E. (Eds.). (2012). *Corpus-informed research and learning in ESP*. Amsterdam: Benjamins.

Breen, M. (1987). Learner contributions to task design. In C. Candlin & D. Murphy (Eds.), *Language learning tasks* (pp. 23-46). Englewood Cliffs, NJ: Prentice Hall.

Breen, M.P. & Littlejohn, A. (2000). *Classroom decision-making: Negotiation and process syllabuses in practice*. Cambridge: Cambridge University Press.

Butt, D. (2008). The robustness of realizational systems. In J.J. Webster, (Ed.), *Meaning in context: Strategies for implementing intelligent applications of language studies* (pp. 59-83). London: Continuum.

Bussi, M.G.B. & Mariotti, M.A. (2008). Semiotic mediation in the mathematics classroom: Artifacts and signs after a Vygotskian perspective. *Handbook of international research in mathematics education* (pp. 746-783). New York: Routledge.

Butt, D.G., Lukin, A. & Matthiessen, C.M.I.M (2004). Grammar – the first covert operation of war. *Discourse & Society, 15* (2-3), 267-290.

Brynes, H. (2006). What kind of resource is language and why does it matter for advanced language learning? An introduction. In H. Byrnes (Ed.), *Advanced language learning: The contributions of Halliday and Vygotsky* (pp. 1-28). London: Continuum.

Byrnes, H. (2008). Articulating a foreign language sequence through content: A look at the Culture Standards. *Language Teaching, 41*(1), 103-118.

Byrnes, H. (2009). Emergent L2 German writing ability in a curricular context: A longitudinal study of grammatical metaphor. *Linguistics and Education, 20*, 50–66.

Byrnes, H. (2013). Positioning writing as meaning-making in writing research: An introduction. *Journal of Second Language Writing, 22*, 95–106.

Byrnes, H., Maxim, H., & Norris, J.M. (2010). Realizing advanced L2 writing development in a collegiate curriculum: Curricular design, pedagogy, assessment [Monograph]. *Modern Language Journal, supplement, 94*.

Cameron, L. (2003). *Metaphor in educational discourse*. London: Continuum.

Carlson, S. (1988). Cultural variation in reflective writing. In A. Purves (Ed.), *Writing across languages and cultures: Issues in contrastive rhetoric* (pp. 160-176). Newbury Park, CA: Sage.

Casanave, C.P. (1992). Cultural diversity and socialization: A case study of a Hispanic woman in a doctoral program in sociology. In D.E. Murray (Ed.), *Diversity as resource: Redefining cultural literacy* (pp. 148-182). Alexandria, VA: TESOL.

Casanave, C. P. (2002). *Writing games: Multicultural case studies of academic literacy practices in higher education*. Mahwah, NJ: Erlbaum.

Casanave, C.P. (2004). *Controversies in second language writing: Dilemmas and decisions in research and instruction.* Ann Arbor, MI: The University of Michigan Press.

Casanave, C., & Vandrick, S. (Eds.). (2003). *Writing for scholarly publication: Behind the scenes in language education*. Mahwah, NJ: Erlbaum.

Chomsky, N. (1970). Remarks on nominalization. In R.A. Jacobs, & P.S. Rosenbaum (Eds.), *Readings in English Transformational Grammar* (pp. 184-221). Boston: Ginn.

Christie, F. (1987). Genre as choice. In I. Reid (Ed.), *The place of genre in learning: Current debates* (pp. 22-35). Geelong: Deakin University.

Christie, F. (2002). The development of abstraction in adolescence in subject English. In M. Schleppegrell & C. Colombi (Eds.), *Developing advanced literacy in first and second languages: Meaning with power* (pp. 45-66). Malwah, NJ: Lawrence Erlbaum.

Christie, F. & Derewianka, B. (2008). *School discourse: Learning to write across the years of schooling*. London: Continuum.

Christie, F. & Martin, J.R. (2000). *Genre and institutions: Social processes in the workplace and school*. London: Continuum.

Coffin, C. (1997). Constructing and giving value to the past: An investigation into secondary school History. In F. Christie & J. R. Martin (Eds.), *Genre and institutions: Social processes in the workplace and school* (pp. 196-230). London: Cassell.

Coffin, C. (2001). Theoretical approaches to written language – a TESOL perspective. In A. Burns & C. Coffin (Eds.), *Analysing English in a global context* (pp. 93-122). London: Routledge.

Coffin, C. & Donohue, J. (2014). A LASS approach to teaching and learning: theoretical foundations. *Language Learning Monograph Series: A language as social semiotic-based approach to teaching and learning in higher education, 64*(1): 39-84.

Coffin, C., Curry, M.J., Goodman, S., Hewings, A., Lillis, T.M., & Swann, J. (2003). *Teaching academic writing: A toolkit for higher education*. London: Routledge.

Colombi, M.C. (2006). Grammatical metaphor: Academic language development in Latino students in Spanish. In H. Byrnes (Ed.), *Advanced language learning: The contribution of Halliday and Vygotsky* (pp. 14-163). London: Continuum.

Connor, U. (1996). *Contrastive rhetoric: Cross-cultural aspects of second language writing.* Cambridge, UK: Cambridge University Press.

Connor, U. (2011). *Intercultural rhetoric in the writing classroom*. Ann Arbor, MI: The University of Michigan Press.

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly, 34*, 213-238.

Cumming, A. (1998). Theoretical perspectives on writing. *Annual Review of Applied Linguistics, 18*, 61-78.

Cumming, A. (Ed.). (2006). *Goals for academic writing: ESL students and their instructors.* Amsterdam: Benjamins.

Curry, M.J. & Lillis, T. (2013). *A scholar's guide to getting published in English: Critical choices and practical strategies*. Bristol, UK: Multilingual Matters.

Dalton-Puffer, C. (2007). *Discourse in content and language integrated (CLIL) classrooms*. Amsterdam: John Benjamins.

de Bot, K., Lowie, W., Thorne, S.L., & Verspoor, M. (2013). Dynamic systems theory as a comprehensive theory of second language development. In M.P.G. Mayo, M.J.G. Mangado, & M.M. Adrian (Eds.), *Contemporary approaches to Second Language Acquisition* (pp. 199-220). Amsterdam: John Benjamins.

Deacon, T. (1997). *The symbolic species: The co-evolution of language and the human brain*. London: The Penguin Press.

Derewianka, B. (2003). Grammatical metaphor in the transition to adolescence. In A.M. Simon-Vandenbergen, M. Taverniers and L. Ravelli (Eds.), *Grammatical metaphor: Views from Systemic Functional Linguistics* (pp. 185–219). Amsterdam: Benjamins.

Denzin, N. (1997). *Interpretive ethnography: Ethnographic practices for the 21st century.* London: Sage.

Devrim, D. (2015). *Teaching grammatical metaphor: Designing pedagogical interventions*. Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

Dore, R. (1976). *The diploma disease: Education, qualification and development*. Berkeley: University of California Press.

Dörnyei, Z. (2007). *Research methods in Applied Linguistics: Quantitative, qualitative and mixed methodologies.* Oxford: Oxford University Press.

Duff, P. (1995). An ethnography of communication in immersion classrooms in Hungary. *TESOL Quarterly 29,* 505-537.

Duff, P.A. (2002). The discursive construction of knowledge, identity, and difference: An ethnography of communication in the high school mainstream. *Applied Linguistics, 23,* 289–322.

Duff, P.A. (2003). New directions in second language socialization research. *Korean Journal of English Language and Linguistics, 3,* 309–339.

Duff, P.A. (2007). Second language socialization as sociocultural theory: insights and issues. *Language Teaching, 40*(4), 309-319.

Duff, P.A. (2008). *Case study research in applied linguistics*. New York: Lawrence Erlbaum.

Duff, P. A. (2010a). Language socialization into academic discourse communities. *Annual Review of Applied Linguistics, 30,* 169–192.

Duff, P.A. (2010b). Language socialization. In N. H. Hornberger & S. McKay (Eds.), *Sociolinguistics and language education* (pp. 427–452). Bristol, UK: Multilingual Matters.

Duff, P.A. (2014). Case study research on language learning and use. *Annual Review of Applied Linguistics, 34,* 233-255.

Duff, P., & Doherty, L. (2015). Examining agency in (second) language socialization research. In P. Deters, X. Gao, E. Miller, & G. Vitanova (Eds.), *Interdisciplinary approaches to theorizing and analyzing agency and second language learning* (pp. 54-72). Bristol, UK: Multilingual Matters.

Duff, P., Ferreira, A.A. & Zappa-Hollman, S. (2015). Putting (functional) grammar to work in content-based English for academic purposes instruction. In M.A. Christison, D. Christian, P.A. Duff, & N. Spada (Eds.), *Teaching and learning English grammar: Research findings and future directions: A festschrift for Betty Azar* (pp. 139-158). London: Routledge.

Duff, P. A. & Hornberger, N. H. (Eds.). (2008). *Encyclopedia of language and education: Vol. 8. Language socialization*. New York: Springer.

Duff, P.A. & Talmy, S. (2011). Language socialization: Beyond "language acquisition" in SLA. In Dwight Atkinson (Ed.), *Alternative approaches to second language acquisition* (pp. 95-116). London: Routledge.

Ellis, R. (2008). *The study of second language acquisition* (2nd edition). Oxford University Press.

Engeström, Y. (1999). Activity theory and individual social transformation. In Y. Engeström, R. Miettinen, & R.L. Punamaki (Eds.), *Perspectives on activity theory*. Cambridge: Cambridge University Press.

Fairclough, N. (1992). The appropriacy of 'appropriateness'. In N. Fairclough (Ed.), *Critical language awareness* (pp. 33-56). London: Longman.

Fauconnier, G., & Turner, M.B., (2003). Polysemy and conceptual blending. In B. Nerlich, V. Herman, Z. Todd & D. Clarke (Eds.), *Polysemy: Flexible patterns of meaning in mind and language* (pp. 79-94). Belin: Walter de Gruyter.

Fauconnier, G., & Turner, M.B., (2008). Rethinking metaphor. In R. Gibbs (Ed.), *Cambridge handbook of metaphor and thought*. New York: Cambridge University Press.

Ferreira, A.A. (2013, July). What counts as grammatical metaphor in second-language writing? Paper presented at the *40th International Systemic Functional Congress*, Guangzhou, China.

Ferreira, A.A. (2007). Japanese semiotic vernaculars in ESP multiliteracies projects. In T.D. Royce, W. Bowcher (Eds.), *New directions in the analysis of multimodal discourse* (pp. 299-329). New York: Erlbaum.

Ferris, D. (1994). Lexical and syntactic features of ESL writing by students at different levels of L2 proficiency. *TESOL Quarterly, 28*, 414-420.

