



THE HONG KONG
POLYTECHNIC UNIVERSITY

香港理工大學

Pao Yue-kong Library

包玉剛圖書館

Copyright Undertaking

This thesis is protected by copyright, with all rights reserved.

By reading and using the thesis, the reader understands and agrees to the following terms:

1. The reader will abide by the rules and legal ordinances governing copyright regarding the use of the thesis.
2. The reader will use the thesis for the purpose of research or private study only and not for distribution or further reproduction or any other purpose.
3. The reader agrees to indemnify and hold the University harmless from and against any loss, damage, cost, liability or expenses arising from copyright infringement or unauthorized usage.

IMPORTANT

If you have reasons to believe that any materials in this thesis are deemed not suitable to be distributed in this form, or a copyright owner having difficulty with the material being included in our database, please contact lbsys@polyu.edu.hk providing details. The Library will look into your claim and consider taking remedial action upon receipt of the written requests.

SCHOLARLY WRITING DEVELOPMENT: COMPLEXITY AND EVALUATION IN
TWENTIETH CENTURY LINGUISTS' SEMIOTIC TRAJECTORIES

JESÚS DAVID GUERRA LYONS

PhD

The Hong Kong Polytechnic University

2021

The Hong Kong Polytechnic University

Department of English

Scholarly Writing Development: Complexity and Evaluation in Twentieth Century Linguists'
Semiotic Trajectories

Jesús David Guerra Lyons

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of
Philosophy

August, 2020

CERTIFICATE OF ORIGINALITY

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text.

Jesús David Guerra Lyons

DEDICATION:

I dedicate this thesis as a humble tribute to my inspiring mentor, Prof. Gillian Moss.

Abstract

This thesis investigates how scholars develop as meaning makers by exploring developmental drifts and pathways in linguists' academic writing trajectories related to syntactic and lexical complexity and the use of interpersonal lexicogrammar. I adopt a complementary methods approach integrating quantitative tools with qualitative follow-up analyses of salient variation patterns. I examine developmental variation in scholarly trajectories through a cohort sequential design examining quantitative data pertaining to the target complexity and interpersonal dimensions for significant variations across two data collection points, termed "Early career" and "Late career", within three cohort groupings determined by decade of birth. I also explore developmental variation through an extended longitudinal approach, featuring a case study of a scholar's five-decade writing trajectory.

Regarding variation in complexity, early career and late career writing remain largely similar as per the statistical analysis of most complexity parameters. The complexity measures showing significant, yet subtle, diachronic differences are coordinate phrase per clause, coordinate phrase per T-unit, lexical diversity, and specialized lexical sophistication. The first two measures correspond to a developmental drift in TCL scholars' academic writing whereby late career writing involves a significant (yet subtle) increase in coordinate phrases. Analysis reveals that functional mechanism underlying this trend is paratactic extension of the coordinating type, a logicosemantic motif involving two or more elements with equal status within a clause complex or a nominal group complex (Halliday & Matthiessen, 2014, p. 559).

With regard to variation in interpersonal lexicogrammar, most interpersonal features examined show no significant differences across career periods, including the overall distribution of speech-functional moves and evaluation through probability-type modalization. Three developmental

drifts include a general decrease of evaluative statements across cohorts, a general decrease in the use of comment assessment, and cohort-specific decrease in the use of negative evaluation. TCL scholars' early career writing tends to include more frequent evaluation of propositions and entities while late career writing could be considered, in Martin and White's (2005) terms, more monoglossic.

Using a cohort sequential design (Schaie & Caskie, 2005), I studied two complementary perspectives on the modelling of registerial change: change across times of measurement (general change) and change between cohorts. The general change perspective considered three times of measurement (the 1960's, 1990's, and 2010's), showed findings coinciding with trends reported in cross-sectional linguistic studies, including densification, objectivization, and a slight decrease in lexical sophistication. The cohort variation perspective examined differences between TCL scholars grouped according to shared historical periods in their semiotic lifelines, illuminating differences in syntactic complexity, lexical complexity, and evaluative lexicogrammar. The complementarity of the perspectives is evident in the different trends identified in each (except for lexical complexity measures, which are significant in both perspectives).

Key words: academic registers, complexity, cohort sequential design, evaluative lexicogrammar, longitudinal case study, scholarly language development

Acknowledgments

This is a brief but heartfelt note of acknowledgement to all the persons and agencies who, in different ways, contributed to the completion of my doctoral program.

I am greatly indebted to all my professors at the Department of English for sharing their wisdom and passion for research.

Christian, my Chief Supervisor, was a source of thought-provoking feedback and encouragement all along. Only by standing on the shoulders of a gentle giant like him can one dare to try out new ideas with confidence that they will be listened to with interest and expanded in fortunate directions. And his impeccable humor went a long way in lightening up even the toughest days!

Dr. Marvin Lam's thoughtful input as my Co-Supervisor during the initial planning stage was of great value in getting the project running.

Dr. Dennis Tay patiently replied to my doubts on statistics and brought to my attention the value of quantitative analysis in addressing the issues targeted by my project. His initial guidance and his chairing of the Methodology Critique Society gave me the courage to use statistics in my project (although, of course, I am responsible for any mistakes in the final product).

Prof. Hu Guangwei was a most supportive and caring mentor during my teaching assistantship in his illuminating course on language learning theories. He also kindly accepted to chair my Board of Examiners in the middle of a very busy semester.

Prof. Douglas Biber and Prof. Jonathan Webster generously reviewed my work in their role as external examiners, making thought-provoking comments on the initial thesis draft and suggesting interesting ways in which my work could be expanded.

During my attachment at University of California-Santa Barbara, I was fortunate to count on Prof. Charles Bazerman's perceptive advice and to participate in two of his fascinating courses on language development and sociocultural theory.

I was also quite lucky to share this journey with a group of kind, supportive and industrious program mates whose research and life stories was a constant source of admiration. I am specially obliged to Steven Wong, for his spiritual guidance and valuable help during my stay in Hong Kong.

At the institutional level, my gratitude goes to The Hong Kong Polytechnic University for providing the human, financial, and material resources for conducting my work. I am also grateful to Universidad del Norte (Colombia) and to Fundación COLFUTURO for offering financial assistance and institutional support.

Fue siempre para mí un gran motivo de felicidad el contar en la distancia con el cariño y apoyo de mis padres, hermanos, sobrinos, familiares, amigos y colegas. Mis padres, Fermín y Nazly, mis hermanos, Felipe y Víctor, y una persona especial me acompañaron cada día y me dieron la fuerza para perseverar. A ellos y a todos en Colombia, mi infinita gratitud.

TABLE OF CONTENTS

Section	Page
1. Chapter 1: Introduction	
1.1. Purpose	1
1.2. Why scholarly language development?	1
1.3. Background	4
1.4. Research questions	7
1.5. Methodological outline	8
1.6. Contribution	9
1.7. Chapter structure	12
2. Chapter II: Theoretical Framework	
2.1. Part I: On the study of scholarly language development	14
2.1.1. Introspection-based research	15
2.1.2. Language-based research	17
2.1.2.1. Historical change in academic registers	17
2.1.2.2. Apprenticeship into academia	19
2.1.2.3. Language change in non-instructional contexts	21
2.1.2.4. Systemic Functional Linguistics and scholarly language development	25
2.1.3. Summary	26
2.2. Part II: Towards systemic functional comprehension of scholarly writing development	28
2.2.1. Axis	28
2.2.2. Stratification	29
2.2.3. Metafunction	32
2.2.4. Instantiation	35
2.2.5. Semogenesis	37
2.2.6. Summary	39
2.3. Part III: Situating scholarly language development in a lifelong perspective	41
2.3.1. From early childhood to scholarly apprenticeship	42
2.3.2. Scholarly writing: the end of the developmental journey?	51
2.3.3. Summary	60

3. Chapter III: Methodology	62
3.1. Research paradigm	62
3.2. Modelling developmental language variation	67
3.2.1. The cohort sequential design	73
3.2.1.1. The Twentieth Century Linguists (TCL) corpus	75
3.2.2. The longitudinal case study design	78
3.3. Data analysis	79
3.3.1. Nonparametric mixed factorial model with <i>nparLD</i>	80
3.4. Summary	87
4. Chapter IV: Complexity and ideational lexicogrammar in early and late career writing	91
4.1. The main study: exploring complexity variation in the TCL corpus	91
4.1.1. Complexity measures	95
4.1.2. Procedure	100
4.1.3. Findings	102
4.2. Follow-up studies	111
4.2.1. Coordination in early and late career writing	112
4.2.1.1. Procedure	112
4.2.1.2. Findings	113
4.2.2. The functional mechanisms of lexical diversity	119
4.2.2.1. Procedure	120
4.2.2.2. Findings	121
4.2.3. Specialized lexical sophistication	128
4.2.3.1. Procedure	129
4.2.3.2. Findings	130
4.3. Conclusion	136
5. Chapter V: Interpersonal lexicogrammar in early and late career writing	139
5.1. A stratified model of evaluation	139
5.1.1. Evaluation in context	140
5.1.2. Evaluation in semantics	141
5.1.3. Evaluation in lexicogrammar	144

5.2. The main study: evaluative lexicogrammar in early and late career writing	148
5.2.1. Procedure	151
5.2.2. Findings	155
5.3. Follow-up studies	161
5.3.1. Comment assessment	161
5.3.1.1. Procedure	165
5.3.1.2. Findings	168
5.3.2. Appreciation	173
5.3.2.1. Procedure	176
5.3.2.2. Findings	176
5.4. Conclusion	184
6. Chapter VI: Registerial change and scholarly language development	186
6.1. Language change in academic registers	186
6.2. General diachronic change in the TCL corpus	189
6.2.1. Procedure	192
6.2.2. Findings	193
6.3. Cohort variation in the TCL corpus	200
6.3.1. Procedure	202
6.3.2. Findings	202
6.4. Conclusion	209
7. Chapter VII: A language-based case study	212
7.1. Why a case study?	212
7.2. M.A.K. Halliday	215
7.3. Complexity in Halliday's trajectory	227
7.3.1. Procedure	228
7.3.2. Findings	230
7.4. Evaluative lexicogrammar in Halliday's writing trajectory	241
7.4.1. Procedure	242
7.4.2. Findings	245
7.5. Conclusion	260
8. Chapter VIII: Conclusion	262
8.1. Summary of major findings	262
8.1.1. The nature of scholarly language development	263

8.1.2. Syntactic and lexical complexity throughout scholarly trajectories	265
8.1.3. Evaluative lexicogrammar throughout scholarly trajectories	266
8.1.4. Scholarly language development and registerial change	267
8.2. Implications	268
8.2.1. Theoretical implications	268
8.2.2. Methodological implications	270
8.3. Limitations of the study	273
8.4. Recommendations for further research	275
9. Appendixes	276
10. References	316

List of figures

Section	Page
 Chapter II: Theoretical Framework	
Figure 2.1: Cycles in ontogenesis, from Rose <i>et al.</i> (1992)	41
Figure 2.2. Doctoral graduate career pathways (from The Royal Society, 2010)	51
 3. Chapter III: Methodology	
Figure 3.1. Longitudinal and cross-sectional designs, adapted from Schrauf (2009, p. 247)	70
Figure 3.2. Cohort sequential and cross-sequential studies, in Schrauf (2009, p. 250)	71
Figure 3.3. Structure of the Twentieth Century Linguists Corpus	78
Figure 3.4. Data frame for nonparametric mixed factorial model	82
Figure 3.5. <i>nparLD</i> model output, section 1	82
Figure 3.6. Relative Treatment Effects from <i>nparLD</i> model output	82
Figure 3.7. Relative Treatment Effects plot from <i>nparLD</i>	85
Figure 3.8. ANOVA and Wald Test statistic from <i>nparLD</i> model	85
Figure 3.9. Cohort-specific diachronic effects and pairwise comparisons in <i>nparLD</i>	86
 4. Chapter IV: Complexity and ideational lexicogrammar in early and late career writing	
Figure 4.1. Mean T-Unit length in early career (EC) and late career (LC) writing.	104
Figure 4.2. Coordinate Phrase per T-unit in early career (EC) and late career (LC).	105
Figure 4.3. Lexical diversity (MSTTR) in early career (EC) and late career (LC) writing	105
Figure 4.4. Cross-sectional diachronic variation in complexity measures	110
Figure 4.5. Annotation scheme for corpus of randomly selected <i>and</i> -instances	113
Figure 4.6. Right-adjacent collocates for <i>and</i> in the TCL corpus, early career (EC) and late career	114
Figure 4.7. Inverse correlation between mean Lexical Diversity and mean RCL	122
Figure 4.8. Median keyness values per word class in the TCL corpus	131
Figure 4.9. Keyness for non-technical and technical terms in the TCL corpus	132
Figure 4.10. Top 30 key terms in TCL late career (aggregate values)	133

Figure 4.11. Community” construed in Labov’s early career corpus	134
Figure 4.12. “Community” construed in Labov’s late career corpus	135
5. Chapter V: Interpersonal lexicogrammar in early and late career writing	
Figure 5.1. Cohort effects in normalized command frequencies.	157
Figure 5.2. Cohort effects in normalized general evaluation	158
Figure 5.3. Cohort-specific effects for comment assessment	159
Figure 5.4. System of comment Adjuncts (from Halliday & Matthiessen, 2014, p. 190)	163
Figure 5.5. Cohort-specific effects for qualified speech-functional assessment	169
Figure 5.6. Mosaic plot showing association between appreciation type and polarity	182
6. Chapter VI: Registerial change and scholarly language development	
Figure 6.1. General change (blue line) and cohort variation (white line) in the TCL corpus	204
Figure 6.2. Diachronic variation in comment assessment in the TCL corpus	204
Figure 6.3. Diachronic variation in Ure-type lexical density the TCL corpus	205
Figure 6.4. Diachronic variation in Lexical Sophistication in the TCL corpus	206
Figure 6.5. Diachronic variation in Lexical Diversity in the TCL corpus	
Figure 6.6. Cohort differences in Dependent Clause per T/Unit	201
Figure 6.7. Cohort differences in Lexical Sophistication	202
Figure 6.8. Cohort differences in Lexical Diversity	209
Figure 6.9. Cohort differences in qualificative assessment	
7. Chapter VII: A language-based case study	
Figure 7.1. Length-based measures in Halliday’s writing trajectory	231
Figure 7.2. Syntactic complexity measures in Halliday’s writing trajectory	232
Figure 7.3. Lexical complexity measures in Halliday’s writing trajectory	237
Figure 7.4. Modality in Halliday’s trajectory (normalized= 1.000 words)	245
Figure 7.5. Comment Assessment in Halliday’s trajectory (normalized= 1.000 words)	248
Figure 7.6. Pronominal self-reference in Halliday’s trajectory (normalized= 1.000 words)	250
Figure 7.7. Unfolding of propositions and proposals in Halliday (1963)	254
Figure 7.8. Unfolding of assessment types in Halliday (1996)	256
Figure 7.9. Unfolding of propositions and proposals in Halliday (1996)	258
Figure 7.10. Unfolding of polar and probability assessment in Halliday (1996)	259

List of tables

Section	Page
 Chapter II: Theoretical Framework	
Table 2.1: Comparison of complexity measures in Applied Linguistics master's degree dissertations and journal papers (based on Liu, 2018)	49
 3. Chapter III: Methodology	
Table 3.1. Numeric variables associated to each research question	84
Table 3.2. nparLD model chart (example)	87
Table 3.3. Overview of data analysis techniques	89
 4. Chapter IV: Complexity and ideational lexicogrammar in early and late career writing	
Table 4.1. Biber et al.'s (2011) proposed complexity development sequence	94
Table 4.2. Normality, skewness, and kurtosis tests for selected complexity measures	101
Table 4.3. Median scores for early and late career complexity measures	103
Table 4.4. Nonparametric mixed factorial model for complexity measures	103
Table 4.5. Taxis and logicosemantic relations at the clause rank (based on Halliday & Matthiessen, 2014, p. 475)	107
Table 4.6. Mean and standard deviation values for conjunctions <i>and</i> , <i>or</i> and <i>but</i> in the TCL corpus	114
Table 4.7. Early and late career frequencies in <i>and</i> -complex types in the TCL corpus	117
Table 4.8. Spearman's correlations between lexical diversity and TAACO cohesion measures	121
Table 4.9. Wilcoxon's signed-ranked tests for cohesion and word class diversity measures	123
Table 4.10. Comparative analysis of excerpts with low and high lexical diversity	124
Table 4.11. Normalized frequencies of TCL key terms in early (EC) and late (LC) career classified by word class and technicality	130
 5. Chapter V: Interpersonal lexicogrammar in early and late career writing	
Table 5.1. Median values for interpersonal lexicogrammatical variables in early and late career TCL corpus	155

Table 5.2. Mixed factorial nparLD model for interpersonal lexicogrammar variables	156
Table 5.3. Lexicogrammatical realization of comment assessment domains (based on Halliday & Matthiessen, 2014, Chapter 10)	165
Table 5.4. F1-LD-F1 model for comment assessment types	168
Table 5.5. Median and IQR values for TCL early and late career appreciation parameters	177
Table 5.6. Nonparametric mixed factorial model for appreciation parameters	177
Table 5.7. Log-linear model for appreciation type, polarity and scope.	181
6. Chapter VI: Registerial change and scholarly language development	
Table 6.1. Median frequency and Kruskal-Wallis statistics for interpersonal variables	193
Table 6.2. Median frequency and Kruskal-Wallis statistics for syntactic and lexical complexity variables	193
Table 6.3. Post-hoc pairwise comparison p-values.	194
Table 6.4. Nonparametric longitudinal model with significant cohort effects and cohort contrasts	203
7. Chapter VII: A language-based case study	
Table 7.1. Early and late career median values for complexity and evaluation features in the TCL corpus and Halliday's sub-corpus	214
Table 7.2. LOGICOSEMANTIC RELATION and TAXIS (Based on Halliday & Matthiessen, 2014, Ch. 7)	229
Table 7.3. Ideational meaning in introductions in Halliday (1963) and Halliday (1996) (Normalized to 100 clauses)	235
Table 7.4. Evaluative resources explored in Halliday corpus (based on Halliday & Matthiessen, 2014, Ch. 4, 10)	244
Table 7.5. Interpersonal meaning in Halliday (1963) and Halliday (1996) (Normalized to 1000 clauses)	254

List of appendixes

Section	Page
3. Methodology	
Appendix 3.1. Scholars in the Twentieth Century Linguist Corpus	276
Appendix 3.2. Twentieth Century Linguists Corpus composition	278
4. Chapter IV: Complexity and ideational lexicogrammar in early and late career writing	
Appendix 4.1.1 : Early career complexity scores	278
Appendix 4.1.2. Early career complexity scores	280
Appendix 4.2. Coordinating preposition counts in TCL corpus (normalized 1000)	282
Appendix 4.3. Lexical cohesion measures in TCL corpus	284
Appendix 4.4. Technical and non-technical terms in the TCL corpus	286
5. Chapter V: Interpersonal lexicogrammar in early and late career writing	
Appendix 5.1. Round 1 analysis of evaluative lexicogrammar	289
Appendix 5.2. Round 2 analysis of evaluative lexicogrammar	295
Appendix 5.3. Comment assessment analysis sample	298
Appendix 5.4. Appreciation analysis sample	306
7. Chapter VII: A language-based case study	
Appendix 7.1. Papers in Halliday text archive	314

CHAPTER I: INTRODUCTION

This chapter introduces the objectives, concepts and methodological strategies orienting the present thesis by stating its purpose, offering a preview of related prior research, introducing the target research questions, and anticipating some of the theoretical and methodological contributions made.

1.1. Purpose

This thesis investigates how scholars develop as meaning-makers by exploring changes in linguists' academic writing throughout their scholarly trajectories, being one of the few sources to approach scholars as developing beings whose language, like that of other meaners, changes throughout life. It provides systematic evidence of changes in scholars' writing across a range of dimensions, including the construction of specialized theories and the interpersonal enactment of evaluative stances reflecting scholarly identities. Through the theoretical tools of Systemic Functional Linguistics, it reflects on the specificities of scholarly language development and advances the proposal that scholars' linguistic repertoires expand through subtle adaptations reflected as drifts and pathways in the linguistic features of academic registers. It considers the methodological challenges inherent to the study of scholarly language development and articulates an innovative approach to address them, combining a diachronic contrast of early and late career writing by a community of scholars with longitudinal exploration of a single scholars' writing trajectory. The global purpose is to foreground the theoretical, methodological and empirical dimensions of scholarly language development as an object of study, bringing to the fore scholars' processual nature as beings in permanent construction.

1.2. Why scholarly language development?

There are important insights to be gained from a developmental perspective on academic writing along scholarly trajectories. The predominantly synchronic approach to the

study of academic registers, with its interest in essential and unchanging features, has sidestepped the treatment of scholarly trajectories as the continuation of language development. While a long tradition of developmentally oriented research on writer's trajectories exists in literary contexts (Clemen, 1977; Frischer, 1991; Forsyth, 1999; Stamou, 2005; Bruster & Smith, 2016; Evans, 2018), academic writing research seems content with the thus far unchallenged assumption that writing experiences no change within scholars' lifetimes. Research within sociological or ethnographic traditions does recognize a developmental dimension in scholarly trajectories, reflected mainly in introspective studies reconstructing writers' biographies under the themes of identity construction and academic socialization (Berkenkotter *et al.*, 1991; Belcher & Connor, 2001; Cassanave & Vandrick, 2003; Bronson, 2004). One problem with these studies is that they feature little or no metalinguistic reflection, constituting what Bazerman (2017, p. 3) calls "after-the-fact reconstructions" constrained by the limitations of subjective memory. An adequate and comprehensive account of academic registers necessitates a developmental perspective capable of illuminating the ways in which scholars' linguistic repertoires adapt in their passage through academia.

The study of scholarly language trajectories offers opportunities to rethink received conceptions of language development. The open-ended nature of scholarly trajectories prevents the temptation of measuring development against predefined goals and makes it necessary to focus on the changes actually taking place over time. Because scholars are, by definition, advanced language users, it makes little sense to conceive of their development as progression towards a standard of linguistic advancedness within the "more and better" conception criticized by Ortega and Byrnes (2008). The particularities of scholarly trajectories push the researcher to challenge these commonplaces and to rethink language development as a lifelong expansion of personalized meaning potentials (c.f. Halliday, 1978;

Matthiessen, 2009). Most importantly, studying scholars' development can substantiate the widely accepted premise that language development is a lifelong endeavor (Halliday, 1975, 1984, 1993; Lukin & Williams, 2008; Ortega & Byrnes, 2008; Bazerman *et al.*, 2017). Supporting this claim requires exploring developmental language variation outside the traditional context of language instruction, the exclusive focus on which has nurtured the now revisited view of development as conformity with some predefined program. Engaging with language development beyond instructional contexts can wash back onto our understanding of development as a phenomenal realm, generating descriptive principles applicable across other stages of learners' lives.

Understanding scholarly language development can also enrich the rationale and praxis of advanced literacy instruction. Knowledge that scholarly trajectories are a continuation of literacy development should inform academic socialization by making it clear that linguistic "scholarliness" is a quality under constant development. Perceptions of scholarly writing as a standard to be reached by a definitive point can affect graduate students' perceived self-efficacy and writing anxiety (Masche, 2013; Huerta *et al.*, 2017). Raising pre-service scholars' awareness of the dynamic construction of linguistic scholarliness can amount to more organic and contextualized formative experiences. Advanced literacy instruction can also benefit from research illuminating differential strategies employed as scholars garner experience within disciplinary fields, including the strategies characterizing early and late career scholars in the discipline and the linguistic adaptations emerging over cycles of theorization. Such forms of knowledge would be a valuable complement to the largely prescriptive body of guides for pre-service and in-service scholars available (see Gray(1999) for an example of such prescriptive work).

The potential contributions from the study of scholarly language development make this relatively unexplored field an interesting and productive area of enquiry. This thesis

advances theoretical and methodological proposals geared towards expanding its comprehension and informing future inquiry.

1.3. Background

Different traditions bearing direct or indirect relevance to the understanding of scholarly language development fall within the broad categories of (i) introspection-based and (ii) language-based inquiry. (i) Introspection-based studies reconstruct scholarly trajectories through autobiographical or biographical accounts based on personal narratives, interviews and the analysis of documentary artifacts (Berkenkotter *et al.*, 1991; Belcher & Connor, 2001; Casanave & Vandrick, 2003; Bronson, 2004). Their aim is to produce rich narratives of individual trajectories by eliciting the meanings participants attach to key transitions and events. A central principle is that academic writing is a socially situated activity occurring throughout unique individual trajectories needing to be studied in their own right, with common themes being the building of scholarly identities and gaining a space within disciplinary fellowships (Casanave, 1992; Dressen-Hammouda, 2008). A recurring limitation is the low level of metalinguistic reflection on changing linguistic traits in the narratives, which prevents the study of language variation throughout scholars' semiotic paths.

(ii) Language-based studies can be subcategorized as synchronic or diachronic, depending on whether they incorporate a time dimension. Synchronic studies examine salient features of scholar's writing to illuminate the workings of a linguistic resource, or to characterize a scholar's style in general terms (de Beaugrande, 1998, 2000; Hoey, 2000; Caffarel, 2018). Although these studies show that scholars can develop characteristic strategies, the lack of a time dimension fails to bring out how these strategies emerge over time. Three research strands have undertaken lifelong studies of adult language change in non-academic contexts: literary stylistics (including "stylochronology") (Forsyth, 1999;

Stamou, 2005), authorship attribution (Coulthard, 2004; Mollin, 2009), and lifespan development research (Sankoff & Blondeau, 2007). Their methodological approaches are generally quantitative, varying from frequency counts to more sophisticated methods involving machine learning and pattern recognition. Evidence for diachronic patterns in writers' trajectories is mixed, with some studies successfully running automatic periodization tasks and others failing to achieve this aim (Stamou, 2007). In lifespan development research, certain forms of linguistic decline have been found to follow consistent patterns, especially concerning lexical diversity and syntactic complexity (Kemper, 1987; Lindsay & Gaskell, 2012). One difficulty in relating these research traditions to the study of scholarly language development is the distinct nature of academic writing as a set of registers oriented to the construction of scientific knowledge. The more socially regulated nature of academic registers makes strong developmental hypotheses less sustainable, although general drifts in scholars' language use within disciplines may exist, as investigated for linguistics in this thesis.

Also important are diachronic studies of language change occurring, as it were, 'around' scholarly trajectories, in the phylogenetic and ontogenetic timeframes. In the phylogenetic timeframe, historical change in scientific prose during the 20th century is likely to be reflected in the semiotic trajectories of scholars during this period (Seoane & Loureiro-Porto, 2005; Banks, 2017; Bondi & Cavalieri, 2012). The relationship between historical and individual language change has, however, been shown to be complex, with individual trends not necessarily reflecting global trends (Nevalainen *et al.*, 2011; Raumolin-Brunberg & Aria, 2011; Brook *et al.*, 2018). In the ontogenetic timeframe, formative transitions prior to scholarly practice also deserve attention. Research on pre-service scholars' writing has shown graduate education to be a watershed for the construction of scholarly identities and the expansion of academic registerial repertoires (Habibie, 2015; Liu, 2018; Cheung, 2018).

Research within the complexity framework has identified developmental trends which may continue through scholars' writing trajectories (Norris & Ortega, 2009; Biber *et al.*, 2011). Relating scholar's language development to historical trends and connecting it with prior developmental cycles are both important aspects of a more integral approach to the study of scholarly language development.

Inquiry on scholarly linguistic development requires a linguistic theory capable of explaining variations in language use as adaptations of meaning-making capacities across institutional contexts. Some of the few studies with an explicit focus on scholarly language development use Systemic Functional Linguistics (SFL) as a guiding framework (Montemayor-Borsinger, 2001, 2002, 2008). The studies show significant contrasts in physics scholars' early and late career writing affecting the nature of Subjects and their thematic position in the clause, providing evidence of diachronic variability in scholarly trajectories. Studies along the same line, exploring development in disciplines with horizontal or mixed knowledge structures, can illuminate developmental differences across disciplines.

The disperse body of literature reviewed converges on the dynamic nature of language use throughout individuals' semiotic lifelines. Most studies surveyed either do not deal with language data, or investigate change in non-academic contexts, with scarce empirical and theoretical treatment of scholarly language development. The present thesis tackles these gaps by undertaking a systematic study of linguistic change in the scholarly trajectories in the field of linguistics. Linguistics is a critical disciplinary context for investigating scholarly language development given the major developments in this science during the twentieth century, leading to the emergence of theoretical traditions shaped by pioneering scholars and further advanced by generations of linguists (Seuren, 1998). The central question is whether general drifts in linguistic variation have characterized the writing trajectories of scholars within this discipline since the second half of the twentieth century. In addressing this issue,

this thesis provides theoretical and methodological models for the study of scholarly language development, guided by a core set of research questions.

1.4. Research questions

The main research question guiding this thesis is **What linguistic variation patterns characterize scholarly language development in the field of linguistics?** As the question suggests, the purpose of the studies is essentially descriptive: the focus is placed on the diachronic patterning of linguistic features and its underlying functional implications. I focus on intra-registerial variation, that is, global variation in meanings and lexicogrammatical resources within a common set of academic registers over time. Delimitation within the field of linguistics makes explicit the assumption that variation patterns are discipline specific, which implies that no intention exists of generalizing findings across other fields. The research questions below elaborate on the general research question:

- (1) What is the nature of scholarly language development within a conception of language as a social semiotic? [Theoretical focus]
- (2) How can the challenges in the study of linguistic variation within scholarly trajectories be methodologically addressed? [Methodological focus]
- (3) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication? [Empirical: Focus on complexity/ideation]
- (4) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities? [Empirical: interpersonal focus]
- (5) What is the relationship between language change within linguistics scholars' trajectories and global change in academic registers? [Empirical: focus on diachronic relations]

As the glosses in brackets indicate, each question has a distinct focus. RQ1 seeks to situate scholarly language development within a broader understanding of language as a meaning-making system and of development as the expansion of semiotic repertoires (e.g. Halliday, 1993; Matthiessen, 2009). I use Systemic Functional Linguistics as a theoretical framework to address this question because of its multiperspectival conception of language as a social semiotic (Halliday & Matthiessen, 2014). The methodological focus of RQ2 is justified by the specific nature of the methodological problems posed by the study scholarly language development. RQ's 3, 4 and 5 reflect the knowledge gaps that need to be addressed through systematic engagement with language data, referring to the ideational and interpersonal linguistic dimensions and to the interaction between developmental and global diachronic change patterns.

1.5. Methodological outline

This thesis follows a complementary methods¹ approach integrating quantitative tools with qualitative follow-up analyses of salient variation patterns. I examine research questions 3, 4 and 5 through a contrastive approach (Leech *et al.*, 2009) in which I test quantitative data pertaining to the target ideational and interpersonal dimensions for significant variations across two data collection points, termed “Early career” and “Late career”. The language data in this approach comes from the purpose-built Twentieth Century Linguists Corpus (see Chapter III), a collection of early and late career written works by 75 renowned linguists, totaling 2.132.034 tokens. I also explore research questions 3 and 4 through an extended longitudinal approach (Ortega & Byrnes, 2008), featuring a case study of M.A.K. Halliday's five-decade writing trajectory. Research question 3 is based on automatically extractable features, including syntactic complexity, lexical density, lexical sophistication and unit

¹The term “complementary methods” is preferred here over the more traditional denomination “mixed methods” to highlight the complementarity between quantitative and qualitative research. “Mixed methods” implicitly entails that these types of research are incommensurate. (Matthiessen, personal communication, May 9 2020)

length. Research question 4 data is based on manual analysis of a range of lexicogrammatical features associated to the evaluation of propositions and entities, drawing on Halliday and Matthiessen (2014, Ch. 4) and on Martin and White (2005). The longitudinal approach allows studying the entire unfolding of linguistic features over a scholars' trajectory in order to characterize extended diachronic patterns (e.g. steady increases/decreases, fluctuations, constants).

In both the contrastive and extended longitudinal approaches, I perform follow-up studies to elaborate on variables with significant quantitative variation. For example, after contrasting early and late career complexity features for RQ3, I conducted a follow-up qualitative study on parataxis within nominal groups which illuminates the underlying functional mechanisms that make this variable a significant site of adaptation in scholarly trajectories. Using qualitative follow-up studies to elaborate on the functional mechanisms underlying variables with statistically significant variation ensures focused exploration of significant patterns while avoiding undue attention to superfluous data. Also important is exploring the relationship between general trends in the evolution of academic registers, which this thesis shows to differ from those observed in scholarly development. This thesis yields additional insights into the fact that individual and community language change, though inextricably linked, can differ from one another given generational differences in exposure to and uptake of linguistic innovations.

1.6. Contribution

This multivariate mixed-methods study of language change throughout linguists' scholarly trajectories makes important contributions to research on language development, the construction of knowledge within disciplines, and the linguistic enactment of values within the institutional context of academia. Language development research has more recently recognized the importance of a lifelong perspective and has paid increasing attention

to pre-service scholars' appropriation of academic semiotic tools (Lukin & Williams, 2008; Ortega & Byrnes, 2008). This study is the only of its kind to undertake a comprehensive study of diachronic variation for scholars' academic writing in a social science discipline. Given the scarcity of literature on scholars' linguistic development, the research reported in this thesis offers original insights into relevant theoretical and methodological problems and provides a systematic and rich body of empirical evidence illuminating key aspects of the issue at hand.

The main empirical contribution lies in the identification of variables showing significant change in linguists' scholarly trajectories and those having a relatively stable unfolding. Findings concerning the change or stability of a variety of linguistic traits along scholarly trajectories are of prime importance in making sense of how scholars use language to construct knowledge throughout their lives. They flesh out the claim that language develops continuously and reveal the areas where strategic adaptations are most at risk, and those with a stable contribution to scholarly semiosis. Likewise, the exploration of functional mechanisms underlying variables most at risk of experiencing developmental adaptations expands on the cumulative body of evidence on the relationship between language features (such as grammatical metaphor, technicality and abstraction) and various semogenic strategies throughout life (Schleppegrell & Colombi, 2002; Painter *et al.*, 2007; Christie & Derewianka, 2008). This study innovates by systematically exploring the connection between linguistic traits broadly termed "complexity measures" (Norris & Ortega, 2009; Bulté & Housen, 2014) and the realization of ideational meaning in academic registers. In doing so, it exploits the informative power of automatically extractable features with the explanatory power of functional categories, thus providing an extensive and deep account of language change processes.

The longitudinal case study of an individual scholars' writing trajectory is another major contribution with no precedents in the literature. Investigating language change in five decades of a scholar's instantiation of academic registers offers unprecedented opportunities for understanding the transformations experienced as scholars appropriate academic registers for advancing their epistemological agendas and adjusting their discursive personae in their passage through academia.

Methodological contributions are also worth highlighting. The scarcity of research on scholarly language development implies that little methodological reflection has gone into addressing domain-specific challenges, like defining an adequate timeframe for data collection, accounting for global registerial change, and ensuring comparative validity. An innovative solution in this thesis has been to adapt two methods available for the study of general language change for the study of within-subjects language change, as summarized in the methodological outline above. By implementing both approaches, this study demonstrates the benefits of combining a contrastive study of language use by a community in two data collection points with the extended longitudinal study of individual language users. The benefits include the possibility of identifying general drifts in variation (a conception differing from that of 'developmental sequences' in language acquisition research) together with individually contextualized pathways. The inclusion of open access automatic measures also promotes a replicable and low cost approach to the study of linguistic variation that could be taken up in the study of developmental language variation in other contexts, including educational, clinical and literary studies of community and individual language change.

In sum, this thesis makes original and valuable contributions towards an empirically based understanding of scholarly language development, engaging with current theoretical discussions and addressing domain-specific methodological challenges.

1.7. Chapter structure

This thesis is divided into eight chapters, each making specific contributions in connection with the purposes and research questions above. Chapter II, “Theoretical framework” surveys the available body of empirical and theoretical work relevant to the issue at hand and advances a conception of scholarly development as expansion of registerial repertoires based on Systemic Functional Linguistics. The first part of the chapter features a survey of relevant literature by grouping studies into the categories “language-based” and “introspection-based” and elaborating the former into more delicate subcategories. The second part situates scholarly language development within the larger ontogenetic timeline and discusses some of its particularities. The third part examines scholarly development as elaboration through the systemic dimensions of axis, stratification, metafunction, instantiation and semogenesis.

Chapter III presents the proposed methodological framework for the study of scholarly language development, beginning with a discussion of the special challenges in pursuing language-based developmental enquiry and continuing with the description of the two research designs illustrated in this thesis: the cohort sequential design and the longitudinal case study design. The cohort sequential design involves comparing linguistic data for a population of scholars and determining the significance of change through statistical tests. I describe the primary data for the construction of the Twentieth Century Linguists corpus, which includes early and late career writing samples from 75 renowned linguists. The longitudinal case study design examines linguistic data for an individual’s entire writing trajectory and seeks to identify and explain fluctuations through follow-up analysis.

Chapters IV through VI contain the more empirically oriented sections of the thesis. Chapter IV, “Complexity and ideational lexicogrammar in early and late career writing”,

addresses Research Question 3 by studying variation in complexity measures in the Twentieth Century Linguists corpus and conducting follow-up studies of significant variations through five follow-up studies drawing on experiential and logical aspects of English ideational grammar. Chapter V, “Interpersonal lexicogrammar in early and late career writing”, illustrates a similar strategy, but focusing on the interpersonal component of Research Question 4. The theoretical section of the chapter explores continuities between the system of MODAL ASSESSMENT and Martin and White’s (2005) system of APPRAISAL, interpreting both as lexicogrammatical systems realizing evaluative strategies resonating with the contextual dimension of valuation. Chapter VI, “Registerial change and scholarly language development”, studies trends in linguistics academic registers from the perspectives of complexity and valuation, and reasons about their correspondences and divergences with the changes observed within linguists’ writing trajectories.

Chapter VII, “A case study of scholarly language development” adopts a longitudinal case study design by investigating variation throughout the five-decade scholarly trajectory of MA.K. Halliday. The first methodological strategy involves applying the automatic complexity indexes introduced in Chapter V and performing follow-up studies on selected text extracts. The second strategy involves contrasting two selected papers and following up with longitudinal corpus analysis of key lexicogrammatical features.

The final chapter, Chapter VIII (“Conclusions”, summarizes key findings, reasons about their significance in the light of the theoretical considerations advanced in Chapter II, addresses their limitations, and proposes further avenues of enquiry.

CHAPTER II: THEORETICAL FRAMEWORK

This chapter explores the nature of scholarly language development from a social semiotic perspective, in response to RQ1 (“What is the nature of scholarly language development within a conception of language as a social semiotic?”). It approaches the question from the vantage point of relevant theories and prior studies, while Chapters IV, V and VI approaches it empirically, based on corpus data. .

The chapter is composed of three main sections. The first section (Section 2.1) provides an overview of pertinent studies, drawing on the initial distinction between introspective and language-based research. The second section (Section 2.2) examines scholarly language development through the lens of four systemic dimensions of language recognized in SFL: Axis, Stratification, Metafunction, and Instantiation. The third section (Section 2.3) reflects on the ontogenetic relationship between scholarly language development and prior developmental cycles, reasoning about it through the concept of registerial repertoire expansion, and discussing the nature of the pressures driving this process.

This chapter provides an overarching framework for the interpretation of findings in subsequent chapters and will be revisited in their respective discussion sections. More specific theoretical discussions with concrete operational categories associated to each research question appear in chapters IV, V, VI and VII.

2.1. Part I: On the study of scholarly language development and adult language change

The study of scholarly language development lies at the crossroads of various research traditions without a well-defined body of research exploring it in its own right. Although linguistic theories recognize the lifelong nature of language development, research beyond instructional contexts, and particularly into scholars’ language development, is considerably scarce. The *SAGE Handbook of Writing Development* (Beard *et al.*, 2009) and Bazerman’s

(2008) *Handbook of Writing Research*, two recent authoritative compendiums, devote none of their chapters to the subject. This sparse theoretical and empirical treatment is in stark contrast with the sustained attention paid in the past decades to the synchronic study of academic language (e.g. Halliday & Martin, 1993; Martin & Veel, 1998; Halliday, 2004; Wignell, 1998, 2007; Dreyfus *et al.*, 2016; Biber, 1988; Swales, 1990; Hyland, 2004), and to academic literacy development in instructional contexts (Christie & Martin, 1997; Schleppegrell & Colombi, 2002; Painter & Derewianka, 2007; Christie & Derewianka, 2008; Christie, 2010).

This section surveys research having direct or indirect relevance to the understanding of scholarly language development, distinguishing between introspection-based studies involving explicit reflection on language users' linguistic development, and language-based studies exploring diachronic variation in language data.

2.1.1. Introspection-based research

Introspection-based studies consist largely of scholars' literacy (auto)biographies recounting their journey from initial literacy into academia. Three often cited volumes are Braine (1999), Belcher and Connor (2001), and Casanave and Vandrick (2003), altogether comprising autobiographical accounts by 37 well-known language scholars. Formative experiences in the home, school and local context feature prominently in scholars' reconstructions of their semiotic paths. Most scholars report growing up in middle class families with literate relatives and diverse opportunities for reading and writing at home (Connor, 1999; Cohen, 2001), and recall themselves as highly motivated readers and writers during their childhood and adolescence. They generally remember school in a positive light as a site shaping their path towards a scholarly career from an early age, although some also recall it as an arena for contestation of hegemony (Canagarajah, 2001). Some biographies describe sociopolitical constraints on what could be read or written about in the family and

school, as in Liu's (2001) recount of her difficulties in accessing material from Western sources during the Chinese Cultural Revolution. A frequent feature is multilingualism resulting from growing up in post-colonial or post-imperial societies, reported by some authors as sparking their initial interest in language as an object of inquiry (Braine, 1999).

Regarding their passage through academia, common themes in scholars' narratives include the quest to gain a space inside disciplinary fellowships, increasingly specialized career paths, and the gate-keeping role of institutional actors (mentors, supervisors, peers, editors). Most literacy biographies associate opportunities for academic development with major lifestyle changes, including moving to distant countries, adapting to an unfamiliar educational system, taking up teaching jobs, and facing demanding academic tasks. Scholars recall mentors and supervisors as critical actors who scaffolded disciplinary writing practices through oral and written feedback, provided academic career guidance, and fostered self-confidence (Li, 1999). They describe editors and reviewers as gatekeepers managing access to and permanence inside the disciplinary fellowship, usually in ways that challenge their mastery of academic registers or demand readjustment of their theoretical positionings. In some narratives, interaction with editors and reviewers is depicted as a negotiation for the validity of viewpoints failing to conform with established disciplinary consensus (Morgan, 2003).

Scholars recall their passage through professorial and managerial positions as an expansion in the range of roles performed within academic institutions, including participation in and management of research projects, training students and peers, managing degree programs, acting as consultants, and editing journals. The new roles pose demands on their linguistic repertoires to expand and adapt to new registers (c.f. Matthiessen, 2009), as reflected in the need to produce new text types such as research papers, grant applications, keynote speeches, policy documents, curriculum guidelines, manuals, and reviews.