Flowerdew, J. (2013). English for research publication purposes. In Paltridge, B. & Starfield, S. (Eds), *The handbook of English for specific purposes* (pp. 301-321). Malden, MA: Wiley-Blackwell.

Flowerdew, L. (2008). *Corpus-based analyses of the problem-solution pattern: A phraseological approach.* Amsterdam: Benjamins.

Fløttum, Dahl & Kinn, (2006). *Academic voices across languages and disciplines*. Amsterdam: John Benjamins.

Freebody, P. (2003). *Qualitative research in education: Interaction and practice*. London: Sage.

Fries, P.H. (1995). Themes, methods of development, and texts. In R. Hasan & P.H. Fries, *On Subject and Theme: A discourse functional perspective* (pp. 317-359). Amsterdam: Benjamins.

Garcia, O., & Li, W. (2014). *Translanguaging: Language, bilingualism and education*. London: Palgrave Macmillan.

Gardner, S. (2008). Mapping ideational meaning in a corpus of student writing. In C. Jones & E. Ventola (Eds.), *New developments in the study of ideational meaning: From language to* multimodality (pp. 169-188). London: Equinox Publishing.

Garrett, P. B., & Baquedano-Lopez, P. (2002). Language socialization: Reproduction and continuity, transformation and change. *Annual Review of Anthropology, 31*, 339–361.

Gebhard, M. (2010). Teacher education in times of change: An SFL perspective. *TESOL Quarterly, 44*(4), 797-803.

Gibbons, P. (2006). *Bridging discourses in the ESL classroom.* London: Continuum.

Gledhill, C. (1995). Collocation and genre analysis; the phraseology of grammatical items in cancer research articles and abstracts. *Zeitschriftfür Anglistik und Amerikanistik XLIII 1*(1). 11-36.

Gledhill, C. (2000). *Collocations in science writing*. *Language in Performance Series No.22.* Tübingen: Gunter Narr Verlag.

Goffman, E. (1981). *Forms of talk*. Philadelphia: University of Pennsylvania.

Goodman, R. (2005). W(h)ither the Japanese university? An introduction to the 2004 higher education reforms in Japan. In J.S Easdes, R. Goodman, & Y. Hada (Eds.), *The 'Big Bang' in Japanese higher education: The 2004 reforms and the dynamics of change* (pp. 1-31). Melbourne: Trans Pacific Press.

Grabe, W., & Stoller, F.L. (2002). *Teaching and researching reading*. London: Pearson.

Grangier, S. (2003). The International Corpus of Learner English: A new resource for foreign language learning and teaching and second language acquisition research. *TESOL Quarterly, 37*(3), 538-546.

Grant, L., & Ginther, L. (2000). Using computer-tagged linguistic features to describe L2 writing differences. *Journal of Second Language Writing, 9,* 123-145.

Greenfield, S. (1997). *The human brain: A guided tour.* London: Weidenfield and Nicolson.

Guinda, C.S. (2011). Variation in students' accounts of graphic data: context and cotext factors in a polytechnic setting. In C. Berkenkotter, V.K. Bhatia & M. Gotti (Eds.) *Insights into academic genres* (pp. 355-376). Bern: Peter Lang.

Halliday, M.A.K. (1961). Categories of a theory of grammar. *Word*, 17(3), 241-292.

Halliday, M.A.K. (1967). Grammar, society, and the noun. London: H.K. Lewis (for University College London). Reprinted in Halliday, M.A.K. & Webster, J. (2003) *On language and linguistics: Collected works of M.A.K. Halliday, 3*. (pp. 50-73) London: Continuum.

Halliday, M.A.K., (1975). *Learning how to mean: Explorations in the development of language*, London: Edward Arnold.

Halliday, M.A.K., (1978). *Language as a social semiotic: The social interpretation of language and meaning*. London: Edward Arnold.

Halliday, M.A.K., (1984). *An introduction to functional grammar*. London: Edward Arnold.

Halliday, M.A.K., (1985a). *Spoken and written language*. London: Oxford University Press.

Halliday, M.A.K., (1985b). *Introduction to functional grammar*. London: Arnold.

Halliday, M.A.K. (1993a). Towards a language-based theory of learning. *Linguistics and Education, 5*, 93-116.

Halliday, M.A.K., (1993b). On the language of physical science. In M.A.K Halliday & J.R. Martin (Eds.), *Writing science: Literacy and discursive power* (pp. 54-68). London: The Falmer Press.

Halliday, M.A.K. (1993c). Language and the order of nature. In M.A.K. Halliday & J.R. Martin (Eds), *Writing science: Literacy and discursive power* (pp. 106-123). Pittsburgh: University of Pittsburgh Press. London & Washington, D.C.: Falmer Press. Reprinted from N. Fabb, D. Attridge, A. Durant & C. MacCabe (Eds.). (1987), *The linguistics of writing: Arguments between language and literature* (pp. 135-154). Manchester: Manchester University Press.

Halliday, M.A.K. (1994). *An introduction to functional grammar* (2nd edition). London: Edward Arnold.

Halliday, M.A.K. (1998). Things and relations: Regrammaticising experience as technical knowledge. In J.R. Martin & R. Veel (Eds.), *Reading science: Critical and functional perspectives on discourses of sciences* (pp. 185-235). London: Routledge.

Halliday, M.A.K. (2004/1999). The grammatical construction of scientific knowledge: the framing of the English clause. In R.R. Favretti, G. Sandri, & R. Scazzieri (Eds.), *Incommensurability and translation: Kuhnian perpsectives on scientific communication and theory change*. Chletenham, U.K.: Edward Elgar. Reprinted in J.J. Webster (Ed.), *The collected works of M.A.K. Halliday, Volume 5: The language of science* (pp. 102-134). London: Continuum.

Halliday, M.A.K., & Martin, J. R. (1993). *Writing science: Literacy and discursive power*. London: The Falmer Press.

Halliday, M.A.K. & Matthiessen, C.M.I.M. (1999). *Construing experience through meaning: A language-based approach to cognition.* London: Continuum.

Halliday, M.A.K. & Matthiessen, C.M.I.M. (2004). *An introduction to functional grammar* (3rd edition). London: Edward Arnold.

Halliday, M.A.K. & Matthiessen, C.M.I.M. (2014). *An introduction to functional grammar* (4th edition). London: Edward Arnold.

Haneda, M. (2006). Classrooms as communities of practice: A reevaluation. *TESOL Quarterly, 40*, 807–817.

Hao, J. (2015). *Construing biology: An ideational perspective.* Unpublished doctoral thesis. University of Sydney, Sydney, Australia.

Harklau, L. (2002). The role of writing in classroom second language acquisition. *Journal of Second Language Writing, 11*, 329-350.

Hasan, R. (1987). The grammarian's dream: Lexis as delicate grammar. In M.A.K. Halliday and R. Fawcett (Eds.), *New developments in Systemic Linguistics, Volume 1: Theory and description* (pp. 184-212). London: Frances Pinter.

Hasan, R. (1995). The conception of context in text. In P.H. Fries & M. Gregory (Eds.), *Discourse in society: Systemic Functional perspectives.* Norwood, N.J.: Ablex.

Hasan, R. (1996). Literacy, everyday talk and society. In R. Hasan & G. Williams (Eds.), *Literacy in society* (pp. 377-424). London: Longman.

Hasan, R. (2005/1973). Code, register and social dialect. In B. Bernstein (Ed.), *Class, codes and control, Volume 2*, London: Routledge & Kegan Paul. Reprinted in full in Hasan, (2005), J.J. Webster (Ed.), *Language society and consciousness. Volume 1 in the collected works of Ruqaiya Hasan*. London: Equinox.

Hasan, R. (2004). The world of words: semiotic mediation, Tenor and ideology. In G. Williams & A. Lukin (Eds.), *The development of language: Functional perspectives on species and individuals* (pp. 158-181). London: Continuum.

Hasan, R. (2005/1992). Speech genre, semiotic mediation and the development of higher mental functions. *Language Sciences, 14*(4), 489-529. Reprinted In J.J. Webster (Ed.). *Language, society and consciousness. The collected works of Ruqaiya Hasan.* Vol. 1 (pp. 68-105). London: Equinox.

Hasan, R. (2005). Semiotic mediation and three exotropic theories: Vygotsky, Halliday and Bernstein. In J.J. Webster (Ed.), *Language, society and consciousness. The collected works of Ruqaiya Hasan*. Vol. 1 (pp. 130-156). London: Equinox.

Hasan, R. (2009/1989). Semantic variation and sociolinguistics. *Australian Journal of Linguistics, 9*(2), pp. 221-276. Reprinted In J.J. Webster (Ed.). *Semantic variation: meaning in society and sociolinguistics. The collected works of Ruqaiya Hasan.* Vol. 3 (pp. 180-230). London: Equinox.

Hasan, R. (2009). *The collected works of Ruqaiya Hasan, Vol. 2: semantic variation: Meaning in society and sociolinguistics*, J.J. Webster (Ed.). London: Equinox.

Hasan, R. (2011a). Author's preface. In J.J. Webster (Ed.). *Language and education: Learning and teaching in society*. *The collected works of Ruqaiya Hasan*. Vol 3. (pp. xi – xvii). London: Equinox.

Hasan, R. (2011b). Modes of learning, modes of teaching: semiotic mediation and knowledge. In J.J. Webster (Ed.). *Language and education: Learning and teaching in society. The collected works of Ruqaiya Hasan*. Vol. 3 (pp. 48-72). London: Equinox.

Hasan, R. (2011/2003). Globalization, literacy and ideology. In *World Englishes,* Vol.22 (4) (2003), pp. 433-448). Reprinted in full in Hasan, R. (2011), *Language and education: Learning and teaching in society* (pp. 207–231). J.J. Webster (Ed.). London: Equinox.

Hashimoto, K. (2007). Japan's language policy and the "lost decade". In A.B.M. Tsui & J.W. Tollefson (Eds.), *Language policy, culture, and identity in Asian contexts* (pp. 25-36). Mahwah, NJ: Erlbaum.

Hemmert, M., Bstieler, L. & Okamuro, H. (2014). Bridging the cultural divide: trust formation in university–industry research collaborations in the US, Japan, and South Korea. *Technovation 34*(10), 605-616.

Hewings, M., & Hewings, A. (2002). "It is interesting to note that…": a comparative study of anticipatory 'it' in student and published writing. *English for Specific Purposes, 21*(4), 367-383.

Hewings, M., & Hewings, A. (2006). Anticipatory 'it' in academic writing: an indicator of disciplinary difference and developing disciplinary knowledge. In M. Hewings (Ed.), *Academic writing in context: implications and applications. Papers in honour of Tony Dudley-Evans* (pp. 199-214). London: Continuum.

Hinkel, E. (2002). *Second language writers' text: Linguistic and rhetorical features*. London: Routledge.