Introspection-based studies contribute rich reconstructions of scholarly development from the insider perspective of those who have succeeded at becoming recognized scholars in their field. However, few scholars reflect explicitly on the changes experienced in their use of language throughout the different stages of their academic careers, limiting themselves to indicating changes in their writing “style” over time without supporting linguistic evidence. While these studies offer valuable qualitative insights into scholarly development, they generally offer insufficient evidence of linguistic change and need to be complemented by diachronic studies of developmental linguistic variation.

2.1.2. Language-based research

Although few studies have addressed scholarly language development by studying language data, studies from a variety of research strands are useful in contextualizing change in scholars’ linguistic trajectories within the historical drift of academic registers, the ontogenetic drift of academic literacy, and the global trends of linguistic change in non-academic contexts. This section offers an overview of these research strands and connects some of their salient findings with scholarly language development.

2.1.2.1. Historical change in academic registers

Diachronic studies of disciplinary language change indicate global trends likely to influence linguistic variation in scholars’ trajectories. One longstanding trend concerns the evolution of the registers of science, which emerged during the European Enlightenment as letters exchanged within academic societies and gradually evolved into text complexes combining procedural, expounding and exploring registers (Halliday, 1988; Bazerman, 1988; Atkinson, 1992; Biber & Finegan, 1997; Banks, 2006; Taavitsainen, 2011). Specific text types within larger academic macro-texts (such as abstracts, introductions and conclusions) have experienced significant transformation, gaining new phases in their contextual structure as their function within disciplinary fellowships evolves (Bondi & Cavalieri, 2012).

In recent decades, technological advances in information processing and scientific equipment have transformed the disciplinary landscape by increasing the delicacy of experiential foci, inducing higher specialization (Teich *et al.*, 2015), and by enabling collaboration around common problems, fostering interdisciplinarity (Christie & Maton, 2011). These contextual changes in scientific registers are concomitant with changes in ideational lexicogrammar, reflected in the trend since the 1980's for academic prose to experience densification as a result of the more frequent occurrence of complex nominal groups (Halliday, 1988; Leech *et al.*, 2009). Passive voice, formerly a hallmark of scientific prose, is on steady decline across disciplinary registers (Seoane & Loureiro-Porto, 2005), while the use of mental processes (*think, believe, assume, suspect*) in active voice constructions has been on the rise since the 1980's, reflecting lesser reliance on experimental methodologies in recent years (Banks, 2017).

Interpersonal lexicogrammar has also experienced transformations, including more overt use of first person and Epithets (Hyland & Jiang, 2016), and increasing preference for periphrastic modal expressions over modals across written and spoken registers (Mair & Leech, 2006; Van Linden, 2015). Such trends have been associated with a growing democratization of scientific registers as reflected in less marked linguistic differentiation of social status between academics and the lay public (Fairclough, 1992; Leech *et al.*, 2009).

The processes whereby individual scholars participate in the emergence and diffusion of registerial transformations are poorly understood. Although language change occurs within and across communities of individuals, individual language change cannot be reliably predicted from community trends, partly because members of speech communities differ in the extent and frequency of exposure to linguistic innovations (De Smet, 2016; Brook *et al.*, 2018). In non-academic contexts, prestigious speakers are known to play a central role in producing and diffusing linguistic innovations within and across speech fellowships (Banks,

2005a; Nevalainen *et al.*, 2011). Individuals are known to differ in their rate of uptake, some being progressive in their adoption of innovations and others being more conservative (Nevalainen *et al.*, 2011). Explicit regulation of the contextual structure and language of scientific registers has also played an important role in shaping their contemporary form through the standardization of text structure, the official endorsement of specialized taxonomies, and the sanctioning of linguistic features such as pronoun use and evaluative lexis (Milroy & Milroy, 1991).

Scientific registers since the second half of the 20th century have experienced transformations reflecting the generalized adaptations of disciplinary fellowships to the changing eco-social institutional environment of academia. Studies controlling for both individual and communal variation are necessary for better comprehension of the relationship between these scales of linguistic change. It is additionally necessary to investigate the relationship between these variation timeframes in social sciences like linguistics, since most research has focused on the physical sciences. Chapter VI is an attempt in that direction.

2.1.2.2. Apprenticeship into academia

Advanced literacy in graduate education contexts fulfils the function of apprenticing ‘pre-service’ scholars into the social semiotic praxis of disciplines. It seeks to endow them with knowledge of valued academic text types and with awareness of the social mechanisms regulating disciplinary fellowships (Duff, 2010; Habibie, 2015). Studies suggest that the main drive at this stage is towards adjusting linguistic repertoires in accordance with disciplinary expectations. Longitudinal studies provide evidence of pre-service scholars adapting generic structures to meet disciplinary conventions (Berkenkotter *et al.*, 1991; Casanave, 1992; Dressen-Hammouda, 2008), adjusting linguistic choices to manage interpersonal distance (Bronson, 2004; Van Compernelle, 2011), and managing the flow of information in text to achieve persuasiveness (Ryshina-Pankova, 2011). The production of high-stakes text types

requiring knowledgeable and the defense of original positions, such as dissertations, monographs, reflections, and conference papers, is part of the arduous task of adopting scholarly roles as knowledge producers within academia (Belcher & Conon, 2001). As scholars gain expertise, the driving force of development shifts from the meeting of disciplinary expectations to the consolidation of a scholarly identity and a ‘voice’, reflected in more distinctive choices in the instantiation of academic registers (Ivanič & Camps, 2001; Matsuda & Tardy, 2007).

Besides attaining a more distinctive linguistic style with expertise, research on linguistic complexity in prior educational cycles predicts changes in nominal group structure as literacy consolidates and expands. Complexity research has identified a developmental pattern whereby advanced written literacy employs less subordination (hypotaxis) at the clause rank and more tactic complexing within the group/phrase rank (Wolfe-Quintero *et al.*, 1998; Ortega, 2003; Byrnes *et al.*, 2010; Biber *et al.*, 2011). Advanced language users tend, in other words, to displace the locus of complexity from the clause complex to the nominal group and phrase rank, a shift interpretable in systemic functional terms as a passage from a logical to an experiential orientation in the construal of experience (Halliday, 1998a; Halliday & Martin, 1993; Halliday & Matthiessen, 1999/2006, Ch. 6). Advanced academic writing in English has been shown to reflect this pattern, construing figures as nominalized participants and logical relations as processes (Parkinson & Musgrave, 2014). Scholar’s writing would, along the same line, reflect more significant variation within the group/phrase rank, and no significant variation at the clause complex rank.

Differences across disciplinary registers require consideration: the highly metaphorical style attributed to scientific discourse is more characteristic of the physical sciences, while the social sciences, humanities and mathematics rely more often on technical abstractions and formulae (Wignell, 1998, 2007; Parodi, 2010). Liu’s (2018) comparison of

complexity measures between master's degree thesis and journal papers in applied linguistics indicates that, contrary to the predicted pattern, no trade-off exists between hypotaxis at the clause complex rank and group/phrase complexity, both master's students and in-service scholars drawing frequently on hypotactic clause complexes. Linguists' scholarly trajectories may thus observe no major variation along these parameters. Chapter IV explores this issue in response to Research Question 3 ("Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication?").

2.1.2.3. Language change in non-instructional contexts

Three traditions have studied diachronic language variation in individuals' trajectories using quantitative methods: stylometry, authorship attribution and lifespan language development. Stylometry, a tradition dating back to the mid nineteenth century, specializes in ascertaining the aesthetic uniqueness and evolution of classic literary and humanistic authors. Of special interest is "stylochronometry", the stylometric strand studying the stylistic development of famous writers and tasked with producing reliable estimates of the date and sequential ordering of valued texts (Forsyth, 1999). An overarching interest in stylochronometric research is determining whether specific stylistic traits change linearly over time and whether their progression is generalizable across authors (Frischer, 1991; Stamou, 2007). Current stylochronometry employs statistical modelling to identify reliable indicators of stylistic development, known as "stylochronometers" (Buster & Smith, 2016).

Some stylochronometric studies have succeeded at producing evidence of diachronic trends coinciding with qualitative assessments by specialists. Employing discriminant analysis on a set of 29 morphological and syntactic features, Andreev (2019) explores lyric writing by US American poet Henry Longfellow, identifying a wavelike pattern of return to initial style features in his late career years. Other studies have failed to identify interpretable

trends (Jaynes, 1980; Laffal, 1995; Whissell, 1999; Smith & Kelly, 2002). Jaynes (1980) finds no evidence of significant changes in the syntactic complexity aspect of Yeats's lyric writing, concluding (against specialist opinion by literary critics) that this aspect of the author's writing remains stable throughout his career. Significant differences did exist, however, in lexical complexity measures throughout Yeats' career, including lexical density and the distribution of lexical items associated with specific themes. After examining chronologically ordered works by Beckett against Biber's (1988) register profile measures, Opas (1996) concludes that the author's linguistic development follows a diffuse pattern, with each work presenting unique literary innovations not carried over into subsequent texts. The stability vs. change debate is unlikely to be settled categorically for all features alike: some features may be more stable, others may be fluctuating and diffuse, and others would experience steadier trends (Litvinova *et al.*, 2018).

Authorship attribution research distinguishes itself from stylometric research in that its main interest is in determining authorship where it is disputed or deliberately hidden (Coulthard, 2004). Its emphasis is on the statistical distribution of quantifiable text features, chiefly the syllable, the word and the sentence. Because authorship studies cater to fields where trait stability is essential to reliable identification (e.g. forensic linguistics, plagiarism detection, speaker profiling), stylistic variation over time is part of the dimensions to be accounted for (Grant & Baker, 2001). Recent work has challenged the notion that idiolects are based on stable linguistic features. Litvinova *et al.* (2018) investigate the extent to which Russian speakers' idiolectal features vary across instantiations of spoken texts. Their findings indicate that, despite most idiolectal features being highly or moderately stable, a subset of them show significant instability, including the proportion of adverbs, negation, and negative adjectives. An issue related to that of stability is whether, over time, language users develop unique linguistic traits unconsciously indexing their authorship. Mollin's (2009) analysis of

Tony Blair's spontaneous spoken interventions in the British Parliament from 1988 to 2007 isolates specific collocations between intensifying Adjuncts and mental processes (i.e. *entirely understand*) as reliable indexes of his idiolect (based on comparisons with the BNC corpus).

Lifespan development research occupies itself with linguistic variation throughout life with a focus on adult and elderly language development. Studies in this area have found significant differences in oral and written texts by young adults and elderly adults (See Shrauf, (2009) for a review). Kemper *et al.* (1989) compares oral and written texts by college students and elderly adults grouped into three age ranges. One significant difference is the lower frequency of clause complexes where the dependent clause precedes the dominant clause (e.g. *After I finished eating, I went home*) in elderly adults' speech, which the authors relate to age-related constraints on working memory. Kemper (1987) obtains similar findings pointing to a decline in syntactic complexity in journal entries by eight adults over a period of five decades, evident in the decrease of clauses downranked as postmodifiers, hypotactic projection, non-finite clauses downranked as Subject, double embedded clauses, and the mean number of clauses per sentence.

While structural diversity in clauses and clause complexes appears to consistently decline with age, the evolution of lexical repertoires throughout the lifespan shows mixed results. Some authors report a steady increase followed by decline past the seventh decade of life (Feyereisen, 1997; Verhaeghen, 2003), others report vocabulary growth into age 50 followed by gradual decline in subsequent ages (Hulsch *et al.* 1992; Alwin & Mcnammon, 2001), and others report gradual decline beginning at age 30 (Connor *et al.*, 2004). Individual differences in educational attainment, occupation, bilingualism or multilingualism, and gender can impact the extent of linguistic decline. Kemper *et al.* (2001) report a narrower difference with young adults' linguistic complexity measures for older adults with higher

educational attainment. Speaking two or more languages positively correlates with better performance in attention control experimental tasks, leading to the postulation of “Cognitive reserve” as an explanatory mechanism for this observed difference (Byalistok *et al.*, 2006). Scholars, as highly literate individuals, would be better protected from age-related linguistic decline.

The issues raised within authorship attribution and lifespan development research could be relevant to the study of scholarly language development, including whether scholars engage creatively with disciplinary registers in a way comparable to how literary authors transform literary registers. Throughout their stylistic trajectories, literary authors may explore one or more higher order themes and gradually develop unique prose or poetic styles, involving creative imagery, plot structures and increasingly complex characters (Clemen, 1977; Hasan, 1985; Matthiessen, 2013). In the process, their linguistic repertoires expand and adapt in keeping with the demands of the creative endeavor, developing new semantic strategies, a surface manifestation of which is the emergence of innovative lexical patterns (Hori, 2004). Scholarly development would also entail the expansion of linguistic repertoires for the construction of theories explaining non-imaginary facts. The question stands as to whether this linguistic repertoire expansion leaves any significant traces in their use of experiential, interpersonal and textual resources over time.

The issue of the stability of linguistic features throughout scholarly lives is also important in that it can expand understanding of registers, not as a fixed system of linguistic traits associated with a specific context, but more as a multidimensional space for variability. Scholars’ instantiation of academic registers would rely on certain traits for developmental adaptation, while others would remain more stable. The methods from the three quantitative traditions discussed could be useful in exploring whether such variation exists. Chapters IV

and V utilize some of these techniques and argues that features with significant variation in scholars' writing represent linguistic areas most likely to undergo developmental adaptations.

2.1.2.4. Systemic Functional Linguistics and scholarly language development

Systemic Functional Linguistics has produced influential accounts of linguistic development with a focus on the expansion of personalized meaning potential across social situations and institutions (Halliday, 1975, 1978, 1984; Painter, 1984, 1999, 2004; Torr, 1998; Christie & Derewianka, 2008; Schleppegrell, 2004). SFL describes development as “ontogenesis”, a lifelong process of meaning-making involving transitions across the linguistic pathways of referring, generalizing, abstracting and metaphorizing (Halliday & Matthiessen, 1999; Painter, Derewianka & Torr, 2007). From an instantiation standpoint, language development involves the lifelong expansion of registerial repertoires in individuals' path through social institutions (Matthiessen, 2009), registers understood as networks of strategic options for social semiotic action (Halliday, 1973). Scholars' semiotic path through academia entails, under these theoretical postulates, the expansion and adaptation of registerial repertoires for categorizing and explaining general classes of phenomena, publicly defending and debating positions, and enabling the execution of scientific procedures.

An empirical approximation to scholarly development informed by SFL analytical principles can be found in the work by Montemayor-Borsinger (2001a, 2001b, 2005, 2009). Applying a mixture of corpus-based and text analytic procedures to a corpus of Physics papers written by ten scholars in their early and late career periods, she identifies a statistically significant trend for the increase of Subjects realized by long nominalizations, and for the decrease of Subjects realized by short nominal groups, consisting mostly of technical terms and pronouns. In their late career papers, the scholars in her study display significant differences in the length and complexity of Subjects, lending support to the

hypothesis that more advanced literacy entails growing complexity at the group rank (Norris & Ortega, 2009; Biber *et al.*, 2011; Parkinson & Musgrave, 2014). Late career writing in her scholar sample is also characterized by placement of complex Subjects in Theme position, as opposed to the use of marked circumstantial Themes, which occur more frequently when Subjects are realized by simple nominal groups (Montemayor-Borsinger, 2001a; 2008).

An important claim in Montemayor-Borsinger's work is that scholarly development entails transformation across the metafunctional spectrum, being part of a syndrome of ideational, interpersonal and textual features. Scholarly development would entail a drift towards experientially loaded entities conflating the roles of interpersonal nub of the move and informational point of departure of the message. The entities compact semantic figures and sequences construing relations and processes textured in prior textual stretches or, intertextually, throughout prior textual instances. However, disciplines and text types construe experience and produce knowledge through different semiotic processes and, similarly, knowledge construction and its linguistic realization in scholarly trajectories would be affected by these factors. The diachronic changes identified by Montemayor-Borsinger would be more characteristic of academic trajectories unfolding within disciplinary vertical knowledge structures and knowledge-based disciplinary fellowships.

2.1.3. Summary

This section has provided an overview of research relevant to the understanding of scholarly language development. While recognizing the importance of introspective research in providing first-hand accounts of scholars' developmental process, it has argued for the need to explore linguistic change in scholars' trajectories by focusing on language data proper. Scholars do not develop in a vacuum. Their use of language over time is permeated by the historical evolution of registers and influenced by the formative processes of academic apprenticeship. Academic registers have coevolved with changes in the social dynamics

science and the need to apprentice young scholars into the complexities of this dynamics has increasingly gained space in the curriculum. As scholars' linguistic repertoires develop, their use of language draws on the evolving pool of collective semiotic resources for semioticizing experience, individuating itself through a history of personalized acts of meaning.

Research in the areas of stylometry, authorship attribution and lifespan language development support the hypothesis that systematic change occurs within meaners' trajectories as they engage repeatedly in specific semiotic activities. It shows that the change is directional (increasing or decreasing) and selective (affecting some linguistic variables more significantly than others). The few studies with an explicit focus on scholars' development, conducted within an SFL framework, also show directional trends regarding the increase in specific types of Theme and in the realization of Subjects. In reflecting on the nature of scholarly language development, it is worth considering issues of selectivity, directionality, and historical contextualization, seeking to explain why specific variables increase or decrease (and not others), and the reasons for their correspondence (or lack thereof) with registerial evolution trends.

2.2. Part II: Towards systemic functional comprehension of scholarly writing development

Systemic Functional theory recognizes four central dimensions in a conception of language as a semiotic system (axis, stratification, metafunction, instantiation) which permeate the creation of meaning in text, individual trajectories and culture at large (semogenesis). Together, these dimensions act as the pillars of the “architecture” of language (Matthiessen, 2007), each representing a vantage point from which to approach language phenomena. This section discusses the connection between these dimensions and scholarly writing development.

2.2.1. Axis

Language manifests to its users as strings of functional elements unfolding in time (structure) which realize an abstract network of possible functional choices (system) (Halliday, 1963, 1969). The axis dimension comprises both perspectives. The paradigmatic axis organizes language as systems, sets of possible choices under a given entry condition. The choices may be specified a varying degree of delicacy, with most delicate choices inheriting the properties of least delicate choices. For example, given the entry condition “clause”, the choice can be made in the system of POLARITY between the least delicate options positive and negative. The syntagmatic axis organizes language as chains of functional elements occurring one next to the other, which realize systemic options. In English, the structure Subject ^ Finite realizes the option “declarative” in the lexicogrammatical system of MOOD. SFL models language and culture paradigmatically as potentials across the strata of context, semantics, lexicogrammar, phonology and phonetics, using system networks and topologies as formal representations. Structure, in turn, is modelled as the convergence of interpersonal patterns (prosodic structure) with ideational

patterns (particulate structure) enabled by textual patterns (periodic structure) (Halliday, 1979).

Axis is the first dimension to emerge in ontogenesis (Halliday, 1975). The first iconic signs produced by infants before the emergence of protolanguage are mono-axial content-expression pairings lacking a systemic connection. Protolanguage emerges as the distinction between a system of micro-functions and their realization by iconic signs, either vocalizations or gestures. With the emergence of grammar and metafunctional differentiation in Phase III (mother tongue), the child's meaning potential significantly expands in the paradigmatic axis, as grammatical systems increase in delicacy; and in the syntagmatic axis, as functional structure begins to conflate interpersonal, experiential and textual meanings (see Part III of this chapter).

The passage through family, schooling, university, workplace and academic contexts increases systemic delicacy by extending the range of strategies and resources for construing experiential domains, enacting roles interpersonally, and managing the flow of information in discourse (Matthiessen, 2009). These strategies and resources are paradigmatically organized as registerial repertoires, the portion of the overall meaning potential of language that individuals' appropriate in their linguistic passage through institutional contexts. Registerial repertoires manifest as contextual and functional syntagmatic structures in text. In the study of scholars' language development, registerial development may be modelled paradigmatically, as increasingly delicate systemic options at different points in their career. The study of functional structures, and even class structures (syntagms) is a complementary vantage point which could generate inferences about the state of their registerial repertoires.

2.2.2. Stratification.

Scholars' linguistic repertoires are stratified in nature. Strata are orders of symbolic abstraction differentiated by their degree of orientation towards content or expression. The

content plane and expression plane are each bi-stratal: lexicogrammar and semantics in the content plane, and phonology and phonetics in the expression plane (Halliday, 1961; Halliday & Matthiessen, 2014, Ch. 1)). Within each plane, the relationship between strata is natural, that is, motivated with respect to the higher stratum. In contrast, the relation between the content plane and the expression plane is largely conventional – lacking an inherent connection other than agreed-upon usage. Semantics is the stratum of meaning – the network of ideational, interpersonal and textual strategies that interfaces between context and wordings. Lexicogrammar is the stratum of wordings – semantically motivated configurations of functions realizing semantic elements in the clause (or relations between clauses) (Halliday, 1994; Matthiessen, 1995; Halliday & Matthiessen, 2004, 2014). Scholars' linguistic repertoires thus include a set of individualized semantic strategies (a semantic repertoire) and an individualized subset of wordings (a lexicogrammatical repertoire).

Scholars' lexicogrammatical repertoires vary in the degree of systemic elaboration of lexicogrammatical systems. Lexicogrammar at the clause rank comprises the systems of TRANSITIVITY for ideational meaning, MOOD for interpersonal meaning and THEME for textual meaning. It integrates lexis and grammar in a continuum of delicacy: the grammatical end entails least delicate systems with closed sets of options (e.g. positive/negative, declarative/interrogative/imperative), while the lexical end comprises most delicate extensions of grammatical systems through open-ended systems (e.g. black/red/blue/green, cow/pig/sheep/horse) (Hasan, 1987; Tucker, 1997). It is in open-ended lexical extensions of grammatical systems where most developmental variation is likely to occur, as scholars' repertoires map lexicalized meanings into a core set of grammatical systems.

The relationship between semantic repertoires and lexicogrammatical repertoires is one of realization. Semantic elements can be realized congruently by lexicogrammatical choices bearing a natural relationship with them (e.g. Process \supset Process: verbal group); or

incongruently (metaphorically), as if they were a different semantic category (e.g. Process realized by a nominal group in lexicogrammar as if it were a Thing). Over time, scholars may vary in their degree of (in)congruence as meanings are recycled throughout several text instances. The ordering principle of rank plays a central role in this variation.

Rank is an organizational principle whereby each stratum is internally organized as a hierarchy of compositional units, called the **rank scale**. A rank is a unit of composition with a delimited potential with respect to other units within the same stratum (Halliday, 1961; Matthiessen, 1995; Halliday & Matthiessen, 2014). A nominal group has a more limited potential for expansion than a clause, and certain systems, like CLASSIFICATION, are limited in scope to the nominal group. Within each stratum, lower ranks are the building blocks of higher ranks, that is, they function as their structural constituents. For example, the verbal group realizes the Process of the clause and the clause can realize a figure in semantics. The formation of complexes (combinations of units linked by logico-semantic relations at the same rank) extends the meaning-making potential of ranking units. Rank-shifting (the placement of higher-ranking units into lower ranking ones) is a common discursive strategy for packing meaning into more restricted units, increasing lexical density.

The interplay in the realization of semantic ranks by lexicogrammatical ranks creates a broad spectrum of interstratal mappings which extends the meaning potential of linguistic repertoires. The basic semantic units are the figure, move and message, corresponding to each metafunction respectively and being congruently realized by the clause as representation, as exchange and as message (Halliday & Matthiessen, 1999/2006). Texts are composed of figures/move/messages, which are realized by clauses. The expansion of scholars' linguistic repertoires takes place as meanings unfold in the reading and writing of academic texts. Some of the realization strategies emerging in the process of making meaning in text become

stable resources within the repertoire, extending scholars' potential to realize disciplinary meanings over time.

Resonating with linguistic repertoires is the range of socio-semiotic processes in which scholars participate according to the institutional roles they accrue throughout their trajectories. Systemic Functional Linguistics models context of situation as an extra-linguistic stratum resonating with linguistic choices and comprising aggregates of socio-semiotic parameters generalized into three variables: **field**, **tenor** and **mode** (Halliday, 1973, 1978, 1992).

Field comprises FIELD OF ACTIVITY (the staged practices in which participants engage in fulfilling a given socio-semiotic purpose – telling a story, giving directions, ordering a meal, piloting an aircraft), and FIELD OF EXPERIENCE (the topical domain and its placement within a continuum of specialization). Tenor encompasses INSTITUTIONAL ROLE (mother, father, sibling/doctor, patient/ teacher, student/ expert, novice), POWER (equal/unequal/negotiated), FAMILIARITY (intimate/close/congenial/distant), SPEECH ROLE (questioner/replier), AFFECT (positive/negative/neutral) and VALUATION. Mode comprises the DIVISION OF LABOR between linguistic and non-linguistic systems, the ORIENTATION of the situation to Field or to Tenor, the type of TURN (monologic/dialogic), the MEDIUM (spoken/written/electronic chat), the CHANNEL (phonic, graphic, audiovisual) and the RHETORICAL MODE (didactic, persuasive, entertaining, etc.). The interstratal relationship between context and scholars' linguistic repertoires is another potential site of developmental activity: as scholarly trajectories unfold, novel semantic and wording strategies may be created to realize recurrent contexts of situation.

2.2.3. Metafunction.

Scholars' linguistic repertoires reflect the semantic diversification of language, captured by the dimension of metafunction. Metafunctions are overarching functional

categories (clusters of functions) understood as “modes of meaning” (Halliday, 1979), which coevolved with social systems to enable humans to represent their experience of the world, enact their social roles and relations, and create meanings as discourse. Three metafunctions are recognized: ideational, interpersonal and textual.

Ideational meanings construe our experience of the world as “quanta” of change in the flow of events (Halliday & Matthiessen, 1999/2006; 2014). Two complementary modes within the ideational metafunction are experiential and logical meaning, differentiated by the type of structure generated in each. Experiential meaning is realized by multivariate structures, configurations of different functional elements (e.g.: Actor + Process + Recipient + Time). Logical meaning generates univariate structures, “iterations of the same functional relationship” (Halliday & Matthiessen, 2014; p. 451), that is, its structural output works as iterative choices of tactic and logico-semantic relations. Interpersonal meanings “enact” social relations and their corresponding division of roles. Unlike ideational meanings, characterized by particle-like constituency, interpersonal meanings manifest prosodically as mutually reinforcing elements of variable evaluative charge (Halliday, 1979; Hood, 2010; Hood & Martin, 2007).

Textual meanings assign prominence to interpersonal and ideational meanings, creating them as text in the flow of discourse (Matthiessen, 1992). Prominence can be thematic, informative or contrastive and manifests fractally at different ranks: in the constitution of the clause as a message and in extended textual sequences as peaks and troughs of information. In modelling scholars’ linguistic repertoires, it is thus necessary to refer to ideational repertoires, interpersonal repertoires, and textual repertoires. The latter play an enabling role, facilitating the presentation of ideational and interpersonal meanings in discourse.

Ideational repertoires comprise both experiential and logical modes of meaning, which are complementary in that chunks of experience may be represented by a figure (realized by a clause) or by a logically linked sequence of figures (realized by a clause complex). Experiential meaning is modelled as “figures”, the “quanta of change” into which our experience of the flow of events is chunked for representation. Logical meaning, in contrast, finds its point of departure in the clause nexus, binding two or more clauses into complexes of variable extension (Halliday & Matthiessen, 1999/2006). The figure is the basic semantic rank involved in the creation of experiential taxonomies and the representation of the processes affecting theoretical entities. Disciplines and paradigms differ in their emphasis in construing experience, foregrounding quanta of causality, identification, classification, composition, description or temporality.

Interpersonal repertoires comprise strategies and resources for enacting roles and value systems in text. Interpersonal systems enable the exchange of meaning – the semiotic process whereby meaning acts as a commodity in social situations. The basic interpersonal semantic system is SPEECH FUNCTION, which specifies the nature of the semiotic commodity and of the move involved in the exchange (statement, question, offer, command). MOOD is the basic lexicogrammatical system involved in the realization of interpersonal meanings at the clause rank (Halliday, 1985). At the stratum of semantics, register-specific strategies resonating with developmental variation in Tenor may relate most directly with evaluative strategies for enacting institutional values.

One of the systemic functional frameworks designed to describe evaluation across registers is Martin and White’s (2005) APPRAISAL system, comprising the systems of ATTITUDE (feelings, emotions and judgments towards things and behaviors), ENGAGEMENT (sourcing of and alignment with opinions) and GRADUATION (amplification and calibration of feelings and categorizations). Evaluative semantics can also be approached as register-

specific bundles of strategies that have evolved to enable the enactment of VALUATION across contexts. One tenor-related aspect with special relevance for this thesis is VALUATION of the experiential field in terms of epistemic stance (whether the author evaluates an aspect of the experiential domain as valid, truthful or probable).

2.2.4. Instantiation.

Scholarly linguistic repertoires may be approached as the collection of text instances produced by a scholar, or as the personalized system of meanings built throughout their trajectories. The semiotic dimension of instantiation models language and culture in a continuum of generality between **potential** (the more general end of the continuum) and **instance** (the more immediately observable end). Halliday (1992) uses the analogy of climate and weather to clarify the distinction. Weather refers to the meteorological conditions observed in a specific day, and climate, to the generalized meteorological profile of a region. Similarly, an instance is the observable manifestation of language as text and of culture as context of situation. The system is the general set of resources that makes up the entire meaning potential of language and culture. Language users instantiate language and culture in the production or comprehension of text and, concurrently, they instantiate culture as the context of situation in which text is produced/comprehended.

Between system and instance lie intermediate potentials known as sub-system and instance type. In culture, sub-systems are called **institutions** and instance types are known as **situation types**. In language, these levels correspond to **registers** and **text types** respectively. Institutions and registers are the vantage point on culture and language from the potential end of the instantiation cline, that is, viewed as generalized sub-sets of social practices and semantic strategies. Situation types and text types are the vantage points from the instance end (i.e. as generalized subsets of features found in a group of instances) (Matthiessen, 2013).

Language development takes place around the instance pole of instantiation, that is, from text instantiations to text types: as scholars instantiate academic texts, they construct personalized register-specific meaning potentials (Hasan, 1996). The study of linguistic repertoires may be approached from the system [potential] pole, considering the distribution of semantic and lexicogrammatical systems across instance types; or from the instance pole, relating text to its context of situation, grouping texts as text types as it moves up in instantiation. Both approaches are reconcilable in linguistic research, the linguistic researcher having the possibility of shunting her or his vantage point on linguistic phenomena at different stages of inquiry.

An indication of a register being fully integrated into an individual's repertoire is his or her ability to perform socio-semiotic roles associated to it in an institutional context, with positive material and social consequences. With semiotic processes in academic contexts, the integration of a register to a meaner's repertoire can be observed in the social and material consequences: a positive committee revision, acceptance for publication, approval of a project grant, invitations to offer plenary speeches, among others. The richness of scholars' registerial repertoire is evident in the history of positive social sanctions of their semiotic products by the academic speech fellowship – although the influence of power groups inside academic circles in regulating the evaluation of scholars should not be ignored. Part of the positive sanction of a semiotic product, such as a review or a research paper, lies in the extent to which the semantic strategies deemed constitutive of the register are recognizable. These external indications, however vague, point to the not directly observable fact that the scholar's registerial repertoire has adapted to incorporate semantic strategies resonating with valued goals in academia, such as categorizing and explaining general classes of phenomena, defending arguments, and discussing the value of theoretical positions.

Meaners individuate in the continuum from the collective reservoir to instancial personae (specific instantiations of institutional roles); and in the semiotic domain, from the entire speech fellowship of language users to individualized acts of meaning (Lemke, 1995). Development takes place in the interplay between the instancial personae embodied by scholars throughout their academic paths and the generalized aggregate of personae that constitutes their individual(ity); and, semiotically, from the multiple personalized acts of meaning performed by the scholar to the generalization of these as registerial repertoires. The social semiotic tradition favors a view of the individual as a composite entity, as an aggregate of multiple personae, each possessing its own voice (Firth, 1950). As individuals mature biologically and socially, the range of registers instantiated in their daily lives expands in a way such that, in a given day, they may participate in conversations with peers, listen to a theoretical monologue by a lecturer, work on an argumentative essay, watch their favorite series, buy a slice of pizza around the corner, and browse the web for daily news – all of these registerial instantiations reflecting distinct roles associated to various personae within an individual.

2.2.5. Semogenesis.

Language is not only a system of meanings; it is also a system that creates meaning, a property captured by the notion of semogenesis (from Greek *semeion*: sign and *genesis*: creation). To create meanings means to bring into consciousness an aspect of experience by assigning to it a novel configuration of existing linguistic resources which creates a new experiential category. Meaning is created along three timescales: in the unfolding of text as semantic choices resonating with a context of situation (logogenesis), in the development of individualized meaning potentials (ontogenesis), and in the evolution of language as a semiotic system (phylogenesis) (Halliday & Matthiessen, 1999/2006).

Viewed from the vantage point of instantiation, meaning-making takes place at the instance end and the new meanings created disseminate across text types and registers, thus expanding along the cline of instantiation. At the instance end, the basic semogenic processes are condensing and compacting (or packing) (Halliday, 1998a). Condensing and packing involve the recodification of larger chunks of ideational meaning as clausal participants by means of the resources of transcategorization, rankshift and grammatical metaphor (including nominalization) (See **Section 3.3**). In the logogenetic unfolding of text, a common semogenic process is the reconstrual of congruent semantic figures as things, qualities or processes in subsequent stretches of discourse. Some of the meanings created in text are instantial and respond to local textual needs, whereas other meanings go on to become recurrent metaphors that language users recognize as theoretical entities.

In the ontogenetic timescale, individuals incorporate the semantic strategies and resources characteristic of the institutional contexts in which they participate, expanding their individualized registerial repertoires without fully encompassing the entire meaning potential of language. The semiotic material that fuels ontogenesis comes from the logogenetic instantiation of text. As individuals comprehend and produce texts across institutional contexts, their meaning potential expands as well as their ability to make new meanings.

In the phylogenetic scale, the meaning potential of language expands in historical co-evolution with changing social and material environments, adapting itself to emergent demands to mean across new institutions and situation types. The meaning potential of language is the sum of the individualized meaning potentials of speakers at a given historical period. Phylogenetic changes are usually gradual, spanning decades or centuries, spreading from one register to another and often being promoted by influential language users (Halliday & Matthiessen, 1999/2006). Language is a metastable system and individuals' negotiation of

the features of institutional registers powers the historical expansion and transformation of its meaning potential.

2.2.6. Summary

This section has provided a succinct discussion of the dimensions recognized by SFL in the architecture of language as a system (axis, stratification, metafunction and instantiation) and their relationship with the creation of meanings along different timescales (semogenesis). The intersection of these dimensions results in a multidimensional framework which allows language to be studied from multiple simultaneous vantage points. Axis contributes a view of personalized meaning potentials as paradigmatically organized systems of meaning-making options whose expansion and probabilistic reconfiguration affects structure at different levels: the contextual structure of text instances, the logogenetic structure of unfolding semantic strategies, and the functional structure of the clause. Stratification offers a trinocular perspective on scholarly development: from above, as socially situated praxis; from below, as changing patterns in wording; and from roundabout, as the incorporation and fine-tuning of semantic strategies. Metafunction brings forward the important realization that scholarly development affects, at the same time, the ideation of field, the interpersonal calibration of value systems and roles, and the textual mediation of meanings.

Through instantiation, scholarly language development can be understood as a process of individuation approachable from the instance end, as meaning-making in text production and interpretation; or from the system end, as probabilistic exploitation of the semantic and wording potential of registers. Registers are clusters of **meanings at risk** of being instantiated in specific institutional contexts. As language functioning in social institutions, registers are determined by configurations of field, tenor and mode values. Field guides the semantic strategies for construing institutional experience as meaning systems and

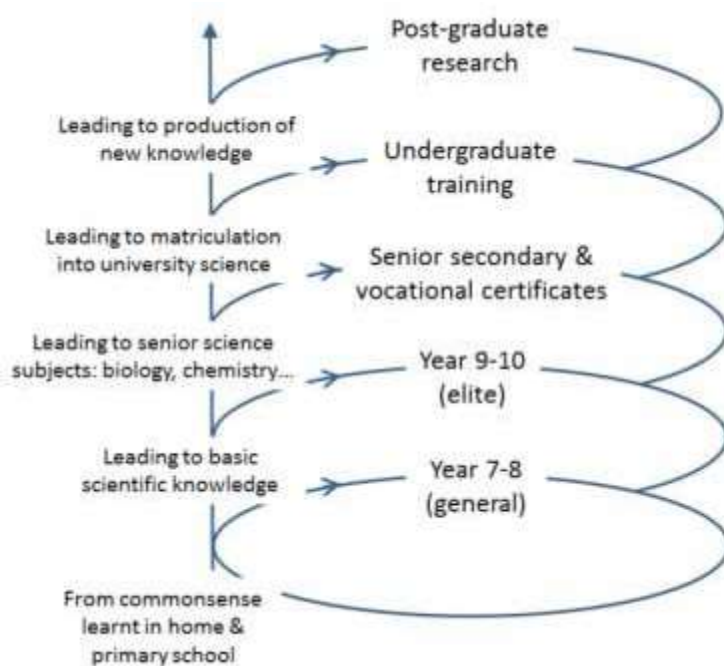
for organizing social practices as text. Tenor orients semantic strategies for enacting institutional roles, values and power relations. Mode indicates semantic strategies for presenting Field and Tenor as information in text, including the experiential and interpersonal aspects foregrounded.

The notion of semogenesis illuminates what is perhaps the most central aspect of scholarly trajectories: the creation of new meanings throughout academic semiotic lives, as theoretical entities are construed and reconstrued at each new instantiation, with new systemic interrelations to other entities in the evolving theoretical edifice. Situating scholarly linguistic development within the course of the broader ontogenetic model recognizes its continuity within the process of expanding personalized meaning potentials, which initiates in early childhood with the gradual formation of an axially differentiated stratified system, continues through schooling with the gradual incorporation of abstraction and grammatical metaphor in literate practices, and expands throughout scholarly trajectories as registerial repertoires expand and adapt in response to emerging roles within academia. Part III of the Theoretical Framework examines this transition.

2.3. Part III: Situating scholarly language development in a lifelong perspective

This section views scholarly language development through the theoretical lens of ontogenesis, the process through which meaners construct personalized meaning potentials throughout their lives (Halliday, 1975/2003, 1984, 2008; Painter, 1984, 1999, 2003; Derewianka, 1995; Schleppegrell, 2004, 2010). Ontogenesis is a biologically enabled, socially situated, and culturally mediated process of expanding meaning-making capacities across social contexts, initiating with the first acts of meaning in the home environment during early childhood, and continuing with the introduction to literate culture in the school, and gradual apprenticeship into disciplinary fellowships throughout higher education. Scholarly trajectories build on this developmental history and continue the expansion of linguistic repertoires in response to evolving institutional roles and evolving theoretical and empirical engagement with the object of study. Figure 2.1, from Rose *et al.* (1992), illustrates this continuity:

Figure 2.1: Cycles in ontogenesis, from Rose *et al.*, (1992).



“Leading to the production of new knowledge”, the label at the top left of the image, reflects what is generally believed to be the social function of scholars. This semiotic activity may seem unrelated to the meaning-making endeavors of young learners in the home and school environments, but its underlying mechanisms are similar in that they continue to be grounded on the ability of language to construe experience as meaning and to enact social relations. The meanings construed by scholars naturally differ in their degree of generality, abstraction, delicacy, and specialization (Halliday & Martin, 1993; Veel, 1997). The process, however, continues to be one of mapping the new onto the old, drawing on the unlimited semantic space created by lexicogrammar (Halliday & Matthiessen, 1999/2006).

2.3.1. From early childhood to scholarly apprenticeship.

Children are born with the innate predispositions to engage with human others intersubjectively and to make sense of their inner states and their surrounding environment (Trevarthen, 1979, 1998; Trevarthen & Hubley, 1978). Human caretakers are also culturally predisposed to engage intersubjectively with infants by responding to their affective states and needs (Trevarthen, 2001). The intersection between these predispositions pushes infants to act symbolically towards human others to regulate their behavior and to make sense of the relationship between their conscious world and the environment (Phase I) (Halliday, 1975/2003, 1984, 2008). The first symbolic acts of meaning are of an iconic nature: their expression, which may be vocal or gestural, has a natural relationship to their meaning and they constitute functions in themselves. A vocally expressed sign such as a squeal or a gestural sign such as an extended hand may mean “Be with me”, “I like that” or “Feed me”.

Toward the eighth month of age, these iconic signs begin to form a paradigmatic system of content-expression pairings termed “protolanguage” (Phase I). In its first stage, protolanguage is a limited collection of iconic signs performing a set of micro-functions, called instrumental (“give me”), interactional (“you and me together”), personal (“I

wonder”), regulatory (“do this”) and imaginative (“let’s play”). The number of iconic signs grows and reaches a critical mass, prompting the second stage of protolanguage involving generalization of the five micro-functions into two macro-functions: pragmatic (language as action) and mathetic (language as reflection) (Phase II). During this transitional stage, symbolic acts for understanding the environment are structurally separate from symbolic acts for regulating interpersonal relations.

What marks the final transition towards adult-like language (Phase III) is the emergence of lexicogrammar as an abstract layer intermediate between meaning and sounding, concomitant with the mastery of the metafunctional principle whereby utterances are simultaneously actions on others and reflections on the world. With the metafunctional conflation of ideational and interpersonal meaning emerges the textual information, enabling the presentation of meanings as information. Stratification and metafunction endow the child’s linguistic system with an indefinitely expandable semantic space, a higher order semiotic, setting off a lifelong process of expanding personalized meaning potentials across social contexts.

The early childhood phase of the expansion entails grammaticalizing meanings as systems of functions in sharing and doing registers, including the interpersonal systems of MOOD and POLARITY for realizing speech-functional moves in dialogue (Halliday, 1984), the experiential system of TRANSITIVITY, and the logical system of LOGICO-SEMANTIC RELATION and TAXIS (Phillips, 1985). Through increasing grammaticalization, language mediates the transformation of social material experience into meaning in two ways: by enabling the transposition of non-linguistic experience into conventional linguistic signs, and by construing linguistic signs as participants within system networks (Halliday & Matthiessen, 1999, p. 611). The transitive motifs of identification and attribution play a central role in these complementary processes. The transformation of an ostensible object

(e.g. a cat) into a linguistic sign involves a Token (the object referred to pronominally or non-linguistically, e.g. by pointing or gaze) and a Value (the linguistic sign expressed by a phonological unit, e.g. //kæt//). Referring to an ostensible object through a class name paves the way for generalizing across several instances of the same object: the Value “cat” expressed by the sound //kæt// can now be assigned to all instances of a four-legged furry animal that meows and purrs. The grammar of attribution, in turn, allows the hyponymic and meronymic elaboration of the identified entity in terms of types, parts and properties: as their ideation base expands, it becomes possible for children to understand that cats *have* legs, ears and fur (possessive attribution), that their cat is *in the kitchen* (circumstantial attribution), and the fact that lions are a type of cat (intensive attribution). The systemic elaboration of the Value “cat” expands in other areas of experiential grammar: children construe cats as Actors that hunt mice, as Goals of the process *feed* and *stroke*, and as Existents – and they also learn that cats are not Sensers capable of mental processes, or Sayers capable of symbolically mediated communication. Once an object is incorporated as a linguistic sign, it is entirely construed within language thanks to the endless potential of grammar for holding representations of the world. Relational clauses continue to occupy a privileged position in construing the world throughout life: this clause type is, in fact, the most characteristic one across academic registers (Halliday, 1998a).