Hirvela, A. (2004). *Connecting reading and writing in second language writing instruction.* Ann Arbor: University of Michigan Press.

Hirvela, A. (2011). Writing to learn in content areas: research insights. In R.M. Manchón, (Ed.), *Learning-to-write and writing-to-learn in an additional language* (pp. 37-60). Amsterdam: John Benjamins.

Hoang, H. (2014). Metaphor and second language learning: the state of the field. *The Electronic Journal of English as a Second Language, 19*(3).

Hoey, M. (2001). *Textual interaction.* London: Routledge.

Holme, R. (2003). Grammatical metaphor as a cognitive construct. In A.M. Simon-Vandenbergen, M. Taverniers and L. Ravelli (Eds.), *Grammatical metaphor: Views from Systemic Functional Linguistics* (pp. 391–415). Amsterdam: Benjamins.

Hood, S. (2010). *Appraising research: Evaluation in academic writing*. London: Palgrave.

Hyland, K. (2004). *Genre and second language writing*. Ann Arbor: The University of Michigan Press.

Hyland, K. (2005). *Metadiscourse: Exploring Interaction in Writing*. London: Continuum.

Hyland, K. (2006). *English for academic purposes*. New York: Routledge.

Hyland, K. (2007a). English for professional academic purposes: Writing for scholarly publication. In D. Belcher (Ed.), *Teaching language purposefully: English for Specific Purposes in theory and practice*. New York: Cambridge University Press.

Hyland, K. (2007b). Genre pedagogy: Language, literacy and L2 writing instruction. *Journal of Second Language Writing, 16*, 148-164.

Hyland, K. (2012). *Disciplinary identities: Individuality and community in academic discourse.* Cambridge: Cambridge University Press.

Hyland, K. & Tse, P. (2007). Is there an "academic vocabulary"? *TESOL Quarterly, 41*(2): 235-254.

Ishida, H. (2007). Japan: Education expansion and inequality in access to higher education. In Y. Shavit, R. Arum, & A. Gamoran (Eds.), *Stratification in higher education: A comparative study.* Stanford: Stanford University Press.

Itoh, M. (2005). Assessing neoliberalism in Japan. In A. Saad-Filho & D. Johnston (Eds.), *Neoliberalism: A critical reader* (pp. 244-250). London: Pluto Press.

Ivanič, R. (1998). *Writing and identity: The discoursal construction of identity in academic writing*. Amsterdam: John Benjamins.

Ivanič, R. (2004). Discourses of writing and learning to write. *Language and Education*, *16*(3), 220-245.

Japan Society for the Promotion of Science (2010). *The Global Centres of Excellence (COE) Program*. Retrieved August 23, 2016 http://www.jsps.go.jp/english/e-globalcoe/index.html

Jarvis, S., Grant, L., Bikowski, D. & Ferris, D. (2003). Exploring multiple profiles of highly rated learner compositions. *Journal of Second Language Writing*, *12*, 377–403.

Jones, J. (1991). Grammatical metaphor and technicality in academic writing: An exploration of ESL and native speaker student texts. In F. Christie (ed.), *Literacy in social processes: Papers from the inaugural Australian Systemic Functional Linguistics Conference* (pp. 178-198). Melbourne: Deakin University Centre for Studies in Language Education.

Jones, J. (2006). *Multiliteracies for academic purposes: A metafunctional exploration of intersemiosis and multimodality in university textbook and computer-based learning resources in science*. Unpublished doctoral thesis, University of Sydney, Sydney, Australia.

Kaneko, M. (2004). Japanese higher education: Contemporary reform and the influence of tradition. In P. G. Altbach & T. Umakoshi (Eds.), *Asian universities: Historical perspectives and contemporary challenges* (pp. 115–143). Baltimore: The Johns Hopkins University Press.

Kinginger, C. (2002). Defining the Zone of Proximal Development in U.S. foreign language education. *Applied Linguistics, 23*(2), 240–261.

Kitamura, K. (1979). Mass higher education. In W.K. Cummings, I. Amano & K. Kitamura (Eds), *Changes in the Japanese university: Comparative perspectives* (pp. 64-82). New York: Praeger.

Klein, P.D., & Unsworth, L. (2014). The logogenesis of writing to learn: A systemic functional perspective. *Linguistics and Education, 28*, 1-17.

Kozulin, A. (2003). Psychological tools and mediated learning. In A. Kozulin, B. Gindis, V.S. Ageyev & S.M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 15-38). Cambridge: Cambridge University Press.

Kramsch, C. (2002). Introduction: "How can we tell the dancer from the dance?". In C. Kramsch (Ed.), *Language acquisition and language socialization: Ecological perspectives* (pp. 1-30). London: Continuum.

Kress, G.R. (2003). *Literacy in the new media age*. London: Routledge.

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago: University of Chicago Press.

Lantolf, J.P., & Thorne, S.L. (2006). *Sociocultural theory and the genesis of second language development.* Oxford: Oxford University Press.

Lapavitsas, C. (2005). Mainstream economics in the neoliberal era. In A. Saad-Filho and D. Johnston (Eds.), *Neoliberalism: A critical reader* (pp. 30-40). London: Pluto Press.

Larsen-Freeman, D. (2015). Complexity theory. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition* (2nd edition) (pp. 227-244). London: Routledge.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Cambridge, Massachusetts: Harvard University Press.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

Leki, I., Cumming, A., & Silva, T. (2008). *A synthesis of research on second language writing in English.* London: Routledge.

Lemke, J.L. (1990a). Technical discourse and technocratic ideology. In M.A.K. Halliday, J. Gibbons & H. Nicholas (Eds.), *Learning, keeping and using language: Selected papers from the Eighth World Congress of Applied Linguistics, Sydney, August, 1987, Volume 2* (pp. 435-460). Amsterdam: John Benjamins.

Lemke, J.L. (1990b). *Talking science: Language, learning, and values*. Norwood, NJ: Ablex Publishing.

Lemke, J.L. (1998). Multiplying meaning: Visual and verbal semiotics in scientific text. In J.R. Martin & R. Veel, (Eds.), *Reading science: Critical and functional perspectives on discourses of science* (pp. 87-113). London: Routledge.

Lemke, J.L. (2002). Language development and identity: multiple timescales in the social ecology of learning. In C. Kramsch (Ed.), *Language acquisition and language socialization: Ecological perspectives* (pp. 68-87). London: Continuum.

Leont'ev, A.N. (1978). *Activity, consciousness, and personality*. Englewood Cliffs, N.J.: Prentice Hall.

Liardét, C.L. (2013). An exploration of Chinese EFL learner's development of grammatical metaphor: Learning to make academically valued meanings. *Journal of Second Language Writing, 22*, 161-178.

Lillis, T. (2003). Student writing as 'academic literacies': Drawing on Bakhtin to move from critique to design. *Language and Education, 17* (3), 192-207.

Lillis, T. (2008). Ethnography as method, methodology, and "deep theorizing": Closing the gap between text and context in academic writing research. *Written Communication, 25*(3), 353-388.

Lillis, T. & Scott, M. (2007). Defining academic literacies research: Issues of epistemology, ideology and strategy. *Journal of Applied Linguistics, 4*(1), 5–32.

Littlemore, J., Krennmayr, T., Turner, J., & Turner, S. (2014). An investigation into metaphor use at different levels of second language writing. *Applied Linguistics, 35*(2), 117–144.

Lorenz, G. (1998). Overstatement in advanced learners' writing: Stylistic aspects of adjective intensification. In S. Granger (Ed.), *Learner English on computer* (pp. 53-66). London: Longman.

Lukin, A., Butt, D.G. & Matthiessen, C.M.I.M. (2004). Reporting war: Grammar as 'covert operation'. *Pacific Journalism Review, 10* (1), 58-74.

Luria, A.R. (1976). *Cognitive development: Its cultural and social foundations*. M. Cole (Ed.), M. Lopez-Morillas & L. Solotaroff (Trans.). Cambridge, MA: Harvard University Press.

MacDonald, S.P. (1994). *Professional academic writing in the humanities and social sciences.* Carbondale, IL: Southern Illinois University Press.

Macken-Horarik, M. (2002). 'Something to shoot for': A systemic functional approach to teaching genre in secondary school science. In A. M. Johns (Ed.), *Genre in the classroom: Multiple perspectives* (pp. 21–46). Mahwah, NJ: Erlbaum.

MacLaury, R.E. (2009). Taxonomy. In G. Senft, J. Ostman & J. Verschueren (Eds.), *Culture and language use* (pp. 248-255). Amsterdam: John Benjamins.

Manchón, R.M. (Ed.) (2009). *Writing in foreign language contexts: Learning, teaching, and research*. Bristol: Multilingual Matters.

Manchón, R.M. (Ed.) (2011). *Learning-to-write and writing-to-learn in an additional language*. Amsterdam: John Benjamins.

Manchón, R. M. (Ed.) (2012). *L2 writing development: Multiple perspectives*. Berlin: de Gruyter Mouton.

Markowitz, H.M. (1952). Portfolio selection. *The Journal of Finance, **7*** (1): 77–91.

Martin, J. R. (1984). Language, register and genre. In F. Christie (Ed.), *Children writing: Reader* (pp. 21-29). Geelong, Australia: Deakin University Press.

Martin J. R. (1991). Nominalization in science and humanities: Distilling knowledge and scaffolding text. In Ventola E. (Ed.), *Functional and systemic linguistics* (pp. 307–337). Berlin: Mouton de Gruyter.

Martin, J.R. (1989). *Factual writing: Exploring and challenging social reality*. Oxford: Oxford University Press.

Martin, J.R. (1992). *English text: System and structure*. Amsterdam: John Benjamins.

Martin, J.R. (2003). Sense and sensibility: Texturing evaluation. In J. Foley (Ed.) *Language, education and discourse* (pp. 270-304). London: Continuum.

Martin, J.R. (2008). Incongruent and proud: Devilifying 'nominalisation'. *Discourse and Society, 19*(6), 801-810.

Martin, J.R. & Rose, D. (2005). Designing literacy pedagogy: scaffolding democracy in the classroom. In R. Hasan, C. Matthiessen & J.J. Webster (Eds.). *Continuing discourse on language: A functional perspective, Volume 1* (pp. 251-280). London: Equinox.

Martin, J.R. & Rose, D. (2007). *Working with discourse: Meaning beyond the clause*. London: Continuum.

Martin, J.R. & Rose, D. (2008). *Genre relations: Mapping culture*. London: Equinox.

Martin, J.R. & White, P.R.R. (2005). *The language of evaluation: Appraisal in English.* Basingstoke: Palgrave/Macmillan.

Matsuda, P.K. (2013). What *is* second language writing--and why does it matter? *Journal of Second Language Writing, 22*, 448-450.

Maton, K. (2016). Legitimation Code Theory: Building knowledge about knowledge-building. In K. Maton, S. Hood, & S. Shay (Eds.), *Knowledge-building: Educational studies in Legitimation Code Theory* (pp. 1-23). London: Routledge.

Matthiessen, C.M.I.M. (1998). Construing processes of consciousness: From the commonsense model to the uncommonsense model of cognitive science. In J.R. Martin & R. Veel (Eds.), *Reading science: Critical and functional perspectives on discourses of sciences* (pp. 327-356). London: Routledge.

Matthiessen, C.M.I.M. (2006). Education for advanced foreign language capacities: exploring the meaning-making resources of languages systemic-functionally. In H. Byrnes (Ed.), *Advanced language learning: The contributions of Halliday and Vygotsky*. (pp. 31-57). London: Continuum.

Matthiessen, C.M.I.M. (2009). Meaning in the making: Meaning potential emerging from acts of meaning. *Language Learning*, 59 (Suppl. 1), 206-229.

Matthiessen, C.M.I.M., Teruya, K., & Lam. M. (2010). *Key terms in systemic functional linguistics*. London: Continuum.

Mauranen, A. (1993). *Cultural differences in academic rhetoric: A textlinguistic study*. Frankfurt: Peter Lang.

McCloskey, D. (1994). *Knowledge and persuasion in economics*. Cambridge: Cambridge University Press.

McVeigh, B.J. (2002). *Japanese higher education as myth*. London: M.E. Sharpe.

McVeigh, B.J. (2005). Higher education and the Ministry: The capitalist development state, strategic schooling and national renovationism. . In J.S Easdes, R. Goodman, & Y. Hada (Eds.), *The 'Big Bang' in Japanese higher education: The 2004 reforms and the dynamics of change* (pp. 1-31). Melbourne: Trans Pacific Press.

Mohan, B. (1986). *Language and content*. Reading, MA: Addison Wesley.

Mohan, B. & Beckett, G. (2001). A functional approach to research on content-based language learning: Recasts in causal explanations. *Canadian Modern Language Review*, *58* (1), 133-155.

Moore, N. (2006). Advanced language for intermediate learners: corpus and register analysis for curriculum specification in English for Academic Purposes. In H. Byrnes (ed.) *Advanced language learning: The contribution of Halliday and Vygotsky* (pp. 246-264). London: Continuum.

Morita, N. (2004). Negotiating participation and identity in second-language academic communities. *TESOL Quarterly*, *38*, 573-603.

Morrissey, J. & Sumich, J.L. (2012). *Introduction to the biology of marine life* (10th edition). Boston: Jones & Bartlett Publishers.

Nesi, H., and Gardner, S. (2012) *Genres across the disciplines: Student writing in higher education.* Cambridge: Cambridge University Press.

Norris, J.M. & Manchón, R.M., (2012). Investigating L2 writing development from multiple perspectives: Issues in theory and research. In R.M. Manchón (Ed.), *L2 writing development: Multiple perspectives* (pp. 221-242). Berlin: Walter de Gruyter.

O'Halloran, K. (2005). *Mathematical discourse: Language, symbolism and visual images*. London: Continuum.

Ong, W.J. (1982). *Orality and literacy: Technologizing of the word.* London: Routledge.

Ortega, L. (2009). *Understanding second language acquisition*. London: Hodder Arnold.

Ortega, L. (2011). Reflections on the learning-to-write and writing-to-learn dimensions of second language writing. In R. Manchón (Ed.), *Learning to write and writing to learn in an additional language* (pp. 237-250). Amsterdam: John Benjamins.

Ortega, L. (2012). Interlanguage complexity: A construct in search of theoretical renewal. In B. Szmrecsanyi & B. Kortmann (Eds), *Linguistic complexity in interlanguage varieties, L2 varieties, and contact languages*. Berlin: Walter de Gruyter.

Ortega, L. (2015). Syntactic complexity in L2 writing: progress and expansion. *Journal of Second Language Writing, 29*, 82–94.

Ortega, L., & Byrnes, H. (Eds.). (2008). *The longitudinal study of advanced L2 capacities.* London: Routledge.

Painter, C. (1996). The development of language as a resource for thinking: A lingusitic view of learning. In R. Hasan & G. Williams (Eds.), *Literacy in society* (pp. 50–85). London: Longman.

Paré, A. (2010). Discourse and social action: Moffett and the New Rhetoric. *Changing English: Studies in culture and education. Special Issue: Re-reading James Moffett, 17* (3), 241-250.

Pennycook, A. (1997). Vulgar pragmatism, critical pragmatism, and EAP. *English for Specific Purposes, 16*, 253-269.

Probyn, M. (2015). Pedagogical translanguaging: bridging discourses in South African science classrooms. *Language and Education, 29* (3): 218-234.

Quirk, R., Greenbaum, S., Leech, G. & Svartvik, J. (1985). *A comprehensive grammar of the English language*. London: Longman.

R Core Team (2015). *R: A language and environment for statistical computing.* R Foundation for Statistical Computing, Vienna, Austria. Available from URL http://www.R-project.org/.

Rampton, B. (2007). Linguistic ethnography, interactional sociolinguistics, and the study of identities. *Working Papers in Urban Languages and Literacies, paper 42*, London: King's College.

Ravelli, L.J. (1985/1999). *Metaphor, mode and complexity: An exploration of co-varying patterns*. Unpublished BA (Hons.) thesis, University of Sydney, Sydney, Australia. Published in 1999 in *Monographs in Systemic Linguistics, 12*. Nottingham, UK: Department of English and Media Studies, Nottingham Trent University.

Ravelli, L.J. (2003). Renewal of connection: integrating theory and practice in an understanding of grammatical metaphor. In A. M. Simon Vandenbergen, M. Taverniers & L.J. Ravelli (Eds.), *Grammatical metaphor: Views from Systemic Functional Linguistics* (pp. 37-64). Amsterdam: Benjamins.

Ravelli, L.J. (2004). Signalling the organization of written texts: Hyper-Themes in management and history essays. In L.J. Ravelli & R.A. Ellis (Eds.), *Analysing academic writing: Contextualised frameworks* (pp104-130). London: Continuum

Ravelli, L.J. & Ellis, R.A. (Eds.). (2004). *Analysing academic writing: Contextualised frameworks* London: Continuum

Römer, U. & Wulff, S. (2010). Applying corpus methods to writing research: Explorations of MICUSP. *Journal of Writing Research, 2*(2), 99-127.

Royama, S. (1999). Let schools be their own masters: Higher education policy needs its own 'big bang', *Look Japan*, (22 September).

Royce, T. (2007). Intersemiotic complementarity: A framework for multimodal discourse analysis. In T. Royce. W.Bowcher (Eds.) *New directions in the analysis of multimodal discourse* (pp. 63-109). Malwah, NJ: Erlbaum.

Ryshina-Pankova, M. (2010). Towards mastering the discourses of reasoning: Use of grammatical metaphor at advanced levels of foreign language acquisition. *Modern Language Journal,* 92, 181–197.

Ryshina-Pankova, M. & Byrnes, H. (2013). Writing as learning to know: Tracing knowledge construction in L2 German compositions. *Journal of Second Language Writing, 22*, p. 179-197.

Sawaki, T. (2014). The CARS model and binary opposition structure, *The Public Journal of Semiotics, 6*(1), 73-90.

Schieffelin, B. B., & Ochs, E. (Eds.). (1986). *Language socialization across cultures*. Cambridge,UK: Cambridge University Press.

Schleppegrell, M. J. (2004a). *The language of schooling: A functional linguistics approach*. Mahwah, NJ: Erlbaum.

Schleppegrell, M. J. (2004b). Technical writing in a second language: The role of grammatical metaphor. In L.J. Ravelli and Ellis, R.A. (Eds.), *Analysing academic writing: contextualised frameworks.* (pp.172-189). London: Continuum.

Schleppegrell, M. J. (2011). Supporting disciplinary learning through language analysis: Developing historical literacy. In F. Christie & K. Maton (Eds.), *Disciplinarity: Functional linguistic and sociological perspectives* (pp. 196–216). London/New York: Continuum.

Schleppegrell, M.J., & Colombi, M.C. (2002). *Developing advanced literacy in first and second languages: Meaning with power*. Mahwah, NJ: Lawrence Erlbaum.

Seargeant, P. (2005). Globalisation and reconfigured English in Japan. *World Englishes*, *24*(3): 309-319.

Séror, J. (2008). *Socialization in the margins: Second language writers and feedback practices in university content courses*. Unpublished doctoral dissertation, University of British Columbia, Vancouver, Canada.

Simon-Vandenbergen, A.M. (2003). Lexical metaphor and interpersonal meaning. In A.M. Simon-Vandenbergen, M. Taverniers and L. Ravelli (eds.), *Grammatical metaphor: Views from Systemic Functional Linguistics* (pp. 223–256). Amsterdam: Benjamins.

Sinclair, J. (2003). *Reading concordances: An introduction*. London: Longman.

Slobin, D.I. (1996). From "thought and language" to "thinking for speaking". In J.J. Gumperz & S.C. Levinson (Eds.*), Rethinking linguistic relativity* (pp. 70-96). Cambridge: Cambridge University Press.

Spack, R. (1997). The acquisition of academic literacy in a second language: A longitudinal case study. *Written Communication, 14,* 3-62.

Stiglitz, J.E. (2001). Information and the change in the paradigm in Economics. *Nobel Prize Lecture,* Aula Magna, Stockholm University, Sweden.

Street, B. (1984). *Literacy in theory and practice*. Cambridge: Cambridge University Press.

Street, B. (1995). *Social literacies: Critical perspectives on literacy in development, ethnography and education*. London: Longman.

Sugita, K. (2006). Time series analysis of the expectations hypothesis for the Japanese term structure of interest rates in the presence of multiple structural breaks. *Discussion paper #2005-15*. Graduate School of Economics, Hitotsubashi University, Tokyo.

Swain, M., Kinnear, P. & Steinman, L. (2011). *Sociocultural theory in second language education: An introduction through narratives.* Bristol, UK: Multilingual Matters.

Swales, J.M. (1990). *Genre analysis: English in academic and research settings.* Cambridge: Cambridge University Press.

Swales, J.M. (1997). English as Tyrannosaurus Rex. *World Englishes, 16*, 383-382.

Swales, J.M. (2008). *Research genres: Explorations and applications.* Cambridge: Cambridge University Press.

Swales, J., and Feak, C. (2000). *English in today's research world: A writing guide*. Ann Arbor, MI: University of Michigan Press.

Swales, J.M. & Feak, C.B. (2004). *Academic writing for graduate students: Essential tasks and skills* (2nd edition). Ann Arbor: Michigan University Press.