Using language as a higher order semiotic, infants also learn the implicit rules of power and social roles in their participation in dialogue with caretakers and peers (Halliday, 1984). Their speech functional moves progressively turn from requests for goods-&-services to a higher prevalence of requests for information, a shift whereby they learn the power of positioning others as providers of information. Unless discouraged by adults, this newly discovered power remains their main vehicle for accessing culture, including the material environment and the social world. Questions continue to be a powerful tool for expanding

knowledge about the world throughout life, and in a scholar's semiosis, their formulation can orient inquiry in different directions. Language also mediates the construction of identities by shaping the concept of the self, constructing basic dimensions of subjectivity such as gender, social class and ethnicity (Painter, 1999; Hasan, 1990). It does so not only through explicit representations of these dimensions, but chiefly through the enactment of power relations and roles in dialogue. Scholars' identities are also enacted through language in text in a way susceptible to developmental change (Camps & Ivanič, 2001; Lemke, 2003). Choices involving self-representation, reader positioning, intersubjective engagement with other voices, and the evaluation of propositions and entities are all part of the interpersonal enactment of scholars' evolving academic persona (Hood, 2010).

Not less important is the role of dialogic sharing contexts in providing an early awareness of the functioning of text as a cohesive unit. The practice of taking turns in dialogic interaction as well as participating as listeners or producers of extended monologs offers a window into the function of Theme and Information in enabling the texturing of ideational and interpersonal meaning as messages (Halliday, 1984). The instantiation of dialogic text in the sharing and doing contexts of the family and local community furthers the expansion of children's meaning potential by enabling them to learn language, through language and about language. Meaning-making in text (logogenesis) provides the semiotic material for expanding personalized meaning potentials (ontogenesis) which draw on- and expand- the collective semiotic reservoir (phylogenesis) (Halliday & Matthiessen, 1999). Interpreting and producing texts is not a secondary activity in which pre-fabricated knowledge is printed on pages: it is the site where the representations of entities and process that comes to be viewed as knowledge emerge and become negotiable.

By the time children enter school, they are endowed with a theory of social material and symbolic experience that provides an unlimited space for semiotic expansion (Halliday,

1979/2003). The school furthers their meaning potential by incorporating new theories of experience gradually less based on commonsense observation and increasingly detached from the here and now. This more abstract form of educational knowledge principally draws on the written medium of communication, which not only demands the learning of symbols for graphic expression, but, most importantly, requires a reconfiguration of children's experiential theories from the spoken world of concrete things participating in actions to the written world of synoptically interrelated abstract things. Commonsense theories are not replaced altogether: even in the knowledge systems of disciplines, commonsense representations of objects and processes can be a pervasive influence (Matthiessen, 1993). The written mode is not just a different means of expression, it is a new way of knowing.

Throughout Primary school, children are presented with increasingly complex registers associated to the experiential domains of school subjects (Christie & Derewianka, 2008; Christie, 2010; Martin & Rose, 2008; Matthiessen, 2009). In the transition towards Secondary school, nearing adolescence, the critical developmental step lies in the ability to comprehend, and later produce, metaphorical meaning (Derewianka, 2003; Schleppegrell, 2004; Schleppegrell & Colombi, 2002). Grammatical metaphor creates affordances for distilling meaning in text, establishing relations between entities, packaging information, and enacting social relations in less congruent manners (Christie, 2010). Exposure to grammatical metaphor throughout school paves the path for later engagement with specialized discourses in subsequent educational cycles, although some individuals are socially positioned make this transition more smoothly (Rose, 1997).

Higher education entails immersion into the specialized discourses of academic fields through exposure to discipline-specific pedagogical and academic text types. The knowledge structure of disciplines influences the nature and content of the texts university students read and write (Bernstein, 1999; Maton, 2006; Parodi, 2010). The 'hard' sciences and engineering,

characterized by vertical knowledge structures with more cumulative and unified theories and stricter regulation of research activities, place a stronger emphasis on university students' acquaintance with accepted theories, thus foregrounding expounding registers with high technicality and metaphoricity. The humanities, with horizontal knowledge structures characterized by the coexistence of multiple -often competing- theoretical paradigms, observe a lesser emphasis on learning theories and privilege the ability to appraise human nature from multiple perspectives, thus foregrounding exploring registers with prevalence of technical abstractions. Social sciences are thought to occupy a middle ground between the prototypically vertical knowledge structures of the hard sciences and the prototypically horizontal structure of the humanities, with co-existing theoretical paradigms achieving varying degrees of theoretical cumulateness (Wignell, 1998, 2007). The university curriculum of social sciences thus addresses both the expounding the exploring sectors of contextual typology, including technical terms and grammatical metaphor but privileging technical abstractions.

Learners' registerial pathway through the university curriculum is determined by disciplinarity not only in terms of exposure to registers, but also in the volume, variety and range of texts instantiated. Parodi's (2010) research on academic and professional genres found students in the social sciences to engage with a significantly larger volume of texts with higher variation in their field of activity (research articles, reports), while students in science and engineering majors read a much smaller amount of texts, almost circumscribed to manuals and didactic guides. Parodi's research also illuminates the miscellaneous nature of texts in the university curriculum by noting its incorporation of pedagogical academic texts (textbooks) and disciplinary texts (those circulating among discipline specialists). The fact that the former are prevalent across the studied university majors reflects the recontextualizing function of registers in university curricula. Pedagogical texts such as

textbooks, manuals and specialized dictionaries recast disciplinary knowledge in a more learnable format, presenting it in a simplified and didactic manner which bears little linguistic resemblance with the more demanding and persuasively oriented disciplinary texts. Exposure to the latter, Parodi adds, is almost exclusive to the social sciences and humanities, suggesting that majors in these areas are more likely to prefigure the text-based knowledge construction practices of the discipline than science and engineering majors, which are more oriented to professional practice.

With graduate education comes a significant expansion of individuals' potential to mean in their areas of specialization, marked by apprenticeship into the world of academic research and into disciplinary registers. Learners at this stage are expected to develop and demonstrate increasingly specialized field knowledge and an optimal capacity for constructing new knowledge and advancing persuasive arguments with adequate command of academic registers. In meeting these expectations, graduate students experience the construction of an authorial self, reflected linguistically in the gradual adjustment of the contextual structure of texts to meet disciplinary conventions (Berkenkotter, Hokin & Ackerman, 1991), the texturing of authorial voice (Ryshina-Pankova, 2011; Cheung, 2018), and the incorporation of 'metadiscursive' devices for mediating the flow of information in long texts (Swales, 1990). The writing of dissertations and doctoral theses plays an important role in pushing these developments. Master's dissertations and doctoral theses integrate a variety of text types which scholars continue instantiating throughout their academic trajectories, including theoretical argumentation, literature reviews, methodological procedures, findings, reports, critical discussions and recommendations (Thompson, 2013); thus their relevance as a formative register fostering key skills for academic publication.

Research on the language of theses and dissertations provides a useful indication of the nature of the developmental drifts originating in the graduate education period. An

interesting cross-sectional study comparing the writing of master's degree dissertations and journal articles in the field of Applied Linguistics from a complexity perspective is Liu (2018) (see comparative Table 1).

Table 2.1: Comparison of complexity measures in Applied Linguistics master's degree dissertations and journal papers (based on Liu, 2018)

Type	Measure	Master's students	Experts	Effect size (Cohen's <i>d</i>)
Sentence-level	Mean length of sentence	23.20	26.28	.786
	Clauses per sentence	1.920	2.010	.297
	Causal/concessive prepositions <i>although/because</i>	1.161	1.967	
	Conditional preposition <i>if</i>	1.140	874	
Clause-level	Mean Clause Length	12.14	13.19	.632
	Non-finite embedded clauses	1.270	2.112	
	Complex nominals per clause	2.951	3.410	.772
Group/phrase level	Noun phrases with post-modifier	42.00%	42.00%	
	Prepositional phrase as post-modifier	90.00%	93.00%	
	Embedded clause as post-modifier	10.00%	7.00%	
	Noun phrases with prepositional post-modifier other than <i>of</i>	50.00%	59.00%	
	Length of post-modification	5.70	6.95	.297
	Percentage of complex nominal groups as Subject	17.66 %	26.00%	
	Length of complex nominal phrases as Subject	6.56	8.2	.530

Compared to master's degree writing, experts' writing in journal papers reveals higher frequency of causal conditional relators, a significantly higher number of non-finite clauses embedded as nominal group post-modifiers, a higher number of complex nominals per clause and longer post-modifying structures. Experts' writing also shows a higher frequency of long nominal groups as clausal Subjects, including a variety of transcategorized fact clauses. Master's students writing shows higher incidence of conditional complexes with relator *if* and of finite embedded clauses as nominal group post-modifiers. Systemic interpretation of these findings suggests that, in Applied Linguistics, the developmental passage into scholarly

practice entails a stronger focus on causal enhancement relations, recognition of alternative voices (as suggested by higher use of concessive prepositions), and improved skills for reducing the negotiability of moves at the nominal group rank (through non-finite embedded clauses). Differences within the nominal group seem to carry much of the developmental contrast, especially regarding the type and length of post-modification and the function realized by long nominal groups in interpersonal clause structure. The question emerges as to whether the complexity features identified for expert writing in the field of linguistics remain stable throughout scholarly trajectories (See Chapter IV).

Another interesting study tracing the development of academic writing in graduate education from an interpersonal perspective is Cheung (2018). This study compared the realization, distribution and systemic co-occurrence patterns of the APPRAISAL system of ATTITUDE in texts written by three case study subjects at the beginning and at the end of their master's program (their master's proposal and their master's dissertation, respectively). The author identified three main developmental drifts. The first drift concerns the increasing trend to couple ideational and interpersonal meanings in textual phases involving the reporting of the object of study, the reporting of relevant prior research, and the description of the writer's own study. The case study subjects developed a stronger authorial presence in these phases by evaluating their object of study and their research with intensified positive ATTITUDE, and by using implicit ('invoked') ATTITUDE to enact a critical voice in the evaluation of prior research.

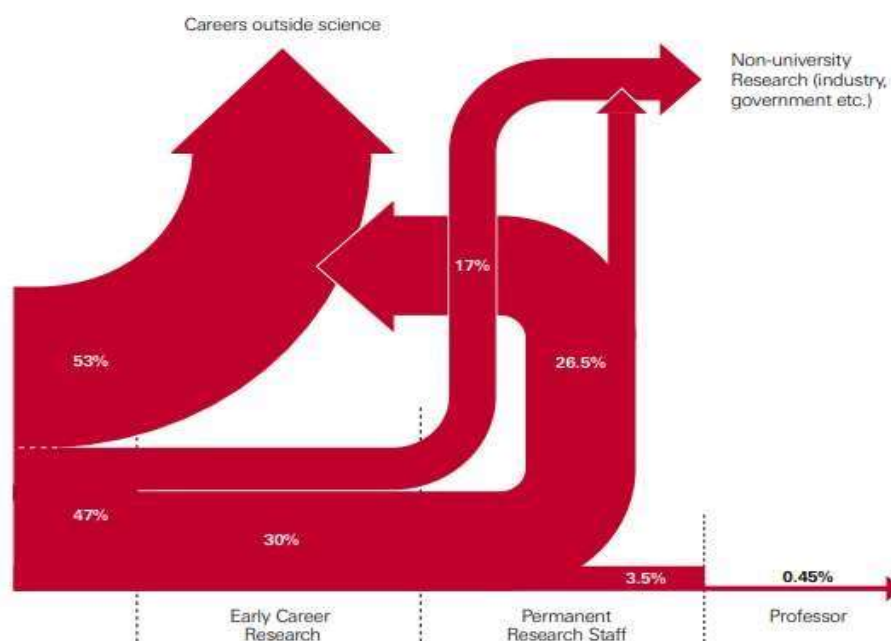
The second drift concerns the position of evaluative resources within each textual phase (the 'prosodic strategies'): master's dissertations evinced a more strategic exploitation of the periodic structure of textual phases to intensify and saturate key ideational meanings, mastering the ability to deliver 'interpersonal punches'. The third drift concerns the opening of intersubjective spaces in the alignment with alternative voices through the system of

ENGAGEMENT: the master's dissertations show a more effective balancing of dialogically open ('heteroglossic') evaluation in the discussion of prior research with dialogically closed ('monoglossic') evaluation in the methodological description of the study. Findings in this study reinforce the importance of the registers of graduate education in expanding the range of semantic strategies for enacting disciplinary roles and in reconfiguring interpersonal lexicogrammatical resources in a more strategic direction (See Chapter V).

2.3.2. Scholarly writing: the end of the developmental journey?

The size of the population obtaining degrees dramatically tapers off as educational cycles advance. Only a small minority of OECD citizens obtains doctoral degrees conducive to a scholarly career (as few as 1.8% in 2019) (OECD, 2020). The rate is generally smaller in less developed economies. Holding a doctoral degree does not, however, guarantee entry into or success in academia. As Figure 2.2. shows, less than half of doctoral graduates join university departments as academics, of whom only 30% manage to become early career researchers.

Figure 2.2: Doctoral graduate career pathways (from The Royal Society, 2010, p. 14)



Approximately halfway through their scholarly careers, 26.5% of academics abandon universities and as few as 3.5% continue on board as permanent research staff, and only a small minority (0.45%) attain professorial positions. Less than 4 out of 100 doctoral graduates has a chance of having a full-fledged scholarly career within academic departments. Besides revealing a tremendously competitive system, these figures justify the inference that individuals succeeding at securing an academic position until -or close to- retirement (what in this thesis is referred to as a ‘scholarly trajectory’) are part of a highly select elite of language users whose level of linguistic development is arguably exceptional.

The notion of linguistic development within this elite minority seems hard to conceive under a view of development as the shedding of layers of linguistic imperfection, the pervasive “more and better” view criticized in Ortega and Byrnes (2008, p. 281). By most standards of linguistic advancedness, scholars’ language use is highly advanced throughout their entire trajectories: it needs to be so if they are to retain their position in such a competitive context. Scholarly writing is, in fact, the standard against which advancedness in educational cycles is often measured, the assumed culmination of the long journey of academic literacy. The dearth of language-based studies of scholars’ development attests to the fact that they are not studied as developing language users. Besides their linguistic exceptionality, the unstructured nature of scholars’ language trajectories makes the study of their developmental pathways less conceivable within traditional notions and approaches to linguistic development. The fact that scholars’ trajectories are not circumscribed within a curriculum establishing expected linguistic performance goals makes it difficult to define what counts as linguistic development for them. A strong conclusion could be that scholars’ language does not develop further, in the sense that their journey towards what is viewed as linguistic advancedness has arguably been completed.

The view that language development¹ entails progression towards more accurate or sophisticated forms of language use has come under attack in recent decades. Writing researchers have called for a redefinition which acknowledges its multifactorial complexity and inherent variability, revisiting the pervasive linear conception of development inherited from the language acquisition paradigm, itself rooted in the modern ideal of progress. As Lemke (2003, p. 71) comments:

Because developmental processes across different scale levels strongly interact with one another, there is no single linear progression in development, and no meaning to claims that later developmental stages (adults) are better adapted than earlier ones (children). It is the typical human conception-to-embryo-to-infant- to-child-to-juvenile-to-adult-to-elder-to-death trajectory that has evolved, and it is this trajectory *as a whole* that has come to be adapted to the human environment.

Part of the shift lies in recognizing each developmental stage as entailing involvement in social activities which are intrinsically meaningful regarding learners' evolving consciousness and needs. The linguistic choices made by learners at each stage serve semiotic purposes connected with their ongoing representations of experience and their evolving positioning within social institutions. Labelling linguistic choices as more or less advanced misses the fact that they reflect socially motivated semiotic processes unfolding within continuous semiotic histories. Scholars' language does not become more advanced over time: it is a continuation of learners' lifetime disposition to adapt to changing needs and contexts.

Phase III language development involves the lifelong expansion of personalized potentials to mean across the institutional contexts of home, schooling, professional practice,

¹ An important distinction needs to be made between language "change" and language "development". Language "change" may be understood as a broader phenomenon encompassing the three complementary semogenic histories proposed in Halliday and Matthiessen (1999): semogenesis (change in the unfolding of meanings in text), ontogenesis (change throughout individuals' linguistic trajectories), and phylogenesis (change in the linguistic system over extended periods). Language "development" is thus one dimension of language change which involves extended variation over an individuals' corpus of texts, reflective of adaptive motifs resonating with their evolving roles within speech communities. This thesis operationalizes developmental change as 1) non-random drifts in linguistic variables in the contrast of scholars' early and late career writing, and 2) as extended pathways in individual scholars' trajectories. It should be stressed, however, that both change and *continuity* are important indicators in the study of developmental language variation (see Chapter III: Methodology).

and research apprenticeship. The learnability of language across contexts rests on the fact that meaners do not need to incorporate the entire meaning potential of language all at once, because this potential is distributed across contexts in functional varieties calls ‘registers’ (Matthiessen, 2009). Registers are varieties of language use that have co-evolved with institutional contexts to enable social participants to perform culturally valued activities , such as the construction and exchange of knowledge (see Part I of the present chapter) (Halliday, 1989; Matthiessen, 1993, 2013).

At the phylogenetic scale, registers are durable disturbances in the systemic probabilities of language systems which make some semantic strategies and lexicogrammatical realizations more or less likely in specific contexts (Nanri, 1994). Their durability is enabled by collective memory of the innumerable instantiations of social situations in which these probabilistic configurations of linguistic resources have served a common social goal. This collective memory makes registers recognizable, socially valued, and teachable cultural tools. In the ontogenetic scale, registerial repertoires are the long-term memory of one’s linguistic passage through institutional contexts: the memorable configurations of systemic probabilities associated with the social activities we significantly engage with throughout our lives. Our continuous history of semiotic engagement with social activities comprises our biography of textual instantiations and reorganizes it as a resource for guiding future semiotic action and enriching our identities over time:

Individual developmental trajectories on longer timescales may be envisioned as "envelopes" of the shorter timescale trajectories. Lifelong development is a vague trending summation, usually retrospective, over many specific kinds of changes in our patterns of behavior, each of which accumulated from many specific incidents or periods of engagement in some activity. Seen from the short-term scale, this moment's performance may or may not ever again recur; some culturally significant aspects of it may be enacted again, soon or much later; there may be other kinds of continuity constructed among these events or none. (Lemke, 2003, p. 73)

At each new instantiation, registerial repertoires provide a model of the relevant social activity and its associated probabilistic configurations of meaning-making strategies.

Depending on the complexity and contingency of contexts of situation, the activation of registerial repertoires in logogenesis may be more or less automatic (Hasan, 1999). Some highly frequent situations are instantiated as ritualized routines with remarkable logogenetic similarity across instances, such as exchanging greetings with a colleague on the way to the office. Some situations are so highly routinized that they are stored in collective memory as verbal formats — such as prayers and judicial declarations — or are materialized as written formats — as in forms or tax declarations. Other situations are highly complex and contingent, varying considerably in Field, Tenor and Mode parameters across instantiations although retaining a higher order unity in terms of social purpose and global range of probable strategies.

The registers of academia are naturally of this latter type. The fact that some isolated features repeat themselves frequently in academic writing (Biber *et al.*, 1999) does not contradict the strategically contingent nature of academic register instantiation. In scholars' instantiation of academic registers throughout their academic trajectories, registerial repertoires are likely to activate recurrent semantic strategies and lexicogrammatical chunks, combined with a set of more open-ended strategies and lexicogrammatical resources (which may go on to become consistent additions to the repertoire). The incorporation, reuse and decay of semantic strategies and resources for their grammaticalization in scholars' registerial repertoires is the driver of linguistic change along scholarly trajectories. Registerial repertoires actualize as individuals adapt to changing institutional roles across contexts. Language is well equipped to deal with the complexities of adaptation because it is itself a complex adaptive system which has co-evolved with a changing social material environment (Beckner *et al.*, 2009). It adapts at the phylogenetic scale, being reshaped by and reshaping

changing institutional contexts (Matthiessen, 2008), and at the ontogenetic scale, as personalized meaning potentials expand in response to meaners' accrual of roles throughout life (Halliday, 2008).

The question guiding this chapter (What is the nature of scholars' writing development?) could be decomposed into two more specific questions: what social changes does scholars' semiotic repertoire adapt to? and how does the adaptation of scholars' semiotic repertoires occur? Both questions are naturally too complex for an answer to be provided with a satisfactory level of detail. Because scholarly trajectories involve specific configurations of settings, participants and goals, the environmental factors driving change and the nature of their adaptive strategies are unique for each scholar. However, reasoning about individuals as belonging to speech fellowships revolving around overarching social goals makes it possible to propose hypotheses as to the general nature of the social transformations pushing the adaptation of linguistic repertoires. The fact that common themes recur through scholars' literacy autobiographies shows that there is unity in diversity, with shared goals, affordances and constraints manifesting to individual scholars through distinct circumstances.

Some of the environmental pressures pushing adaptation in scholarly registerial repertoires are of an exogenous nature. The highly excluding and competitive nature of academic careers, illustrated in Figure 2.2, can influence the semiotic pathways of scholars towards specific orientations. Early career scholars, facing the pressure of inserting themselves in a tight academic work market, may be more intent on emphasizing the added value contributed by their research, and on showing alignment with specific sectors of the academic speech fellowship. The prevailing "Publish or Perish" culture puts pressure on academics to increase publication rates in compliance with management expectations, prompting adaptations in scholars' career goals and priorities, including "the marginalization

of teaching and research that may lack relevance, creativity and innovation” (Miller, Taylor & Bedeian, 2011, p. 422). The complex social structure of universities and their sub-units, characterized by internal struggles over the flow of goods, services, information, and decision-making power (Gumport, 2007) constrains the roles that scholars can perform throughout their lives and, by extension, their range of accessible semiotic activities (see Section 7.2 in Chapter VII for illustration). These exogenous pressures shape scholarly language trajectories and can indirectly influence adaptations in scholars’ registerial repertoires.