Swales, J.M. & Feak, C.B. (2011). *Creating contexts: Writing introductions across genres*. Ann Arbor: Michigan University Press.

Talmy, S. (2008). The cultural productions of the ESL student at Tradewinds High: Contingency, multidirectionality, and identity in L2 socialization. *Applied Linguistics, 29*, 619–644

Talmy, S. (2009). A very important lesson: Respect and the socialization of order(s) in high school ESL. *Linguistics and Education*, *20*(3), 235-253.

Talmy, S. (2011). The interview as collaborative achievement: interaction, identity, and ideology in a speech event. *Applied Linguistics, 32*(1), 25-42.

Teruya, K. (2006). Grammar as a resource for the construction of language logic for advanced language learning in Japanese. In H. Byrnes (Ed.), *Advanced language learning: The contributions of Halliday and Vygotsky* (pp. 109-133). London: Continuum.

Thomas, H. & Wilson, A.D. (2011). 'Physics Envy', cognitive legitimacy or practical relevance: Dilemmas in the evolution of Management research in the UK. *British Journal of Management, 22*, 443–456.

Thompson, G. & Hunston, S. (Eds.). (2006). *System and corpus: Exploring connections*. London: Equinox.

Thompson, G. (2013). Seeing double: Complementarities of perspective on interpersonal grammatical metaphor. Plenary Presentation at the *40th International Systemic functional Congress (ISFC40).*

Tomaselli, K.G., & Mboti, N. (2013). 'Doing' cultural studies: What is literacy in the age of the post? *International Journal of Cultural Studies*, *16*(5), 521-537.

Unsworth, L. (2000). Investigating subject-specific literacies in school learning. In L. Unworth (Ed.), *Researching language in schools and communities: Functional linguistic perspectives* (pp. 245-274). London: Continuum.

Veel, R. (1997). Learning how to mean – scientifically speaking: Apprenticeship into scientific discourse in the secondary school. In F. Christie & J.R. Martin (Eds.), *Genres and institutions: Social processes in the workplace and school* (pp. 161-195). London: Cassell.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological Processes*. M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.). Cambridge, MA: Harvard University Press.

Vygotsky, L.S. (1981). The genesis of higher mental functions. In J.V. Wertsch (Ed.), *The concept of activity in Soviet Psychology*. Armonk, NY: M. E. Sharp.

Vygotsky, L.S. (1986). *Thought and language* (revised edition). Cambridge, MA: MIT Press.

Vygotsky, L.S. (1997). *The collected works of L. S. Vygotsky, Volume 4*. New York: Plenum.

Wallace, A.F.C. (1970). *Culture and personality* (2nd edition). New York: Random House.

Wang, X. (2010). Grammatical metaphor and its difficulties in application. *US-China Foreign Language Journal* 8(12): 29-37.

Wang, H., Runtsova, T., & Chen, H. (2013). A comparative study of metaphor in English and Russian economic discourse. *Text & Talk, 33*(2), 259–288.

Weigle, S. (2002). *Assessing writing.* Cambridge: Cambridge University Press.

Wells G. (2004). *Dialogic inquiry: Towards a socio-cultural practice and theory of education.* Cambridge: Cambridge University Press.

Wells, R. (1960). Nominal and verbal style. In T. A. Sebeok (Ed.), *Style in language* (pp. 213-220). Cambridge, MA: MIT Press.

Wells, G. (2007). Semiotic mediation, dialogue and the construction of knowledge. *Human Development* 50/5, 244-274.

Wertsch, J.V. (1985). *Vygotsky and the social formation of mind*. Cambridge, MA: Harvard University Press.

Wertsch J. (1991). *Voices of the mind: A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.

Whorf, B.L. (1956/1939). Language, mind and reality. In J.B. Carroll (Ed.) *Language, thought & reality: Selected writings of Benjamin Lee Whorf* (pp. 246-278). Boston: MIT Press.

Widdowson, H. (1990). Pedagogic research and teacher education. In H. Widdowson (Ed.) *Aspects of language teaching* (pp. 55-70). Oxford: Oxford University Press.

Wignell, P. (1998). Technicality and abstraction in social science. In J.R. Martin & R. Veel, *Reading science: Critical and functional perspectives on discourses of science* (pp. 297-326). London: Routledge.

Wignell, P. (2007). *On the discourse of social science*. Darwin, NT: Charles Darwin University Press.

Wignell, P., Martin, J.R, & Eggins, S. (1993). The discourse of geography: ordering and explaining the experiential world. In M.A.K. Halliday & J.R. Martin (Eds), *Writing science: Literacy and discursive power* (pp. 136-165). London & Washington, D.C.: Falmer Press.

Williams, G. (1994). *Joint book-reading and literacy pedagogy: A socio-semantic examination, Vols. 1-3*, Unpublished doctoral thesis, Macquarie University, Sydney, Australia.

Williams, G. (2001). Literacy pedagogy prior to schooling: Relations between social and semantic variation. In A. Morais, I. Neves, B. Davies & H. Daniels (Eds.) *Towards a sociology of pedagogy: The contribution of Basil Bernstein to research* (pp. 17-45). New York: Peter Lang.

Williams, G. (2005a). Grammatics in schools. In R. Hasan, C. Matthiessen & J.J. Webster (Eds.), *Continuing discourse on language: A functional perspective, Volume 1* (pp. 281-310). London: Equinox.

Williams, G. (2005b). Semantic variation. In J. Webster, C. Matthiessen and R. Hasan (Eds.) *Continuing discourse on language: A functional perspective*, Volume 1 (pp. 458-480). London: Equinox.

Woodward-Kron, R. (2008). More than just jargon – the nature and role of specialist language in learning disciplinary knowledge. *Journal of English for Academic Purposes, 7*, 234-249.

Yasuda, S. (2011). Genre-based tasks in foreign language writing: Developing writers' genre awareness, linguistic knowledge, and writing competence. *Journal of Second Language Writing, 20*(2), 111-133.

Yasuda, S. (2014). Issues in teaching and learning EFL Writing in East Asian contexts: The case of Japan. *Asian EFL Journal, 16*(4), 150-187.

Yoshimi, D.R. (1999). L1 language socialization as a variable in the use of *ne* by L2 learners of Japanese. *Journal of Pragmatics, 31*(11), 1513-1525.

Yoshino, K. (1995). *Cultural nationalism and contemporary Japan*. London: Routledge.

Zamel, V. (1982). Writing: The process of discovering meaning. *TESOL Quarterly, 16*(2), 195–209.

Zamel, V. & Spack, R. (Eds.) (1998). *Negotiating academic identities: Teaching and learning across languages and cultures*. Mawah, NJ: Lawrence Erlbaum.

Appendix 1: Yoshi's course writings tagged for GMs (as per typology in Table 5.1)

Pre-Course Text

1. Recently, China has been growing[9n] so rapidly [[that its GDP[7n, 6a, 4n] is almost the same [as[13a] that [of[13a] Japan]]]].
2. I am especially interested in the macroeconomic[6a] framework[3n] [of[13a] Chinese[13c] economy[3n]],
3. and I assume[9n]
4. others are also concerned about this topic.
5. The reason[4n] is simple:
6. Economics[4n] itself is based on the experiences [of[13a] capitalistic countries],
7. whereas China is basically communistic nation.
8. Therefore, a new viewpoint[3n], the one [[which may be totally different[7n] [from[13a] the ideas [in[13e] the mainstream[6a] economics[4n]]]]], is likely [[to be needed]]
9. to analyze the Chinese[13c] economy[4n].,
10. However, this perspective[3n] still seems to remain[9n] unclear.
11. The economic[13c] crisis [in[13e] 2008] has proved[9n]
12. that [[studying Chinese[13c] economy[4n]]] is important[7n].
13. During[10n] the economic[13c] turmoil[2a], the economy[4n] [of[13a] most capitalistic nations] has been seriously damaged.
14. On[10n] the other hand, China has suffered slightly
15. and it succeeded in [[maintaining[9n] economic[7n] growth[2a]]].
16. Considering this situation[3n],
17. some economists claim
18. that Chinese[13c] economy[4n], << >>.could be a new form[2a] [of[13a] economic[13c] system[4n] [[that is durable[5a] to[10n] crises]]]
19. <<which takes the advantages[4n] [of[13a] both capitalistic[13c] and communistic[13c] economy[4n]],>>
20. However, it is difficult [[to describe [[what "Chinese[13c] economy[4n]" is]]]]
21. because no communistic[13c] economy[4n], throughout[10n] history[4n], has ever escaped from[10n] collapse[2a], for[10n] example, the Soviet Union.
22. Therefore, it is said [[that economics[4n] itself has absorbed[2c] only little[6a] experience [from[10n] communistic[13c] economy[4n]]]]
23. Since the theories[3n] [of[13a] the Western[13c] economics[4n]] are built on the assumptions[4n] [[which are appropriate[6a] in[10n] the capitalistic countries]],
24. these theories[3n] would not be valid[7n] in[10n] China,
25. the economic[13c] system[4n] of which is totally different[7n] from the West.
26. For[10n] this reason[4n], Chinese[13c] economy[4n] can be only analyzed through[10n] the scope[3n] [of[13a] new theories[3n] [[that are especially customized[9n] for[13e] China]]].

Extended Definition: Draft 1

T. "Portfolio[13c] Approach[3n]" [in Foreign Exchange[5a] Market]: An Extended[7n] Definition[5c] Text

1. The foreign[6a] exchange[5a] rate[4n] [between[13e] the Japanese yen and the U.S. dollars] has recently been changing[9n] so drastically [[that it has brought[9n] fortune to some investors]].
2. Therefore, investors have been increasingly concerned about the prediction[2b] [of[13a] the foreign[6a] exchange[5a], or FX[5a], rate[4n]].