However, the main pressures pushing adaptation in scholarly writing development are arguably of an endogenous nature, referring to individuals’ developing appropriation and negotiation of contexts of situation. These pressures, approached through context of situation parameters, could be classified as Field-oriented, Tenor-oriented.

From a Field of Experience perspective, one of the drivers of adaptation is specialization into experiential domains, a process in which the knowledge structure of the discipline is a major differentiating factor. Disciplines differ in the extent to which they construct knowledge cumulatively and in the order in which empirical observation, analysis, description and theory occur. Scholars in the physical and biological sciences may exhibit high continuity in thematic specialization throughout their trajectories, their linguistic repertoires adapting to the continuous emergence of new meanings about a specific object or phenomenon by becoming more delicate and by increasing the interconnections between experiential domains. The increasing paradigmatic elaboration and interdependency of scholars’ experiential repertoires is reflected syntagmatically in denser clausal structures, where prior construals become things participating in new construals, and are backgrounded as Given in unfolding discourse. Montemayor-Borsinger’s (2002) finding regarding the

higher complexity of nominalizations functioning as Subject in physics scholars' late career writing attests to this adaptive mechanism.

Social sciences differ in the unity of their knowledge base and in the linguistic strategies for coping with the accumulation of meanings at the logogenetic, ontogenetic and phylogenetic timescales. Developing as a scholar in the social sciences entails specializing into one of the various paradigms coexisting in the discipline, each adopting a perspective on the object of study, a body of theoretical assumptions about its nature, and specific strategies for constructing and legitimizing knowledge claims. Initial specialization into a disciplinary paradigm occurs during young scholars' disciplinary apprenticeship, where critical socializing actors like mentors, supervisors and peers orient scholars to embrace specific paradigms. Paradigm-specific taxonomies of entities and processes shape experiential repertoires, making certain aspects of the object of study visible and rendering others less visible. Social science scholars may remain circumscribed to a single paradigm, traverse different paradigms throughout their trajectories, or attempt to combine different paradigms.

Specialization within a single experiential domain is less characteristic for social science scholars: because research agendas are less regulated from a singular disciplinary center, but are rather coordinated within multiple disciplinary poles with weaker regulating capacity, social science scholars exercise higher autonomy in their thematic specialization choices and tend to incorporate more than one research interest. Their construction of experiential repertoires would entail less delicate taxonomies for specific objects and lesser integration between them: their experiential repertoires would have a multipolar structure (reflecting the knowledge structure of their discipline). This multipolar structure distributes experiential meanings across several areas, reducing the overall saturation of personalized experiential systems. The multiple foci of specialization reduce the need for recycling meanings across textual instantiations as construals evolve logogenetically and

ontogenetically, and thus clausal structure would not drift towards increasing density or metaphoricity. Social science scholars' trajectories would, instead, drift towards higher lexical diversity, reflecting the multipolar structure of their experiential repertoires (See Chapter IV). Naturally, individual social science scholars can differ in their degree of specialization and experiential focus throughout their trajectories.

From a Field of Activity perspective, two possible orientations for the expansion of activity repertoires may be proposed. On one hand, activity repertoires expand by extension, as new semiotic activities are incorporated into scholars' repertoires in consonance with the institutional roles performed throughout their academic trajectories (research associates, project leaders, theory developers, critics, hypothesis testers, trainers, advisers, designers, etc.). Individual scholars never encompass the entire meaning potential of language: there will be a number of registers not accessible to meaners throughout their life, registers beyond their full capacity to understand or produce or participate in. Apprenticeship into academic registers, typically during graduate education, significantly extends young scholars' activity repertoires through intensive exposure to exploring and expounding scientific registers. Throughout scholarly trajectories, the expansion of activity repertoires also occurs by elaboration, as scholars re-instantiate registers throughout their semiotic lifelines revisiting previous categorizations, developing explanations as comprehension of phenomena evolves, restating arguments in consonance with their evolving convictions, and revaluing theoretical positions in their field. In the process, they may reshape specific activities by adding, removing or reorganizing contextual phases and the semantic strategies realizing them. Scholars may, for example, privilege the CARS structure for article introductions (Swales, 1990) early in their career and develop new introduction structures over time. Disciplinary variation is also important in this regard. Physical sciences may entail lesser variation in contextual structure, given higher regulation in the expected contents of text sections;

whereas some social science paradigms may be flexible enough to leave room to innovations in their content and structure.

From a Tenor perspective, scholars' repertoires adapt by calibrating authorial and reader positionings, developing what has been called a "voice" or an authorial identity. One of the endogenous pressures affecting Tenor-related aspects is the cyclical nature of theory construction, which calls for varying degrees of certainty, engagement with alternative voices and evaluative force. These cycles may occur in parallel with the gradual construction of an authorial identity over time – a developing concept of one's positioning vis-à-vis knowledge and the disciplinary speech fellowship (See Chapter V). Disciplinary variation is, again, an important factor. Tenor-related parameters are likely to be more dynamic in scholarly trajectories in social science and humanities disciplines, whose registerial center of gravity is in the exploring sector of Field of Activity.

2.3.3. Summary

This section situates scholarly language development within the ontogenetic model, showing some of its continuities and discontinuities with prior developmental transitions. Scholars' development continues to be chiefly about expanding personalized meaning capacities across contexts. Through the instantiation of academic registers of their discipline over time, scholars individuate the set of strategies for making meaning and realizing meanings as wordings in text, they expand the delicacy of their experiential repertoires and recalibrate their interpersonal relationship with readers in accordance with their developing identities and their changing roles. The overview of language development from early childhood to graduate education reflects an extensive orientation once Phase III is fully in place: individuals expand their registerial repertoires by adapting to the doing and sharing registers of the family and community contexts, the multiple registers of schooling, the pedagogical and disciplinary registers of undergraduate education, and the apprenticeship

registers of graduate education. On one hand, scholarly development is approached as an expansion of registerial repertoires evident in the growing range of text types instantiated by scholars in their passage through academia. On the other hand, development is approached as intra-registerial variation, based on the hypothesis that the linguistic resources associated with specific registers undergo reconfigurations as they are instantiated repeatedly throughout scholars' trajectories. The subsequent chapters of this thesis present and discuss findings related to this expansion in the writing trajectories of 20th century linguists.

CHAPTER III: METHODOLOGY

This chapter discusses methodological considerations providing an orientation for the study of scholarly writing development in the present thesis. The first part defines the scope and research paradigm guiding the studies performed to address the research questions introduced in Chapter I. The second part outlines methodological problems inherent in the study of scholarly writing development and describes relevant longitudinal research designs and strategies. The third part elaborates on the selected research designs (retrospective longitudinal cohort sequential design and longitudinal case study design) and on the structure of the language corpora built for each of them (the Twentieth Century Linguists corpus and the Halliday Corpus). The fourth and last part introduces general aspects of the data analysis procedures applied, stressing the complementarity between quantitative and qualitative analysis. Chapters IV, V, VI and VII each contain methodological sections elaborating on the specific analytical procedure applied for their target research question.

3.1. Research paradigm

This research project addresses the issue of scholarly writing development as reflected in the diachronic use of ideational and interpersonal language features by linguistics scholars born and educated during the twentieth century. The scope circumscribes itself to a medium of communication (writing), a single discipline (linguistics), a subset of language features, and a specific phenomenon (language change within scholarly trajectories). The theoretical, methodological, and empirical generalizations deriving from this project cover these delimited domains; although, with proper contextualization, they may inform related domains (i.e. different disciplines, historical periods, or language features).

In reflecting on the connections between this thesis and linguistic research, a useful initial step is to situate it within a research paradigm, an “underlying philosophical view of

what constitutes knowledge as the researcher seeks to gain understanding of a particular topic” (Paltridge & Phakiti, 2010, p. 15). A popular scheme comes from Guba and Lincoln (2005), who characterize five social science research paradigms (positivist, postpositivist, critical, constructivist, and participatory) around various criteria, including ontology, epistemology, methodology, and reflexivity. One limitation with these categorizations is that they are broadly geared towards research in social sciences (including education), leaving aside central methodological issues specific to linguistic research (C.M.I.M. Matthiessen, personal communication, May 8 2020). There are various dimensions around which paradigms in linguistic research can be mapped. In the present case, key considerations include the nature of the research activity, the systemic order in which the studies specialize, and the trade-offs between comprehensiveness and selectivity and between manual analysis and automated analysis. These considerations I will now briefly examine with regard to Matthiessen’s (2010) vision of an Applicable Linguistics as a synthesis between theory and application.

The nature of research activity refers to the scope of the researcher’s task within a hierarchy of activities including, from smaller to larger scope, analysis, description, comparison, and theory (Matthiessen, 2010, p. 141). The organization implies that the activities higher up in the hierarchy have a broader scope, entail higher abstraction, and presuppose extensive completion of the activities below them. Theory seeks to “define the properties of the human system of language” (p. 141), which presupposes systematic comparisons of descriptions from multiple languages; which entails, in turn, the existence of adequate descriptions of the systems of these languages based on the analysis of a large and diversified body of language data. Analysis involves relating instances (texts) to options in language systems, moving up towards the potential end of the cline of instantiation. Along these lines, a theory of scholarly language development presupposes the existence of

systematic comparisons of developmental patterns across scholars writing in different disciplines and languages, which requires adequate descriptions of variation profiles in linguistic systems based on extensive analytical evidence. This thesis situates itself within the lower end of this hierarchy (analysis) with a view to descriptive statements applicable, in their most immediate scope, to scholars in the field of linguistics born during the first half of the 20th century, but potentially relevant to future comparative work capable of informing a theory of scholarly language development.

Linguistic phenomena may be approached within at least four orders of analysis: physical, biological, sociological, and semiotic (Matthiessen, 2010, p. 149). Scholarly language development can be studied within the physical/biological order as a process of neurological maturation, reconfiguration, and decay, as illustrated by research in lifespan language variation (e.g. Bialystok *et al.*, 2006; Salthouse, 2010). It can also be approached sociologically, foregrounding the institutional affordances and constraints shaping scholars' paths in connection with their interests and goals, as illustrated by the rich body of introspective research discussed in Chapter II (Part I). This thesis approaches scholarly language development within the semiotic order of analysis, with a focus on the denotative system of language in covariation with the connotative system of context. This choice entails that the focus of analysis is on the variation patterns of linguistic resources throughout their trajectories as meaners and their possible resonances with the semiotic processes of expounding on and exploring scientific knowledge.

The breadth and complexity of analysis in the semiotic order makes it necessary to entertain the trade-off between comprehensiveness and selectivity (Matthiessen, 2010, p. 189). Linguistic analysis has handled this trade-off in two ways: i) by privileging the number of systems analyzed at the expense of data coverage, and ii) by privileging data coverage at the expense of reducing the number of systems analyzed. The former option can provide rich

and highly contextualized accounts of text, but it is costlier in terms of research resources (e.g. time devoted to analysis) and supposes a higher risk of analytical bias. The latter option is maximally reliable, but potentially limited in its ability to inform meaningful inferences. This thesis proposes a middle-ground solution between these two extremes, which consists of combining waves of highly selective and extensive analysis geared towards detecting patterns in large volumes of text data with waves of comprehensive analysis geared towards illuminating underlying functional mechanisms in the detected patterns. This approach is reflected in the multi-report structure of Chapters IV and V, where a main study with limited systemic coverage is complemented by follow-up studies analyzing systems more delicately. It is grounded on the argument that analytical delicacy is costly and needs to be employed strategically in exploring the more significant patterns in the data (this might be termed a principle of “analytical economy”).

Related to the trade-off between comprehensiveness and selectivity is that between manual and automated analysis in terms of level of analysis and volume of text analyzed (Matthiessen, 2010, p. 192). Automated analysis allows covering large, even vast, amounts of language data such as those in contemporary corpora, but it is currently limited in its ability to go beyond low-level features at the orthographic word rank. Manual analysis allows engaging with the lexicogrammatical, semantic and contextual layers of text, but the amount of texts that an individual researcher can analyze within the timeframe of a doctoral research project (three years in this case) is necessarily small. In this thesis, I deal with this trade-off in different ways depending on the research question at hand, attempting to maximize comprehensiveness and depth through combinations of automated and manual analysis. For research question 3 (“Throughout their scholarly trajectories, to what extent does linguists’ writing change regarding its complexity, intricacy, density and sophistication?”), I mix automated analysis of a set of parameters known under the category of “complexity features”

(Norris & Ortega, 2009) with manual analysis of ideational systems in specific texts (Chapter IV). This complementarity allowed me to explore diachronic patterns in a corpus of more than two million tokens and to propose their interpretation in terms of syndromes of ideational language features (c.f. Halliday, 1985a).

For research question 4 (“Throughout their scholarly trajectories, to what extent does linguists’ writing change regarding the use of evaluative resources for assessing propositions and entities?”), I use manual analysis of a sub-sample of texts at the lexicogrammatical stratum, mainly because the interpersonal systems I am interested in cannot be automated in a way that allows meaningful inferences about them (See Chapter V). In Chapter VII, I combine word-level analysis assisted by corpus concordance tools with manual analysis of specific texts to account for patterns in a longitudinal study of interpersonal features. The combination of automated and manual modes allows me to probe the research questions at hand in a more extensive and meaningful manner than a purely automated or text-analytical approach.

Besides the above considerations, it is helpful to define the research paradigm informing this thesis with regard to the data collection and analysis approach. Regarding data collection, this thesis entails a non-experimental descriptive orientation (Paltridge & Phakiti, 2010) in which the principal aim is to analyze a phenomenon (scholarly writing development) as it occurs naturally, with no manipulation, modification, or control of the research setting. As for data analysis, the thesis follows a mixed-methods (or, more accurately, complementary methods) approach evident in the combination of quantitative and qualitative analysis techniques, the former flagging statistically significant diachronic trends in the target linguistic variables, and the latter elaborating on the functional mechanisms motivating diachronic trends. The complementarity of data analysis methods is firmly grounded in diachronic linguistic research. As Biber and Gray (2016, p. 106) affirm, “it is only through

the complementary qualitative analyses of particular linguistic features that we can elaborate upon, and attempt to explain, the functional motivations for quantitative trends”. The complementarity is justified by the fact that numeric trends are not self-explanatory, but they are symptomatic of underlying social semiotic processes which can only be revealed through linguistic analysis, ideally of the functional type (Matthiessen & Nesbitt, 1996).

3.2. Modelling developmental language variation

The study of scholarly writing development poses specific methodological problems calling for thoughtful consideration of longitudinal research design options. First, it requires distinguishing instantial changes in text from extended developmental change, considering the fact that, in logogenesis, meaners confront and craft solutions to emerging needs by devising adaptive strategies that may or not become durable traits of their linguistic repertoires (Lemke, 2003). It also needs to ascertain the relationship between global language change and change within individuals’ semiotic lifelines. Although change in individuals’ registerial repertoires and register change are indissolubly connected, they can occur in a manner such that individual trends may overlap with, outpace, or lag behind language change within registers (de Smet, 2016; Brook *et al.*, 2018). This lack of correspondence stems from the fact that individuals are unequally exposed to linguistic innovations, largely because generations of speakers with varying linguistic experience coexist within the community.

Studies of scholarly writing development additionally need to define the temporal boundaries of scholarly trajectories: unlike development in instructional contexts, where curricula offer natural guiding frames for delimiting developmental patterns, scholarly development occurs in an open-ended timeframe lacking a consistent structure. If scholars’ trajectories are studied based on their academic publication record, a fourth problem is the irregularity of publication frequencies across scholars: some scholars publish continuously,

others experience bouts of publication followed by extended gaps. Another central methodological issue is ensuring comparative validity: obtaining writing samples from the same scholar does not necessarily entail that the samples are comparable in registerial terms. These methodological problems render traditional approaches to diachronic linguistic research, based on the contrast of two or more cross-sectional corpora (e.g. Biber & Finegan, 1997; Mair & Leech, 2006; Leech *et al.*, 2009) less effective when accounting for linguistic change in scholarly trajectories.

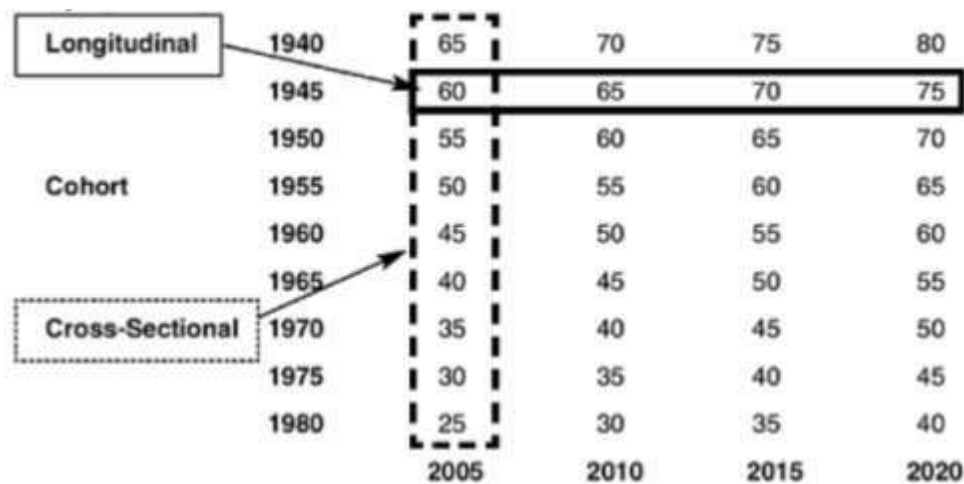
The study of language change may follow an apparent time or a real time approach, a distinction introduced to linguistics in Labov's classic Martha's Vineyard study (Labov, 1963/1972). Apparent time research involves comparing language data cross-sectionally from individuals at different age groups, assuming that the resulting trends reflect typical intra-individual variation. This research design sidesteps the fact that speech communities include generations of speakers whose exposure to, and adoption of, linguistic innovations varies throughout their lives. Real-time designs rely on language samples from the same individual or community at different time points. They can be prospective, requiring extended data collection periods, or they can be retrospective, entailing the collection of language data produced by an individual or community in the past. Retrospective designs are useful in cases where the individuals studied are not accessible (e.g. they are public figures with restricted schedules or they have passed away), and there is a detailed open-access record of their linguistic production over an extended period (Mollin, 2009). Both features are characteristic of scholars, which is why retrospective studies are the most feasible methodological designs when investigating scholarly writing development. Such designs focus on writing as product, targeting texts as depositaries of linguistic traits amenable to analysis and quantification. Their adequacy for process-oriented research is limited because longitudinal evidence of the planning, drafting, revising, and editing stages of the writing process is normally out of reach.

Central to real-time developmental inquiry is teasing out the confounding effects of age (years since birth), cohort (relative position since year of birth), and time of measurement (Schaie, 1965; Schaie & Caskie, 2005; Shrauf, 2009). Solid methodological proposals distinguish three constructs: age differences (a between persons effect), age-related change (a within persons effect), and differential change (a between persons effect) (Sliwinski & Buschke, 1999). The age differences construct can be explored through cross-sectional studies (those measuring multiple cohorts on a variable in a single time of measurement, Fig. 3.1.).

Although it has traditionally served as a proxy for the age-related change construct, longitudinal studies seeking to test its predictions have disproved its validity. For example, Verhaeghen's (2003) conclusion that vocabulary size increases throughout life, based on a meta-analysis of cross-sectional studies, has been disconfirmed by longitudinal studies testing the same group of individuals over time (Connor *et al.*, 2004). Age-related change, as a within-persons construct, requires longitudinal designs capable of capturing variation throughout individuals' trajectories.

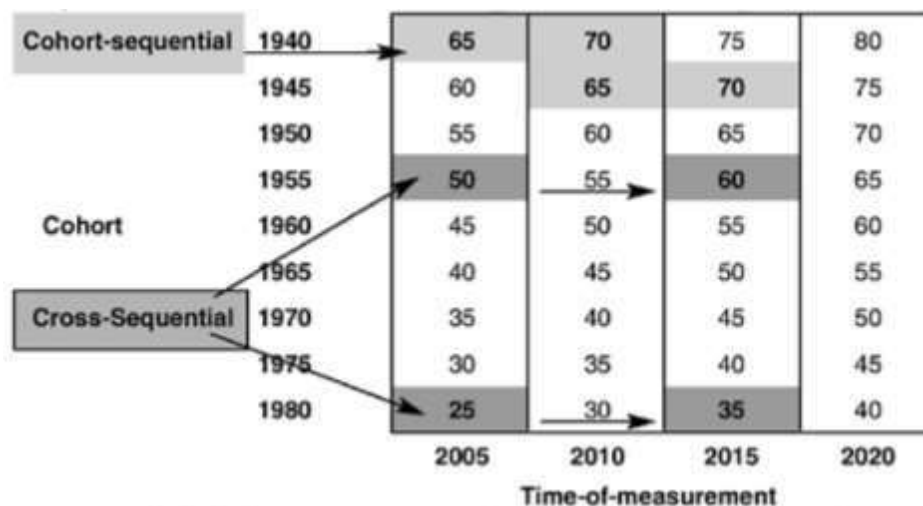
Simple longitudinal designs study linguistic variables in a single cohort over two or more data collection points (See Figure 3.1.). Although these designs adequately address the age-related change construct, they fail to address the differential change construct (the extent to which age-related change varies according to generational differences). For example, developmental differences may occur in the writing trajectories of scholars born in the generations before and after World War II, which a simple longitudinal design (i.e. only studying scholars born in the 1920's) may fail to capture.