3. The portfolio[13c] approach[3n]," is one [of the basic[7n] theories [[that explain[9n] [[how the FX[5a] rate[4n] is determined[9n] in[10n] the exchange[5a] market]]]]].
4. An important[7n] assumption[2b] [[which lies in[10n] this approach[3n]]] is [[that investors prefer not to take[9n] high[6a] risk[2g]]].
5. Thus, they diversify[9n] their assets
6. to minimize[9n] the risk[2g] among[10n] their investment[2a].
7. Assume[9n]
8. that you are a Japanese[13c] investor
9. and possess two types [of assets],
10. one is paid in[10n] yen
11. and the other is paid in[10n] dollars.
12. Here, suppose
13. that the two assets are maintained[9n] in[10n] a certain[5c] balance[4n] [[which minimizes[9n] the risk[2g]]].
14. This balance[4n] is defined to be the optimal[7n] one.
15. This model[4n] introduces two chief[7n] factors[4n] [[that influence[9n] the F[6a]X[5a] rate[4n]]].
16. The first[7n] one is the FX[5a] market[6a] volatility[1a].
17. If the risk[2g] [of[13a] dollars] increases[9n],
18. you may prefer the asset [[paid in[10n] yen]]
19. to avoid[9n] [[taking[9n] the risk[2g]]].
20. This change[4n] encourage [9n] investors [[who maintain[9n] their optimal[7n] assets[13c] balance[4n]]] to acquire the asset [[paid in[10n] yen]]
21. and abandon the asset [[paid in[10n] dollars]].
22. As[10n] a result[4n], more yen than dollars will be demanded[9n] in[10n] the market
23. to attain the former[6a] asset.
24. Thus, yen will appreciate[9n] against[10n] dollars.
25. The other factor[4n] is the amount [of the asset [[supplied in[10n] the market]]].
26. If the supply[2a] [of[13a] the asset [[paid in[10n] yen]]] increases[9n]
27. while its demand[2g] remains[9n] unchanged[7n],
28. Investors still want to preserve[9n] their optimal[7n] balance[4n]
29. and will not be motivated to obtain new assets.
30. For[10n] this reason[4n], the surplus[4n] [of[13a] the asset [[paid in[10n] yen]]] will reduce[9n] its value[2b].
31. Therefore, investors become[9n] more favorable[5g] [to[13a] the asset [[paid in[10n] dollars]]] than the one [[paid in[10n] yen]].
32. This boosts[9n] the demand[4n] on[10n] dollars,
33. and as[10n] a result, yen will depreciate[4n] against[10n] dollars.
34. Though the statistical[13c] analysis[2a] [[conducted on (?????, 2007)]] was not able to provide enough[6a] evidence[1a]
35. to proof[9n] this approach[3n],
36. the theory[3n] itself seems to remain[9n] valid[7n].
37. Therefore, a further[7n] investigation[2a] might be needed[9n]
38. to gather more reliable[7n] evidence[1a].

Extended Definition: Draft 2

T. Intuitive[6a] Definition[2c] [of[13a] 'Portfolio[13c] Approach[3n]']: An Extended[7n] Definition[5c] Text

1. The prediction[2b] [over[13a] the random[6a] movement[2a] [of[13a] the foreign[6a] exchange[5a], or FX, rate[4n]]] is well known to be1 a major[7n] concern[2b] [of[13a] investors].
2. The portfolio[13c] approach[3n] provides a theoretical[6a] explanation[4n] for[10n] the determinants[4n] [of[13a] the FX[5a] rate[4n] [in[13e] the market]].
3. This approach[3n] presupposes[9n] risk-averse[7n] investors and diversification[4n] [of[13a] the investment[2a]].
4. In[10n] other words, a postulated[7n] strategy[3n] [for[13a] all investors] is risk[5g] minimization[4n].
5. For[10n] simplification[4n], assume[9n] a Japanese[13c] investor [[who maintains[9n] a portfolio [[consisted of two types of assets, one [[paid in[10n] yen]] and the other [[paid in[10n] dollars]]]]].
6. This portfolio is supposed to balance[9n] two assets
7. to minimize[9n] risk[13c] exposure[2g].
8. Under[10n] these assumeptions[4n], the portfolio[13c] approach[9] examines the effects[4n] [of[13a] 'market[13c] volatility[1a],'] and 'market[13c] supply[2a] [of[13a] the asset' [on[13e] the FX[5a] market]].
9. These are considered to be the two underlying[7n] determinants[4n] [of[13a] the currency[13c] exchange[5a] rate[4n]].
10. For[10n] example, sudden[6a] increase[9n] [in[13a] the risk[2g] [of[13a] dollars [[resulted[9n] from[13e] higher[6a] market[13c] volatility[1a]]]]] encourages[9n] the Japanese[13c] investor to abandon the asset [[paid in[10n] dollars]]
11. and acquire the asset [[paid in[10n] yen]]
12. in order to eliminate the increased[7n] risk[5g] exposure[2a].
13. This surging[7n] demand[2g] [over[13a] the asset [[paid in[10n] yen]]] triggers[9n] yen's[13b] appreciation[4n] [against[13e] dollars].
14. On[10n] the other hand, sudden[6a] expansion[4n] [of the asset[13c] stock[2a] [[paid in[10n] yen]]] may lead[9n] to yen's[13b] depreciation[4n] [against[13e] dollars]
15. if the investor's[13b] demand[2g] [on[13e] the asset [[paid in[10n] yen]] remains[9n] unchanged[7n].
16. The portfolio[13c] approach[3n] explains[9n]
17. that the incentive[4n] [of[13a] the risk-averse[5b] investor] to maintain[9n] the initial[6a] balance[4n] [of[13a] the two assets] comparatively devalues[9n] the newly supplied[5a] asset [[paid in[10n] yen]]
18. because the asset [[paid in[10n] dollar]] becomes[9n] relatively scarce, in[10n] other word, valuable[5b], in[10n] the market.
19. The outcome[4n] [of[13a] this process[2a]] is dollars's[13b] appreciation[4n] against[10n] yen.
20. The impacts[4n] [of[13a] both the market[13c] volatility[1a] and the supply[2a] [of the asset] over[13e] the currency[13c] exchange[2a] rate[4n] are revealed through[10n] the portfolio[13c] approach[3n].
21. In[10n] contrast[4n] to the intuitive[6a] definition[2c] [[introduced in this paper]], Ogawa and Kawasaki (2007) provides a strict[6a] mathematical[13c] definition[2c] on[10n] this approach[3n].

Extended Definition: Draft 3

T. Intuitive[6a] Definition[2c] [of[13a] 'Portfolio[13c] Approach[3n],']: An Extended[7n] Definition[5c] Text

1. The portfolio[13c] approach[3n] provides a theoretical[6a] explanation[4n] for[10n] the random[6a] movement[2a] [of[13a] the foreign[6a] exchange[5a] (FX) rate[4n]],
2. which is a well-known[5b] concern[2b] [of[13a] investors].
3. This approach[3n] presupposes[9n] risk-averse[7n] investors and diversification[4n] [of[13a] the investment[2a]].

4. In[10n] other words, a postulated[7n] strategy[3n] [for[13a] all investors] is risk[13c] minimization[4n].
5. For[10n] simplification[4n], assume[9n] a Japanese[13c] investor 2 [[who maintains[9n] a portfolio [[consisted of two types [of assets[4n]], one [paid in[10n] yen] and the other [paid in[10n] dollars]]]]]].
6. This portfolio is supposed to balance[9n] two assets[4n]
7. to minimize[9n] risk[13c] exposure[2g].
8. Under[10n] these assumeptions[4n], the portfolio[13c] approach[9] examines the effects[4n] [of 'market[13c] volatility[1a],] and 'market[13c] supply[2a] [of[13a] the asset[4n], [on[13e] the FX[5a] market]]
9. These are considered to be the two underlying[7n] determinants[4n] [of[13a] the currency[13c] exchange[5a] rate[4n]].
10. For example, sudden[6a] increase[9n] [in[13a] the risk[2g] [of dollars [[resulted[9n] from[13e] higher[6a] market[13c] volatility[1a]]]]] encourages[9n] the Japanese[13c] investor to abandon the asset[4n] [[paid in[10n] dollars]]
11. and acquire the asset[4n] [[paid in[10n] yen]]
12. in order to eliminate the increased[7n] risk[5g] exposure[2a].
13. This surging[7n] demand[2g] 3 [over[13a] the asset[4n] [[paid in[10n] yen]]] triggers[9n] yen's appreciation[4n] [against[13e] dollars]. 108
14. On[10n] the other hand, sudden[6a] expansion[4n] [of[13a] the asset[13c] stock[2a] [[paid in[10n] yen]]] may lead[9n] to yen's[13b] depreciation[4n] [against[13e] dollars]
15. if the investor's[13b] demand[2g] [on[13e] the asset[4n] [[paid in[10n] yen]] remains[9n] unchanged[7n].
16. According to[10n] the explanation[9n] [[provided by the portfolio[13c] approach[3n]]], the incentive[4n] [of[13a] the risk-averse[5b] investor] to maintain[9n] the initial[6a] balance[4n] [of[13a] the two assets[4n]] comparatively devalues[9n] the newly supplied[5a] asset[4n] [[paid in[10n] yen]]
17. because the asset[4n] [[paid in[10n] dollar]] becomes[9n] relatively scarce and valuable[5b] in[10n] the market
18. The outcome[4n] [of[13a] this process] is dollars's[13b] appreciation[4n]
19. This intuitive[6a] definition[2c] suggests
20. that both market[13c] volatility[1a] and asset[13c] supply[2a] [in[13e] the market] have influences[4n] [on[13a] the FX[5a] rate[4n].]
21. Though the previous[7n] discussion[2d] is limited[5c] to the qualitative[6a] research[2a] [of[13a] the portfolio[13c] approach[3n]].
22. the quantitative[6a] analysis[2a] is possible[5g]
23. by[10n] introducing the mathematical[13c] definition[2c], such as the one [[provided in Ogawa and Kawasaki (2009)]].

Data Commentary: Draft 1

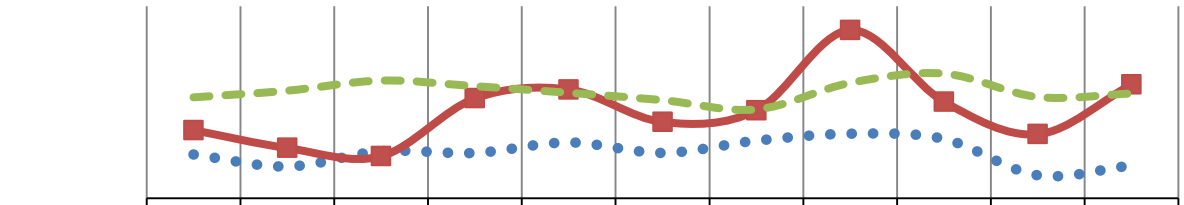
T. The Change[2a] [in[13a] the Consumer[13c] Price[13d] Index [3n] [in[13e] China]]: A Data[13c] Commentary[5d] Text

1. The recent[6a] rapid[6a] economic[13c] growth[4n] [in[13e] China] seems to have little[6a] contribution[4n] [to[13e] its economic[13c] stability[1a]].
2. A nation's[13b] robust[7n] economy[3a] is partly built
3. through decreasing[9n] the volatility[4n] [through[13e] time] [in the price[13c] level[3n] [of consumer[13c] goods[1a] and services[2a] [[purchased[9n] by[10n] households]]]].
4. This price[13c] level[3n] is referred as 'the Consumer[13c] Price[13d] Index [3n] (CPI).'