Figure 3.1. Longitudinal and cross-sectional designs, adapted from Schrauf (2009, p. 247)



Sequential longitudinal studies are sensitive to both age-related change and differential change across generations. They involve collecting data from multiple cohorts (different age groups) and following up with the same individuals in at least one subsequent measurement. Schaie and Caskie (2005) distinguish three types of analytical strategies applicable to sequential designs: cohort-sequential, cross-sequential, and time-sequential. The cohort sequential strategy involves a layered data analysis process in which within-persons effects for specific cohorts are studied in overlapping data collection waves. Figure 3.2 illustrates a hypothetical study in which the 1940 cohort are measured at age 65 in 2005 and at age 70 in 2010, and the 1945 cohort are measured at the same ages on years 2010 and 2015. The cross-sequential strategy involves measuring two or more cohorts in at least two times of measurement. Figure 3.2 illustrates a cross-sequential analysis of two cohorts (1955 and 1980) measured in the same years (2005 and 2015). Schaie (1965) considers the cohort sequential strategy the most efficient design in for capturing intraindividual (age-related change) and interindividual (generational) change.

Figure 3.2: Cohort sequential and cross-sequential studies, in Schrauf (2009, p. 250)



An example of a retrospective cohort sequential longitudinal study is Kemper (1987), who studied syntactic complexity decline in a longitudinal sample and a cohort sequential sample of writings extracted from a set of diary volumes published by writers born between 1820 and 1829. Her study illustrates the advantages of combining these analytical techniques by distinguishing age effects (decline in embedded constructions) from cohort effects (reduction in the use of infinitive Subjects and sentence length). Cohort sequential studies are thus an adequate strategy for addressing the problem of distinguishing developmental change from logogenetic and phylogenetic change. They also address the problem of partitioning individuals' trajectories for measurement, since data collection points can be adjusted to match specific age ranges.

Diachronic corpus-based linguistics has addressed the problem of comparative validity through diverse methodological strategies, although largely neglecting the issue of intra and inter-individual variation in language change. Leech *et al.* (2009) stress the importance of ensuring corpus comparability in establishing valid diachronic corpus contrasts, highlighting the need for the registerial composition of corpora to be as homogenous as possible. Biber and Gray (2016) finetune comparative validity criteria to

include disciplines, a source of linguistic variation not acknowledged in earlier studies of academic language historical variation. Register is central to comparative validity. As functional varieties of language resonating with institutional contexts (Halliday, 1978), registers constitute the primary criterion for deciding on the validity of diachronic comparisons between texts.

Historical linguistic studies typically assume linguistic homogeneity in the registerial profile of disciplines, omitting the variability of academic discourse along the expounding-exploring continuum (Matthiessen, 2013). One valid reason for doing so is the fact that more nuanced comparisons based on text-typological criteria impose a layer of analysis which may not be consistently applicable across texts. While contextual phases of description, explanation, argumentation, and discussion can be isolated analytically for specific texts, most instances combine these semiotic processes in complex manner. Comparisons based on paper sections (introduction, literature review, conclusions) would ensure higher comparative validity, although the assumption that academic texts in a discipline like linguistics follow a standardized section structure with consistent registerial features may not be born out in language data, especially that from earlier periods of the discipline. For the purposes of this thesis, it seems sufficient to establish diachronic comparisons on scholars' academic production, assuming a satisfactory degree of registerial comparability.

One weakness of cohort sequential designs studying communities of speakers is their limited ability to illuminate fine-grained developmental processes characterizing individual trajectories. These processes may be more aptly approached through longitudinal case studies of selected individuals, in which repeated measures of their linguistic production are submitted to statistical and functional linguistic analysis. Case studies facilitate intensive engagement with complex phenomena by maximizing opportunities for observing specimens in their naturalistic setting and reflecting on their relationship with broader constructs under

research (Duff, 2014). By avoiding reductionism and promoting holistic approximations, case study research is better suited for extending, refining, and modifying existing theoretical constructs, or pointing to theory gaps (Yin, 2018). Longitudinal case studies of language development especially fit the goal of establishing antecedent and consequent relations between variables (Belz & Kirkinger, 2002; Ortega & Iberry-Shea, 2005). Combining a cohort sequential design with one or more longitudinal case studies maximizes opportunities for teasing out the diachronic unfolding and interrelation between linguistic variables along meaners' semiotic trajectories.

This thesis adopts some of the reviewed methodological strategies, contextualized to the study of scholarly writing development. It implements a dual approach to distinguishing developmental trends from instantial changes, involving a retrospective longitudinal cohort-sequential design and a retrospective longitudinal case study.

3.2.1. The cohort sequential design

The cohort sequential design connects to the age-related change construct, addressing research questions three and four (enquiring about trajectory changes in complexity and evaluation):

(RQ3) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication?

(RQ4) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities?

This approach has a contrastive orientation, in that it seeks to identify possible changes in linguists' writing between their early and late career periods. Early career is operationalized as the period comprising ten years after doctoral graduation or equivalent

milestone in academic apprenticeship (for most scholars sampled corresponding to their late twenties and thirties), and late career as the period between mid-fifties and mid-sixties, where most of the scholars sampled have retired or approach retirement. The underlying hypothesis is that one or more of the variables associated to complexity and evaluation will show significant differences in linguists' late career writing, revealing a developmental drift (a general tendency to increase, decrease or remain stable). I borrow Sapir's (1921, p. 10) notion of drift to denote non-random directional change across the aggregate trajectories of a community of scholars:

Language exists only in so far as it is actually used— spoken and heard, written and read. What significant changes take place in it must exist, to begin with, as individual variations. This is perfectly true, and yet it by no means follows that the general drift of language can be understood from an exhaustive descriptive study of these variations alone. They themselves are random phenomena, like the waves of the sea, moving backward and forward in purposeless flux. The linguistic drift has direction. In other words, only those individual variations embody it or carry it which move in a certain direction, just as only certain wave movements in the bay outline the tide. The drift of a language is constituted by the unconscious selection on the part of its speakers of those individual variations that are cumulative in some special direction.

Developmental drifts differ from developmental pathways in that they do not presuppose a linear progression towards an expected end state: they inform of likely variation patterns in aggregates of individual trajectories, from which specific individuals can differ.

The cohort sequential design also covers between-persons effects related to registerial evolution, addressing research question 5:

(RQ5) What is the relationship between language change within linguistics scholars' trajectories and the general evolution of academic registers?).

The design thus allows teasing apart age-related change from registerial change, providing a solid account of the relationship between these interrelated but distinct timescales.

3.2.1.1. The Twentieth Century Linguists (TCL) corpus

The language data for the cohort sequential design comes from the Twentieth Century Linguist Corpus, a collection of academic papers by 75 linguists born between 1904 and 1963 built for the purposes of the present thesis. The construction of a new corpus is justified by the fact that no academic language corpus exists which allows the study of within-persons and between-persons linguistic change. The corpus building process proceeded in two stages: planning, and compiling.

The planning stage involved making decisions as to the content and organization of the corpus, weighing the needs of fitting the selected cohort sequential design and ensuring an adequate degree of representativeness. An early decision was setting the disciplinary focus on linguistics, given the scarce body of related research in human sciences and the intensive growth of this discipline during the 20th century. Although a multidisciplinary corpus would allow a more nuanced understanding of the issues under study, the amount of working hours needed to compile a valid and representative corpus of this type was deemed to exceed the time constraints for this doctoral research. For reference, building the corpus for a single discipline took approximately five months.

With a defined disciplinary focus, the next planning step entailed deciding on the features of the selected scholars. The cohort sequential design required a layered chronological corpus structure, with scholar cohorts born during different decades of the twentieth century. Access to scholars' biographical data, chiefly year of birth and year of PhD/MA graduation, was a major inclusion criterion, given the demands of the design I

selected. Biodata with the required features is most readily available for well-known linguists, whose lives are recounted in more detail in online documentary sources, including Wikipedia, departmental webpages, tribute papers, and obituaries. A guiding source was the Google H-Index ranking for linguistics, which includes some of the most recognized scholars in the field.

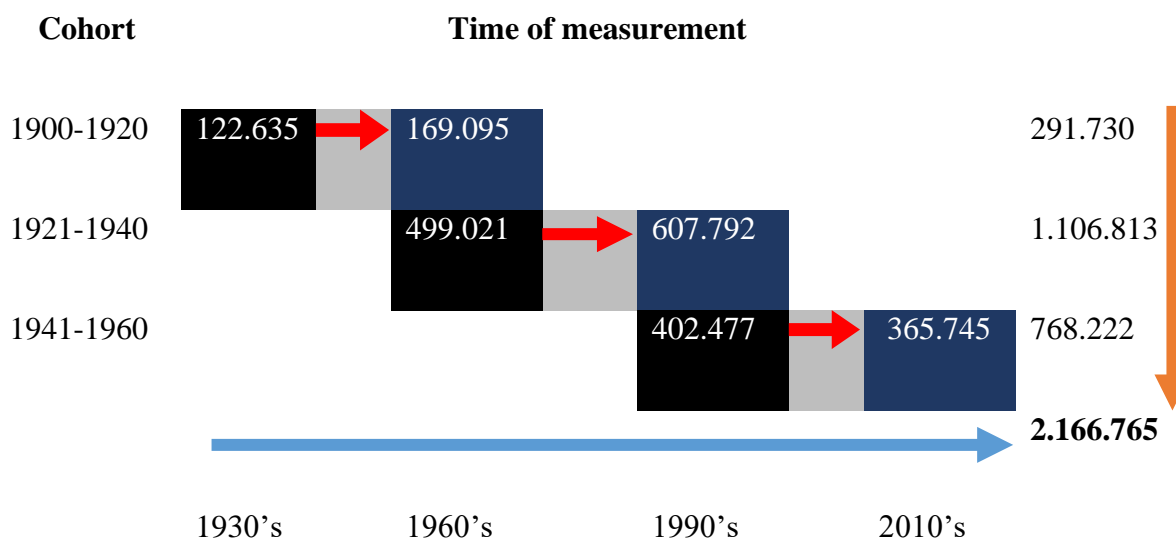
Other important inclusion criteria referred to more specific characteristics of the scholars' trajectories. The corpus only includes authors whose disciplinary area is linguistics and its subdomains, including phonology, lexicology, grammar, semantics, pragmatics, and discourse analysis. It excludes scholars working in other language-related disciplines (i.e. philosophy of language, literary studies, and neurolinguistics) and in applied linguistic domains. It only includes authors whose trajectories feature 10 or more single-authored papers published originally in English and accessible from online databases. I excluded authors whose trajectory consists mostly of co-authored papers, or with more than a half of their publications in a language other than English, to control for the confounding effects of co-authorship and linguistic variation (accounting for these variables would require a more complex design). To remove the effect of different modes in the corpus, I excluded interviews and printed conference speeches, as well as papers with a non-academic rhetorical mode, such as manuals and handbooks.

Initial documentary revision yielded a total of 98 scholars meeting the established inclusion criteria. After I removed 28 scholars due to inconsistencies in their biographical record or difficulties in accessing their publications, the eventual sample of scholars included in the TCL corpus adds up 75 scholars (See Appendix 3.1 and Appendix 3.2). The scholars constitute a representative sample of 20th century linguistics English academic writing, covering the major theoretical paradigms that emerged and developed during the century, including structuralism, generativism, functionalism, discourse analysis, lexicology, and language

typology. They are/were all recognized academic figures with high citation scores and publishing in the most respected journals of their respective traditions. They all are/were part of prestigious language departments around the English-speaking world, including (but not limited to) the United States, Europe and Australia. The spread of birth decades includes linguists born in the 1900's ($n=10$), the 1910's ($n=9$), the 1920's ($n=13$), the 1930's ($n=15$), the 1940's ($n=13$), the 1950's ($n=10$), and the 1960's ($n=4$). To allow for a more interpretable model of cohort effects, I grouped scholars into three cohorts according to their birth decade, each cohort containing between 20 and 27 scholars: those born between 1900 and 1920 (<1920), those born between 1921 and 1940 (<1940), and those born between 1941 and 1960 (<1960) (See Chapter VI for elaboration on cohort grouping).

The compiling stage involved collecting evidence of the selected scholars' academic writing throughout their trajectories and processing it to guarantee its adequacy for linguistic analysis. Public records of scholars' publications (CV's, web profiles, Research Gate) served as guidance for selecting and accessing their papers. Based on their year of birth, I selected publications so that they would reflect their writing in their second and third decade of life (the "early career" period) and the period after their sixth decade of life (the "late career" period). The mean age for early career papers is 36, and that for late career papers is 65. I downloaded most of the publications from academic databases and scanned a few of them from hardcover books). I converted the texts into .doc and .txt files using open-source online resources, except in cases where format of the original PDF required OCR software and manual editing of blurry fragments. I then edited each file manually to erase reference lists, footnotes and endnotes, long citations of other authors, and any excerpt not written by the authors themselves. There was no need of annotating the corpus for part-of-speech because the analysis programs perform this operation automatically.

Figure 3.3: Structure of the Twentieth Century Linguists Corpus (red arrow: early to late career, orange arrow: across cohorts, blue arrow: across times of measurement)



3.2.2. The longitudinal case study design

The longitudinal case study focuses on the writing trajectory of a single scholar with the aim of studying extended patterns of linguistic variation not captured by the contrastive focus of the cohort sequential design. The case study focuses on diachronic change in ideational and interpersonal features in the writing trajectory of British linguist Michael Halliday (1925-2018), one of the most influential scholars in contemporary linguistics. Halliday has an extensive trajectory, starting with seminal papers during the fifties and sixties and continuing into the twenty first century, shortly before his passing. Throughout this period, Halliday pioneered and contributed to the development of Systemic Functional Linguistics, retaining consistent interest on a select yet rich set of disciplinary domains. He published a large number of papers, all of them in English and most of them single authored. These features make Halliday an interesting candidate for a longitudinal case study aiming at analyzing extended diachronic patterns along scholarly trajectories.

The language data for the case study comes from a collection of papers published by Halliday between 1957 and 2010, compiled with the aid of a list of publications edited by the author himself (accessed through a key informant). The list identifies the original date of publication and the original journal for each of the papers, providing confidence in their

chronological ordering. The “Halliday corpus”, with 2.031.431 tokens, is the most extensive diachronic corpus ever compiled for a contemporary scholar. It offers a highly representative sample of the author’s use of academic writing throughout his entire scholarly trajectory. Its compilation, as that of the TCL corpus, involved accessing the papers from a variety of online and physical sources, including the authors’ collected works, and transferring them into a processable format (.doc, .txt). The corpus excludes all material external to the central text body of the papers, including reference lists, footnotes and endnotes, appendixes, and long quotations of text (e.g. those used in exemplifying theoretical points).

3.3. Data analysis

This section closes the chapter by providing an outline of the analytical procedures employed to address the research questions posed. The more specific description of the procedures and the operationalization of analytical categories are to be found in the methodological segments of Chapters IV, V, VI and VII.

As stated in the “Paradigm” section above, this thesis follows a complementary methods approach based on the conviction that combining quantitative and qualitative methods offers the most solid response to the problems at hand. The implementation of this approach would be labeled by Flick (2014) as a “one-after-the-other design”, in which quantitative trends with statistical or descriptive significance are further explored through linguistic analysis seeking to uncover underlying functional mechanisms.

The cohort-sequential and longitudinal case study designs rely on quantitative data derived from automatic measurement of lexical and syntactic complexity features (section 4.1 in Chapter IV) and manual analysis of evaluative grammatical resources (section 5.1 in Chapter V). Automatic complexity analysis relies on Lu's (2010) web-based syntactic and lexical complexity analyzers. The long history of empirical studies based on complexity measures (see Norris & Ortega (2009) and Bulté & Housen (2014) for detailed reviews) reinforces their status as valid and reliable indicators in language development research. The analysis of evaluative features based on Systemic Functional Linguistics also has been gaining ground in academic register research (Hood, 2010, 2012; Xu, 2017). One of its advantages is trinocularly, the consideration of grammatical instances from above in terms of their meaning, from below in terms of their phonological realization, and from around in terms of alternative realizations (Halliday, 1978). Issues of inter-rating reliability for complexity measures and manual analysis are addressed in Chapters IV and V. For both constructs, the quantitative outcome is a numeric score assigned for each scholars' early career and late career sub-corpora (in the cohort-sequential design), and a numeric score for each instance in the authors' trajectory (in the longitudinal case study design).

3.3.1. Non-parametric mixed factorial model with *nparLD*

The cohort-sequential design is concerned with both within-persons and between-persons effects. Prior studies using this design (Kemper, 1987; Sliwinski & Buschke, 1999) have employed Generalized Linear Models to account for both effect types. Generalized Linear Models are capable of isolating significant effects when independent variables are grouped within two or more embedded factors (e.g. age and cohort) (Field, 2015, Ch. 12-15). These statistical models assume data normality and the absence of outliers, a condition not met by most of the variables in this project. In view of this limitation, I decided to use a

robust non-parametric alternative capable of modelling the different effect types in the cohort sequential design (following Field's (p. 503) recommendation for such cases).

The Non-parametric Longitudinal Data R package (*nparLD*) (Noguchi *et al.*, 2012) offers a variety of robust (i.e. requiring no normality) analytical options for longitudinal data, including mixed factorial designs. Mixed factorial designs account for within-persons effects (e.g. language change from early to late career), between persons effects (e.g. variation between cohorts), and mixed effects (e.g. cohort-specific change from early to late career). I selected the F1-LD-L1 design option (Brunner *et al.*, 2002), which tests the null hypotheses i) that no differences exist between the early and late career measurements and no differences exist and ii) that no significant differences exist between the cohort groupings. The alternative hypotheses I sustain in this thesis are that i) there are significant differences between early and late career scores for all the variables under consideration, and ii) there are significant differences between cohort groups. The variables under study are summarized in Table 3.1. The variables and the procedure for their measurement are discussed in more detail in Chapters IV and V.

For each of the variables in Table 3.1, I performed a nonparametric mixed factorial model using the *nparLD* R package. I will illustrate the procedure using the data for lexical diversity as an example. The first step involves organizing the data in a .csv file so that it is arranged in a four-column data frame (Figure 3.4). The first column indicates the names of the scholars in the TCL corpus; the second column indicates the career periods for each observation ("early", "late"); the third column indicates the cohort grouping ("<1920", "<1940", and "<1960"); and the fourth column contains the numeric scores for the dependent variable. The data frame is then added into R studio through the code: `data <- read.csv(file.choose ())`

Figure 3.4: Data frame for nonparametric mixed factorial model

```
> head(data)
  Scholar Cohort Career.Period Lexical.Diversity
1   Abbot      3             1             0.6856523
2 Aikhenvald  3             1             0.6595085
3   Allan     3             1             0.6545028
4   Biber     3             1             0.6569419
5 Bonfante    1             1             0.7169028
6   Bybee     3             1             0.6767864
```

Once the *npadLD* package is uploaded into R-Studio, the code is edited to match the headers of the data frame. In this case, it is necessary to indicate “y” as “lexical diversity”, “time” as “career period”, “group” as “cohort”, and “subject” as “scholar”. The resulting output is divided into four sections. The first section provides descriptive information concerning the number of observations and data set structure:

Figure 3.5: *npadLD* model output, section 1

```
> attach(data)
> model <- f1.ld.f1(y= Lexical.Diversity, time= Career.Period, group= Cohort, subject =Scholar)
Total number of observations: 150
Total number of subjects: 75
Total number of missing observations: 0

Class level information
-----
Levels of Time (sub-plot factor time) : 2
Levels of Group (whole-plot factor group) : 3
```

The second section provides the “Relative Treatment Effects” (RTE’s) for each of the individual and combined factors in the model, plus the rank means and number of observations (Nobs) in each:

Figure 3.6: Relative Treatment Effects from *npadLD* model output

```
> model
$RTE
      RankMeans Nobs      RTE
Group3      72.10417  48 0.4773611
Group1      99.65000  40 0.6610000
Group2      62.54839  62 0.4136559
Time1       70.40842  75 0.4660562
Time2       85.79328  75 0.5686219
Group3:Time1 61.33333  24 0.4055556
Group3:Time2 82.87500  24 0.5491667
Group1:Time1 95.15000  20 0.6310000
Group1:Time2 104.15000  20 0.6910000
Group2:Time1 54.74194  31 0.3616129
Group2:Time2 70.35484  31 0.4656989
```

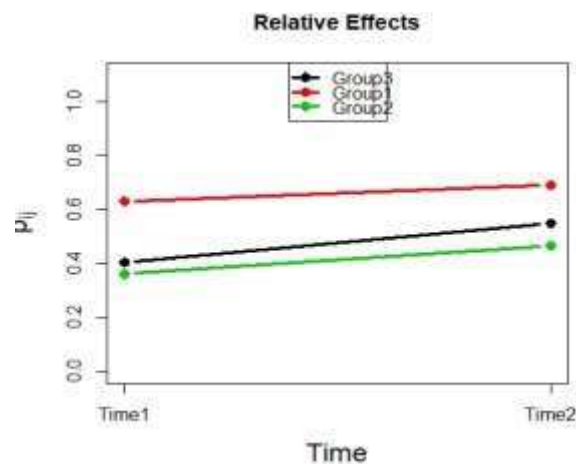
The important thing to note in this second section is the Relative Treatment Effects, which the model uses as an indication of the size of the effects of each individual and combined factor. Their interpretation is as follows: for a factor with two levels (e.g. Time), an RTE of .50 indicates no difference (more technically, it indicates that there is 50% chance of a randomly selected observation in level 1 being higher than a randomly selected observation from level 2, and a 50% chance of it being lower). An RTE of .0 indicates null chance for a randomly selected observation in level 1 being higher than a randomly selected observation from level 2; and an RTE of 1.0 indicates absolute possibility of it being higher. In the output in Figure 3.6, we can note that Time 1 (early career) has an RTE of 0.46, indicating 46% of possibilities of a randomly selected observation from Time 1 being higher than a randomly selected observation from Time 2 (thus, while there is a difference, it is quite small).