5. Figure 1 shows the comparison[4n] [of[13a] the CPI [13c,13d,6a] change[2a] [in[13e] Japan, China and Korea]].
6. As can be seen,
7. the change[2a] [in[13e] China] ranges[9n] from[10n] -0.59% to 6.63%,
8. while {the change} [in[13e] Japan] {ranges} from[10n] -1.68% to 0.7%,
9. and {the change} [in[13e] Korea] {ranges} from[10n] 2.09% to 4.14%,
10. demonstrating a more volatile [7n] change [2a] [in[13e] China [[compared[9n] with the other two]]].
11. This higher[6a] volatility[1a] [in the CPI[13c,13d,6a] change[2a]] could negatively affect[9n] Chinese[13c] domestic[6a] economy[3a] because of[10n] the upward[6a] change[2a] [[frequently triggering[9n] economic[13c] bubble[4n]] and the downward[6a] change[2a] [[sometimes suppressing[9n] economic[13c] activity[2a]]].
12. According to[10n] Reinhart and Rogoff (2009), unexpected[7n] increase[2a] [in[13e] CPI[13c,13d,6a]] are equivalent[7n] to outright[6b] default[2g]
13. for inflation[4n] [[created by[10n] the rise[2a] [in the CPI[13c,13d,6a]]] allows all debtors [[including the government]] to repay[9n] their debts in[10n] currency [[that has less purchasing[5a] power [[than it did [ii] [[when the loans[2a] were made]]]]]].
14. This domestic[6a] vulnerability[1b] leads[9n] to the recent[6n] raise[2a] [of[13a] the interest[13c] rate[3a] [by[13e] the China central[13c] bank]] [[to control[9n] inflation[4n]]].
15. However, the higher[6a] interest[13c] rate[3a] [in[13e] China] attracts[9n] more foreign[6a] capital[13c] inflow[4a]
16. accelerating[9n] the appreciation[4n] [of[13e] RBM]
17. implying[9n] negative influence[4n] [on[13e] the Chinese[13c] export[5a] industry[3a]].
18. This circumstance[3n] needs[9n] careful[6a] observation[2b]
19. because China could be dragged[9n] into[10n] a serious dilemma[4n] [over [[whether to stabilize[9n] the consumer[13c] price or protect[9n] its exports[2a]]]].

Source: Data from IMF World Economic Outlook 2010/10.

Figure 1.
The CPI Change From Previous Year (%)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	-0.49	-1.18	-0.3	-0.4	0.2	-0.4	0.3	0.7	0.4	-1.68	-1.12
China	0.9	-0.12	-0.59	2.72	3.23	1.37	2.03	6.63	2.53	0.67	3.52
Korea	2.78	3.16	3.74	3.42	3.04	2.62	2.09	3.61	4.14	2.8	3

Data Commentary: Draft 2
The Change[2a] [in[13a] the Consumer[13c] Price[13d] Index [3n] [in[13e] China]]: A Data[13c] Commentary[5d] Text

1. The recent[6a] rapid[6a] economic[13c] growth[2a] [in[13e] China] seems to have less contribution[2a] [to[13e] its economic[13c] stability[1a]] [[than expected [9n]]].
2. Robustness[4n] [in[13e] a nation's[13b] economy[3a]] is partly built
3. through decreasing[9n] the volatility[4n] [in the Consumer[13c] Price[13d] Index [3n] (CPI).
4. Figure 1 shows the comparison [4n] [of[13a] the CPI [13c,13d,3n] change[2a] [in[13e] Japan, China and Korea]].
5. As can be seen,
6. the change[2a] [in[13e] China] ranges[9n] from[10n] -0.59% to 6.63%,
7. while {the change} [in[13e] Japan] {ranges} from[10n] -1.68% to 0.7%,
8. and {the change} [in[13e] Korea] {ranges} from[10n] 2.09% to 4.14%.
9. This higher[13d] CPI[13c,13d,13c] volatility[4n] [in[13e] China] suggests
10. that Chinese[13c] economy[3a] seems to be less stable[7n] [than Japan and Korea].
11. This volatility[4n] [in the Chinese[13c] CPI[13c,13d,3a]], << >> could negatively affect[9n] its domestic[6a] economy.
12. <<causing[9n] either economic[13c] bubble[4n] or stagnation[4n],>>
13. According to[10n] Reinhart and Rogoff (2009), unexpected[7n] increase[2a] [in[13e] CPI[13c,13d,3a]] are equivalent[7n] to outright[6b] default[2g]
14. because inflation[4n] [[created by[10n] the rise[2a] [in the CPI[13c,13d,3a]]]] allows all debtors [[including the government]] to repay[9n] their debts in[10n] currency [[that has less purchasing[5a] power than it did 2 at[10n] the time [of the loan[5a] agreement[2d]]]].
15. This domestic[6a] vulnerability[1b] has urged[9n] the China central[13c] bank to raise the interest[13c] rate[3a]
16. to control[9n] potential[6a] inflation[4n] [in[13e] China].
17. However, the increased[5a] foreign[6a] capital[13c] inflow[4a] [into[13e] China] [[attracted by[10n] this higher[13d] interest[13c] rate[3a]]] could accelerate[9n] the appreciation[4n] [of [13e] RMB],
18. which negatively affects[9n] the Chinese[13c] export[5a] industry[3a]
19. This circumstance[3n] needs[9n] careful[6a] observation[2b]
20. because China could be dragged [9n] into[10n] a serious dilemma[4n] [over [[whether to stabilize[9n] the consumer[13c] price or protect[9n] its exports[2a]]]].

[Figure 1 as per Data Commentary Draft 1]

Problem-Solution: Draft 1
T. A New Framework[3n] [for[13a] Business[13c] Investment[13c] Decisions[2b]]: A Problem-Solution[2b] Text

1. When considering a firm's problem [of[10n] [[making[9n] investment[13c] decision[2b]]]],
2. the net[7n] present[6a] value[5b] (NPV) rule[2g] is widely taught in economics and business schools.
3. Much of the theoretical[13c] and empirical[13c] literature [[dealing[8n] NPV[7n,6a,5b] rule[2g]]], for[10n] example, Jorgenson (1963), proves[9n] its effectiveness[4n].
4. This NPV[7n,6a,5b] rule[2g] is based on an assumption[4n] [[that investment[2a] is reversible[5g]]].

5. According to[10n] Dixit and Pindyck (1994), however,this assumption[4n] is hardly valid[7n] in[10n] reality[1a]
6. because the expenditure[2a] [on[13e] firm[13c] or industry[13c] specific[13d] investment[2a]] usually becomes sunk[7n] cost[2a].
7. As a rapidly growing[5a] literature has shown,
8. the process[4n] [of[13e] investment[13b] decision[2b] [of[13a] the firm[13a] [[facing irreversible[5g] investment[5a] expenditure[2a] [under[13e] uncertainty[5b]]]]] is profoundly affected[9n] by[10n] the ability[2g] [[to delay[9n] the investment[2a]]], rather than the NPV[7n,6a,2b] measure[2a], due to[10n] the firm's[13b] motivation[4n] [[to obtain more information[2d] [[to decrease[9n] the uncertainty[5b]]]].
9. The previous[6a] discussion[2d] suggests
10. that those evaluations[2g] [on[13a] the effectiveness[4n] [of[13a] NPV[7n,6a,5b] rule[2g]]] are possibly inflated[9n] due to[10n] its negligence[1a] [of[13a] irreversibility[1b] [of[13a] business[13c] investments[2a]]].
11. This limit[2a] [of[13a] the NPV[7n,6a,5b] framework[3n]] can be surmounted by[10n] "the real options[5b] approach[3n] (ROA)" [[introduced in[10n] Dixit and Pindyck (1994)]].
12. This new approach[3n] considers the firm's[13c] ability[2g] [[to delay[9n] the irreversible[5g] investment[2a]]] as[10n] an "option[2b]" analogous[7n] to a financial[13c] call[13e] option[2b].
13. In [10n] other words, the firm holds the right[4n] [[to invest]] but not the obligation[4n].
14. This increased[7n] flexibility[5g] [on[13e] investment[2a]] could eventually turn[9n] the highly uncertain[6a] investment[5a] projects << >> into profitable[5g] ones [Arai, 2001].
15. <<regarded as unprofitable[5g] under[10n] the NPV[7n,6a,5b] measure[2a]>>
16. In[10n] this respect[3n], the ROA[5b,3n] reveals
17. that the intensive[6a] use[2a] [of[13a] the NPV[7n,6a,5b] rule[2g]] could sacrifice the potentially lucrative[7n] investment[5a] opportunities[2g] [of[13a] firms].
18. Despite[10n] the advantages[4n] [of[13a] the ROA[5b,3n] [over[13e] the NPV[7n,6a,5b] rule[2g]] the difficulty[1a] of[13a] [[calculating the real options[5b] value[2b]]] is a major[7n] obstacle for[10n] corporate[13c] managers [[to apply the ROA[5b,3n] on[10n] practical[5a] situation[3n] [of[13e] business[13c] decision[5b] making[9n]]]].
19. As is well-known[6a],
20. the calculation[2b] [of[13a] financial[13c] option[2b]] is deeply based[9n] on the volatility[1b] [of[13a] financial[13c] asset[13c] price[4n]].
21. Considering the analogy[4n],
22. the quantitative[13c] analyses[2a] [on[13e] the real options[2b]] also need[9n] the volatility[1b] [of[13a] the price[4n] [of real assets[4n]]].
23. However, criteria[4n] [[for[13e] evaluating[2b] real assets [13c] price [4n]]] are yet [[to be standardized[4n]]],
24. triggering[4n] inappropriate[7n] calculation[2b] [of[13a] the volatility[1b]].
25. This weakness[1a] [of[13a] the ROA[5b,3n]] can be overcome[9n]
26. through[10n] developing[9n] a standard[7n] evaluative[5b] measure[3n] on[13a] real assets price[4n].
27. The calculation[2b] [of[13a] the real options[5b] value[2b] [[based on this standard[7n] benchmark[4n]]]] enables[9n] the ROA[5b,3n] to amend the firm's[13b] investment[13c] strategy[3n] [[possibly misguided[9n] by[10n] the NPV[7n,6a,5b] measure[3n]]].

Problem-Solution: Draft 2

T. A New Framework[3n] [for[13a] Business[13c] Investment[13c] Decisions[2b]]: A Problem-Solution[2b] Text

1. When considering a firm’s problem of[13a] [[making investment[13c] decisions[2b]]],

2. the net[7n] present[6a] value[5b] (NPV) rule[2g] is widely taught in economics and business schools.
3. Much of the theoretical[6a] and empirical[6a] literature [[dealing[8n] the NPV[7n,6a,5b] rule[2g]]] such as[13e] Jorgenson (1963) 1 proves[9n] its effectiveness[4n] in[13e] [[explaining[9n] corporate[13c] investment[5a]behaviors[2e]]].
4. This NPV[7n,6a,5b] rule[2g] is based[9n] on an assumption[4n] [[that investment[2a] is reversible[5g]]].
5. According to[10n] Dixit and Pindyck (1994), however, this assumption[4n] is hardly valid[7n] in reality[1a]
6. because the expenditure[2a] [on[13e] firm[13c]- or industry[13c]-specific[13c] investment[2a]] is not reversible[5g]
7. when the investment[5a] project fails[9n].
8. As rapidly growing[5a] literature, has shown
9. the investment[13b] decision[2b] [of[13a] the firm [[facing irreversible[5g] investment[5a] expenditure[2a] [under[13e] uncertainty[5b]]]] is affected[9n] by the ability[2g] [[to delay[9n] the investment[2a]]] rather than the NPV[7n,6a,5b] measure[2a] due to[10n] the firm's[13b] motivation[4n] [[to obtain more information[2d] [[to decrease[9n] the uncertainty[1b]]]]].
10. The previous[7n] discussion[2d] suggests
11. that those evaluations[2g] [on[13a] the effectiveness[4n] [of[13a] NPV[7n,6a,5b] rule[2g]]] are possibly inflated[9n] due to[10n] its negligence[1a] [of[13a] irreversibility[1b] [of[13a] business[13c] investments[2a]]].
12. This limitation[4n] [of[13a] the NPV[7n,6a,5b] framework[3n]] can be surmounted[9n] by[10n] "the real options[5b] approach[3n] (ROA)" [[introduced in Dixit and Pindyck (1994)]].
13. This new approach[3n] considers the firm's[13c] ability[2g] [[to delay[9n] the irreversible[5g] investment[2a]]] as[13e] an "option[2b]" [[analogous[7n] to a financial[13c] call[13e] option[2b]]].
14. In[10n] other words, the firm holds the right[4n] [[to invest]] but not the obligation[4n].
15. This increased[7n] flexibility[1b] [on[13e] investment[2a]] could eventually turn[9n] the highly uncertain[6a] investment[5a] projects << >> into profitable[5g] ones [Arai, 2001].
16. <<regarded as unprofitable[5g] under[10n] the NPV[7n,6a,5b] measure[2a]>>
17. Despite[10n] the advantages[4n] [of the ROA[5b,3n] over[13e] the NPV[7n,6a,5b] rule[2g]], the difficulty[1a] [of calculating[2b] the real options[5b] value[2b]] is a major[7n] obstacle for[10n] corporate[13c] managers[2a] [[to apply the ROA[5b,3n] on[10n] practical[5a] situation[3n] [of[13e] business[13c] decision[5b] making[2a]]]].
18. As is well-known[6a],
19. the calculation[2b] [of[13a] financial[13c] option[2b]] is deeply based[9n] on the volatility[1b] [of financial[13c] asset[13c] price[4n]].
20. Considering the analogy[4n] [between[13a] the concepts[2b] [of[13a] the two options[2b]]],
21. the quantitative[13c] analyses[2a] [on[13a] the real options[2b]]] also need[9n] the volatility[1b] [of[13a] the price[4n] [of[13a] real assets[4n]]].
22. However, 2 inconsistent[7n] criteria[4n] [[for[13e] evaluating real assets[13c] price[4n]]] could lead[9n] to the inappropriate[6b] calculation[2b] [of[13a] its volatility[1b]].
23. This weakness[1a] [of[13a] the ROA[5b,3n]] can be overcome[9n]
24. by[10n] developing[9n] an evaluation[5b] standard[4n] for[10n] the real asset[13c] price[4n].
25. The calculation[2b] [of the real options[5b] value[2b] [[based[9n] on this standard[7n] benchmark[4n]]]] enables[9n] the ROA[5b,3n] to amend the firm's[13b] investment[13c] strategy[3n] [[possibly 3 overestimated[6b] by[10n] the NPV[7n,6a,5b] framework[3n]]].

Appendix 2: Student Needs Survey

STUDENT NEEDS and PLACEMENT FORM

Welcome to the EAP program! This form contains the instructions for submitting your information and pre-course writing sample for the EAP writing courses conducted by Alfredo Ferreira. The information is useful for understanding students' backgrounds, needs and interests, and for course planning.

If you would like to take this course and your registration is confirmed by the Department of Economics, please email this information to alfredo: [....] between October 18 – 21. In the **subject line of the email**, please write the short name of the course(s) you intend to take this semester, eg: Subject: Academic Writing I

In the **body of the email**, please provide the following information. You do not need to re-write each question below. Just write the number of the question, & the information (e.g. "1. Taro Suzuki… 8. Political Science…").

Feel free to email or call Alfredo […] if you would like to discuss or ask about any matter related to the course.

1. Name (*first name, family name)*

2. Name you would like to be called in class: (I tend to use 1st name unless otherwise directed)

3. Student number

4. Email address (full-function email, not just cellphone email address please)

5. Which course(s) & which day & time/period are you registered for? (example: 5: Academic Writing 1; Mon; 3rd period)

6. List names of Alfredo's courses you have already taken, if any.

7. Your major (*i.e. department e.g. Economics, Sociology, Law, etc).*

8. What program and year are you in? example: PhD *1st year;* MA *2nd year;* 5yrMA 1st year*;* BA *(undergrad) 3rd year/jr:*

9. Have you written or presented any academic, technical, business or other professional material in English? yes / no If so, please summarize briefly in 3-4 sentences

10. What, if anything, do you consider a notable achievement of yours in writing for school, university, job, research etc in any language, including your first language? Briefly describe this (e.g., the aims & results of the writing, situation, etc).

11. What challenges, if any, have you faced/do you now face writing academically (eg for school) in your first language?

12. What, if any, do you consider specific challenges that you face in writing academically in English?

13. What is your career preference, if any? eg: research/teach business government not sure other/describe

14. Explain in 3-4 sentences why you want to take this course.

15. If you have a TOEFL, IELTS or Cambridge test score: score, date: TOEFL_____, _____ IELTS____, _____

16. IF you have any other major commitments this semester (*e.g. job hunting, overseas study, challenging zemi, writing MA thesis for submission at the end of semester, major part-time job, etc*) that may interfere significantly with your ability to complete the course work satisfactorily, explain how you plan to manage the course work. If there's nothing special, ignore this question.

17. Have you already completed all the course credits you need to graduate from your program? yes or no

18. Writing sample (suggestion: write this first in Word or other program, then copy it into the email). Write 150-250 words.

TOPIC

Introduce an issue, problem or question in your academic field(s) (e.g., sociology, political science, law, economics) that is of interest to you and others in your field. The target reader for this writing is an educated specialist who understands your field. Briefly introduce the issue, and explain why the issue is interesting and/or worth studying further.

Appendix 3: Raw Quantitative Data

Student	Discipline: Economics, Humanities	Text Type	Text Type Draft #	ND mean	ND std.dev	LD mean	LD std.dev	GI	LC mean	LC std.dev
Yoshi	Econ	PC	1	4.730769	3.504942	5.07692	2.6065	2	10.34615	5.74764
Yoshi	Econ	DF	1	4.608108	3.3148134117	4.89189	3.04397	1.85	9.675676	5.6078
Yoshi	Econ	DF	2	8.571429	4.4166891288	8.571429	4.05674	1.4	15.28571	7.19821
Yoshi	Econ	DF	3	7.456522	4.6756454188	7.782609	4.51217	1.64	13.73913	7.65279
Yoshi	Econ	DC	1	7.105263	4.7772	7.842105	4.81044	1.9	13.57895	8.02299
Yoshi	Econ	DC	2	5.975	3.599982	6.75	3.65449	2	12.05	7.18532
Yoshi	Econ	PS	1	9.314815	7.637393	8.740741	5.4954	1.59	14.55556	9.26255
Yoshi	Econ	PS	2	9.56	7.771905	9.52	6.00777	1.56	15.24	9.14366
Taka	Econ	PC	1	7.027778	4.387389	6.777778	3.31761	1.29	12.9444	6.15937
Taka	Econ	DF	1	7.285714	5.703286	7.357143	3.69213	2	13.7857143	6.715 98
Taka	Econ	DF	2	5.6125	3.984726	6.125	3.44322	2	11.575	6.55113
Taka	Econ	DC	1	7.545455	5.1403	7.272727	5.23623	1.83	13.9090909	10.3097
Taka	Econ	DC	2	8.954545	5.716006	8.636364	5.90377	1.375	15.2727273	10.9553
Taka	Econ	DC	3	8.909091	5.499173	9.818182	7.20858	1.375	15.4545455	10.4725
Taka	Econ	PS	1	8.763158	8.066337	8.736842	5.8735	1.72	14.3157895	9.01882

Student	Discipline: Economics, Humanities	Text Type	Text Type Draft #	ND mean	ND std.dev	LD mean	LD std.dev	GI	LC mean	LC std.dev
Taka	Econ	PS	2	9.236842	7.890515	8.473684	4.37383	1.72	14.6842105	8.64775
Haru	Hum	PC	1	4.973684	3.466	6.263158	3.75414	1.73	12.47368	6.49246
Haru	Hum	DF	1	4.096154	3.964894	5.961538	4.96774	2.89	11.34615	9.16053
Haru	Hum	DF	2	5.409091	5.28393	7.227273	5.89537	2.44	13.68182	11.58975
Haru	Hum	DF	3	5.216667	3.532322	6.533333	4.00631	2	12.3	6.31446
Haru	Hum	DF	4	5.589286	3.832255	6.821429	3.83022	1.47	13.14286	5.99823
Haru	Hum	DC	1	7.933333	3.385192	9.8	3.16679	1.36	16.13333	5.48851
Haru	Hum	DC	2	9.1875	4.725375	10.8125	4.99624	1.23	17.5	8
Haru	Hum	PS	1	5.0625	3.930341	6.5625	3.61838	1.78	11.21875	6.27197
Haru	Hum	PS	2	5.935484	3.921611	7.548387	4.03186	1.72	12.90323	7.02545
Sotty	Hum	PC	1	4.105263	2.899133	5.684211	2.58312	1.58	11.68421	5.36503
Sotty	Hum	DF	1	5.552632	3.886925	6.157895	3.41992	1.9	13.21053	7.383
Sotty	Hum	DF	2	8.769231	4.935481	8.384615	4.50071	1.44	14.76923	7.80121
Sotty	Hum	DC	1	6.384615	4.326054	8	4.81317	1.44	16.07692	9.67351
Sotty	Hum	DC	2	6.269231	4.245661	7.846154	4.66987	1.44	15.69231	9.19587
Sotty	Hum	PS	1	8.086957	4.828072	10.04348	5.8735	1.35	17.47826	8.75873
Sotty	Hum	PS	2	8.25	4.196272	9.5	4.37383	1.2	16	7.68397