For a factor with more than two levels (e.g. Group in Figure 3.6), the Relative Treatment Effect is interpreted as the probability that a randomly selected observation from one of the levels is higher than a randomly selected observation from the entire dataset. Thus, the RTE of Group 1 in Figure 3.6 means that randomly selected observation from Group 1 (the >1920 cohort) has 66.10% of probabilities of being higher than a randomly selected observation from Groups 1, 2 and 3.

Table 3.1: Numeric variables associated to each research question

Research Question ²	Variable	Definition
Research Question 3: Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication?	Mean T-Unit Length	Mean number of orthographic words per T-Unit
	Mean Clause Length	Mean number of orthographic words per clause
	T-Units per Sentence	Mean number of T-Units per orthographic sentence
	Clauses per T-Unit	Mean number of clause per T-Unit
	Coordinate Phrases per T-Unit	Mean number of coordinate phrases per T-Unit
	Dependent Clause per T-Unit	Mean number of dependent clauses per T-Unit
	Lexical Density (Ure-type)	Total number of lexical items divided by total number of items.
	Lexical Density (Halliday-type)	Mean number of lexical items per clause.
	Lexical Sophistication (external)	Mean number of sophisticated lexical items compared to BNC corpus
	Lexical Sophistication (Internal)	Average keyness of first 100 key terms in author subcorpus
Research Question 4: Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities?	Lexical Diversity	Mean Segmental Type Token Ratio
	Frequency of propositions	Number of propositions divided by total number of moves
	Frequency of proposals	Number of proposals divided by total number of moves
	Frequency of evaluative propositions	Number of evaluative propositions divided by total number of propositions.
	Frequency of propositions evaluated for probability-type modalization.	Number of propositions with probability-type modalization divided by total number of propositions.
Frequency of propositions evaluated with comment assessment.	Number of propositions with comment assessment divided by total number of propositions.	

² Research question 5 focuses on the same variables as those for research questions 3 and 4, with a focus on variation between cohorts.

Figure 3.7: Relative Treatment Effects plot from *nparLD*

The *nparLD* package automatically generates a Relative Treatment Effects plot for time and group levels (Figure 3.7). From the plot, we can infer that there is a higher chance for randomly selected observations in Group 1 (the > 1920 cohort) to be higher than randomly selected observations in the entire dataset, and that there are subtle differences from early career (Time 1) to late career (Time 2) in the two groups.

The second part of the output provides two types of statistic indicating the significance of group, time and mixed factors in the model: the Wald test and the (robust) ANOVA test.

Figure 3.8: ANOVA and Wald Test statistic from *nparLD* model

```

$Wald.test
      Statistic df      p-value
Group    10.342480  2 5.677525e-03
Time     15.747007  1 7.240241e-05
Group:Time  1.908525  2 3.850961e-01

$ANOVA.test
      Statistic      df      p-value
Group    6.4080557  1.850590 2.196005e-03
Time     15.7470067  1.000000 7.240241e-05
Group:Time  0.8729129  1.977385 4.166804e-01

```

Both the ANOVA-type statistic and Wald test statistic indicate factor significance in the model and, in the tests performed in this thesis, they invariably coincided in their p -

values³, as shown in Figure 3.8. I use the ANOVA-type statistic based on Noguchi *et al.*'s (2011) observation that this statistic provides better control of Type 1 error (claiming significance when no actual significance exists) and suits itself better to smaller samples. The ANOVA statistic in Figure 3.8 indicates a significant effect for Group (Cohort) ($p= 0.002$), and Time (Career period) ($p= 0.00$), but no significant effect for the Group: Time interaction ($p= 0.41$). This result indicates that lexical diversity shows significant variation across career periods and between cohorts, but this variation is not specific to any of the three cohorts. The Relative Treatment Effects in Figure 3.6 indicates the specific levels in which the significant variation is distributed.

Figure 3.9: Cohort-specific diachronic effects and pairwise comparisons in *nparLD*

```

$wald.test.time
  Statistic df      p-value
3 12.823012  1 0.0003423821
1  1.748069  1 0.1861196627
2  4.620732  1 0.0315877618

$ANOVA.test.time
  Statistic df      p-value
3 12.823012  1 0.0003423821
1  1.748069  1 0.1861196627
2  4.620732  1 0.0315877618

$pattern.time
NULL

$pair.comparison
  Pairs      Test Statistic df      p-value
1 Group3:Group1  Group  5.8261620  1 1.578953e-02
2 Group3:Group1   Time 11.3031379  1 7.737621e-04
3 Group3:Group1 Group:Time  1.9060051  1 1.674077e-01
4 Group3:Group2   Group  1.1002255  1 2.942166e-01
5 Group3:Group2   Time 15.5208415  1 8.160059e-05
6 Group3:Group2 Group:Time  0.3952019  1 5.295777e-01
7 Group1:Group2   Group 10.2541588  1 1.363768e-03
8 Group1:Group2   Time  6.1135228  1 1.341515e-02
9 Group1:Group2 Group:Time  0.4413165  1 5.064877e-01

```

The final part of the output provides ANOVA and Wald Test statistics for mixed effects in the model, in this case corresponding to interactions between cohorts and career

³Note that R presents p -values in a format known as scientific notation, in which the number of zeroes to the right of the number indicates the exact significance. To transform the number into traditional notation, it is only necessary to place the zeros to the left. Thus, 2.196005e-03 equals 0.0021. The charts in this thesis use traditional notation for ease of interpretation.

periods (Figure 3.9). Because the group: time interaction in the ANOVA statistic in Figure 3.8 is not significant, it makes no sense to consider the mixed effects in this section. The studies in Chapters IV and V report *nparLD* model findings in a chart similar to that in Table 3.2, which shows ANOVA statistics for career period, cohort and period: cohort interaction, plus cohort-specific variation across career periods.

Table 3.2: *nparLD* model chart (example)

F1-LD-L1 Model	Effects (ANOVA)			Cohort		
	Period	Cohort	Period: Cohort	<1920	<1940	<1960
Lexical diversity	15.747	6.408	0.872	12.823	1.748	4.620
<i>p</i> -value (2T)	.000	.002	.416	.000	.186	.031

The nonparametric mixed factorial model with *nparLD* is the most important statistical analysis technique in this thesis, since it indicates significance for developmental and cohort variation in connection with research questions 3, 4 and 5. I use other nonparametric and descriptive techniques in follow-up or complementary studies, which I describe in their respective analytical procedure sections. Table 3.3 provides an overview of the analytical techniques employed throughout the thesis.

3.4. Summary

This chapter has discussed the overarching methodological framework for this thesis, leaving the procedural specificities associated with each research question for their respective chapters. In situating this thesis within a research paradigm, I focused on the nature of the research activity, the order of systemic analysis, and the trade-offs between comprehensiveness and data coverage and between automatic and manual analysis (c.f. Matthiessen, 2010). This thesis focuses on the analysis of linguistic variation within scholarly trajectories within the semiotic analytical order, examining diachronic patterns through a

combination of automatic and manual analysis. . Its methodological framework follows a complementary methods approach in which quantitative analysis identifies developmental drifts and pathways and qualitative analyses illuminates underlying functional mechanisms in the observed patterns. I address research questions 3, 4, and 5 through a cohort-sequential design, involving two measurements at periods named “early career” (third decade of life) and “late career” (sixth decade and older) for cohorts of linguists born between the 1910’s and the 1960’s. I use nonparametric mixed factorial modelling with *nparLD* to tease out developmental, between cohort and mixed effects in the data. I also perform a longitudinal case study of a single scholar (Michael Halliday), as a means to illuminate developmental variation along extended scholarly trajectories. The remaining chapters in this document present the studies performed for the research questions under focus.

Table 3.3: Overview of data analysis techniques

Chapter	Study	Aim	Data analysis technique(s)
Chapter IV: “Complexity and ideational lexicogrammar in early and late career writing”	Main study: exploring complexity variation in the TCL corpus	<ul style="list-style-type: none"> •To identify developmental drifts in TCL scholars’ syntactic and lexical complexity. 	Nonparametric mixed factorial model with <i>nparLD</i>
	Follow-up study 1: Coordination in early and late career writing	<ul style="list-style-type: none"> •To examine the functional mechanisms underlying developmental variation in the use of parataxis. 	Descriptive analysis of parataxis subtypes + collocational analysis of parataxis with <i>and</i> .
	Follow up study 2: The functional mechanisms of Lexical Diversity	<ul style="list-style-type: none"> •To examine the relationship between lexical diversity and lexical cohesion. •To explore the relationship between lexical diversity and field of activity. 	Spearman’s correlation test. Descriptive analysis of text excerpts.
	Follow up study 3: Specialized lexical sophistication	<ul style="list-style-type: none"> • To explore the relationship between specialized lexical sophistication and word class and technicality. 	Descriptive analysis of word class and technical term frequencies in early and late career writing.
Chapter V: “Interpersonal lexicogrammar and early and late career writing	Main study: evaluative lexicogrammar in early and late career writing	<ul style="list-style-type: none"> • To identify developmental drifts in TCL scholars’ use of evaluative lexicogrammar. 	Nonparametric mixed factorial model with <i>nparLD</i>
	Follow-up study 1: Comment assessment	<ul style="list-style-type: none"> • To identify developmental drifts in TCL scholars’ use of specific comment assessment categories. 	Nonparametric mixed factorial model with <i>nparLD</i> + analysis of text excerpts

	Follow up 2: Appreciation	<ul style="list-style-type: none"> • To identify developmental drifts in TCL scholars' use of specific comment assessment categories. 	Nonparametric mixed factorial model with nparLD + analysis of text excerpts
Chapter VI: Registerial change and scholarly language development	General diachronic change in the TCL corpus	<ul style="list-style-type: none"> • To explore complexity and interpersonal lexicogrammar variation across times of measurement in the TCL corpus. 	Kruskal-Wallis one-way analysis of variance
	Cohort variation in the TCL corpus	<ul style="list-style-type: none"> • To explore complexity and interpersonal lexicogrammar variation across cohorts in the TCL corpus. 	Nonparametric mixed factorial model with nparLD (based on models from Chapter IV and V)
Chapter VII: A language-based case study	Complexity in Halliday's writing trajectory	<ul style="list-style-type: none"> • To characterize variation pathways in syntactic and lexical complexity in extended scholarly trajectories. 	Descriptive analysis of time series data with Locally Estimated Scatterplot Smoothing (LOESS) + text analysis
	Evaluative lexicogrammar in Halliday's writing trajectory	<ul style="list-style-type: none"> • To characterize variation pathways in the use of interpersonal lexicogrammar in extended scholarly trajectories. 	Descriptive analysis of time series data with Locally Estimated Scatterplot Smoothing (LOESS) + text analysis

CHAPTER IV: COMPLEXITY AND IDEATIONAL LEXICOGRAMMAR IN EARLY AND LATE CAREER WRITING

This chapter explores variation in linguists' writing trajectories with a focus on syntactic and lexical complexity and its relationship with ideational lexicogrammar, addressing Research Question 3: "Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication?" The main study is based on automatic complexity measures from the Twentieth Century Linguists Corpus (see Section 3.2.1.1). Three follow-up studies branch off from the main study, elaborating on the quantitative findings therein presented. The main study and the follow-up studies each describe their specific methodological procedures.

4.1. The main study: exploring complexity variation in the TCL corpus

This study undertakes an initial exploration of variation in syntactic and lexical complexity in the Twentieth Century Linguists corpus, inquiring into possible developmental drifts associated with these variables. One good reason for an initial focus on syntactic and lexical complexity, besides the convenience of their automated analysis, is the ability of these constructs to reflect the degree of semantic packaging in written discourse, and the delicacy with which experiential domains are elaborated in scholarly trajectories. The constructs are most directly relevant to inferences about the ideational metafunction, covering the complementary continuum between experiential meaning — the construal of experience as quanta of change (Halliday & Matthiessen, 1999/2006) — and logical meaning — the recursive chaining of experiential figures into complexes of expansion and projection. The experiential mode construes experience in a particulate manner, as configurations of entities participating in a process of some kind (being, doing, happening, saying, or sensing). The logical mode construes experience in a recursive manner, as interrelated events connected by relations of expansion (elaboration, addition, or enhancement) and projection (mental or verbal).

Any text instance may be characterized as more experientially or logically inclined in its construal of experience, the distinction typically depending on its instantiation as a written or spoken text. The written-like quality of text is often predicted on its preference for construing events and the relations between them as things, while its spoken-like quality largely rests on its preference for construing logical relations congruently. Halliday (1985b), one of the earlier studies to use complexity measures to explain differences between spoken and written text, suggests that written text typically displays higher lexical density, while spoken text tends to exhibit higher grammatical intricacy. The difference is not categorical, but one of degree, and one of the aspects in which scholars' writing is often qualified is in its having a more written-like or spoken-like style.

The observation that scholars' written discourse is invariably complex and specialized is not at odds with the fact that variation exists in the way they choose to construe experience in text, leaning towards higher or lower metaphoricity, density and technicality. Variability along these lines in experienced scholars' writing has been studied under the frameworks of identity and individuality (Gotti, 2009). The aggregate of ideational choices through which a scholars' writing comes to be recognized for a specific style constitutes an area of linguistic individuation, and thus one worth investigating from a developmental perspective, assuming that this style is built throughout scholarly trajectories. Thought-inducing questions in this regard include whether scholars' writing becomes denser and more technical as they accrue experience in their fields, or whether expertise brings about a more marked concern for clarity and simplicity.

Prior research suggests that the complementarity between experiential and logical representations is a likely site of developmental change in scholars' trajectories. Writing development in instructional contexts has been proposed to involve diachronic trade-offs between experiential and logical modes of representation. Biber *et al.* (2011) put forward a

hypothetical five-stage developmental sequence (Table 4.1) in which later stages feature higher complexity within nominal groups, achieved through transcategorization of clauses as Postmodifiers, nominal group complexing, and prepositional phrase complexing. Advanced literacy, the authors argue, entails a gradual trade-off in the locus of grammatical complexity, from clause complexes with congruent realization of logical relations to complex nominal groups with extended postmodifying structures. Norris and Ortega (2009, p. 563) support the hypothesis of diachronic tradeoffs between logical and experiential representations in complexity development, associating paratactic clause complexing with elementary level writing, hypotactic clause complexing with intermediate writing, and group/phrase-rank complexing with advanced writing. The developmental drift in advanced academic writing would, along these lines, entail higher complexity at the nominal group/phrase rank.

The issue of complexity development is not, however, simple enough to be captured by a single developmental sequence. Disciplinary variation would affect the manifestation of the predicted drifts. Liu's (2018) cross-sectional study of complexity features in linguistics found no evidence of the hypothesized trade-off and, on the contrary, identified significant use of hypotactic complexes in linguistics scholars' writing. Montemayor-Borsinger (2005), a diachronic study comparing novice and expert physics scholars, does report higher occurrence of elaborate nominal groups in the latter. While these studies explore the idea that complexity increases over time, lifespan language development research in non-academic contexts consistently reports age-related declines in both syntactic complexity and noun/phrase complexity in written production tasks (Kemper, 1987; Kemper *et al.*, 2001, 2003). Formulating a hypothesis regarding the diachronic development of syntactic complexity in the TCL corpus seems difficult in view of the complex picture offered by previous studies.

An alternative possibility I explore in this chapter is for syntactic complexity parameters to remain stable throughout linguists' scholarly trajectories, with fluctuations affecting specific instances without forming a steady increasing or decreasing trend. Linguists' experiential repertoires tend, as discussed in Chapter II, to be multipolar in their paradigmatic organization, involving several specialized domains without sustained devotion to any of them throughout their academic trajectories. The distribution of experiential meanings across different domains would reduce the endogenous pressure for increasing nominal group density over time, which would be reflected in stable syntactic complexity parameters.

Table 4.1: Biber *et al.*'s (2011) proposed complexity development sequence

Stage	Features	Examples
Stage 1	<ul style="list-style-type: none"> • Transcategorized questions realizing Phenomena in mental clauses. • Congruent mental projection nexuses. 	<ul style="list-style-type: none"> • <i>We never quite know <u>what to make of him.</u></i> • <i>I just think <u>that he didn't pay attention.</u></i>
Stage 2	<ul style="list-style-type: none"> • Hypotactic complexes of causal and conditional enhancement. 	<ul style="list-style-type: none"> • <i>I'm assuming I gained weight <u>because things are a little tighter than they used to be.</u></i>
Stage 3	<ul style="list-style-type: none"> • Relational clauses with Attribute realized by a nominal group with quality as Head (impersonal projection) • Prepositional phrases or ellipsed circumstantial clauses as Postmodifier in nominal groups. 	<ul style="list-style-type: none"> • <i>It seemed quite clear <u>that he was not at home.</u></i> • <i>editor <u>of the food section/</u> house <u>in the suburbs</u></i>
Stage 4	<ul style="list-style-type: none"> • Impersonal projection • Ellipsed non-finite clauses and prepositional phrases as post-Modifiers of nominal groups • Nominal group complexes 	<ul style="list-style-type: none"> • <i>It is clear <u>that much remains to be learned...</u></i> • <i>The method <u>used here</u> should suffice... / Studies <u>employing electrophysiological measures...</u></i> • <i><u>Both plant and animal systems...</u></i>
Stage 5	<ul style="list-style-type: none"> • Fact clauses • Prepositional phrase complexes expanding Things in nominal groups 	<ul style="list-style-type: none"> • <i>The hypothesis <u>that female body weight was more variable...</u></i> • <i>The presence of <u>layered structures at the borderline of cell territories...</u></i>

Prior lifespan development research points to lexical complexity as another potential area for developmental drifts. Longitudinal studies investigating the notion of “world knowledge” through vocabulary test batteries indicate mild loss of lexical range into the sixth decade of life, followed by accelerated decline in subsequent decades (Hultsch *et al.*, 1992; Salthouse, 2010). Educational achievement and bilingualism -two common features in scholars’ semiotic lifelines- have been found to associate with milder declines in overall verbal ability (Bialystok *et al.*, 2006; Opdebeek *et al.*, 2015). Experimental measurement of vocabulary range may lack validity in predicting developmental lexical complexity patterns, given its focus on decontextualized word recognition and production tasks. Scholarly writing in later decades of adulthood may, in fact, characterize itself by higher Lexical Diversity and specialization than observed in early career academic writing, considering the accumulation of specialized knowledge throughout life.

Automatic measures of syntactic and lexical complexity have been widely exploited in language development research because of their explicit operationalization, accessibility, and ease of implementation. They are indicators of underlying functional dimensions most directly connected with the ideational aspect of academic writing. This exploratory study sets out to investigate their variation across early and late career periods in the TCL corpus.

4.1.1. Complexity measures

A wide range of complexity measures has been proposed over the decades and frameworks have been articulated to integrate them within theoretically informed constructs (Wolf-Quintero *et al.*, 1999; Norris & Ortega, 2009; Bulté & Housen, 2014). The measures implemented in this study derive from Lu Xiaofei’s syntactic and lexical complexity analyzers (Ai & Lu, 2010; Lu & Ai, 2015). Complexity measures may be usefully distinguished by the intersection between the grammatical rank scale and three types of

measurement (length, ratio, and frequency). The grammatical rank scale is a hierarchy of grammatical units based on composition, from the most extensive unit (the clause complex) to the most delimited unit (the word), including the intermediate units of the clause and the group (nominal, verbal or prepositional phrase) (Halliday, 1961).

The length-based family of measures, covering the clause complex and clause ranks, have been linked with the constructs of “overall complexity” and “phrasal complexity” (Norris & Ortega, 2009). Overall complexity is a generalized indication of the linguistic advancedness of a speaker/writer based on the length of measures beyond the clause. In written language analysis, overall complexity can be measured as mean sentence length or as mean T-Unit length, a T-unit being defined by Hundt (1970) as “a main clause plus all subordinate clauses and non-clausal structures attached to and embedded within it” (p. 4). The distinction is illustrated by the example below (the T-Units are enclosed in brackets):

(4.1) Expounding: categorizing (written, monologic): Big men’s roles in Sepik society	Sentences	Mean S. Length	T-Units	Mean T-Unit Length
	2	32.25	3	25.66
[The persuasiveness of the big men's oratory is also backed up by their economic power.] [Through the skillful use of their wealth in loans and exchanges, they build up a large reservoir of indebtedness on the part of other members of the community,] [and this acts as a strong inducement in getting their own views accepted as the consensus of the group as a whole.] (Foley, EC-TCL)	Clauses	Clause Length		
	3	21.66		

Mean clause length indicates the degree of elaboration at the group/phrase rank, longer clauses typically having longer nominal groups or prepositional phrases. Length-based measures may coincide with one another for specific instances, as in example 4.1, where clauses coincide with T-Units. One limitation in Lu’s automatic complexity measurement platform is its inability to distinguish non-finite clauses from finite clauses, counting the

former as clause constituents. A hypotactic clause complex containing one finite independent clause and one finite dependent clause is analyzed as one clause by automatic measurement.

The ratio-based family of measures, measuring the mean number of times a lower ranking unit fits inside a higher-ranking unit, addresses the constructs of “subordination complexity” and “coordination complexity” (Norris & Ortega, 2009). Subordination complexity measures the extent to which language users employ hypotactic clause complexes of expansion and clauses embedded within nominal groups (automatic measures count hypotactically projected clauses as constituents, following traditional grammar). Two types of hypotactic clauses are considered in subordination complexity measurement: dependent clauses (finite dependent clauses) and relative clauses (downranked finite clauses). These measures include T-units per sentence, clauses per sentence and clauses per T-unit.

(4.2)	Expounding: categorizing (written, monologic): Big men’s roles in Sepik society	T-Units/ Sentence	Clauses/ T- Unit	Dependent clause/T- Unit
	[The persuasiveness of the big men's oratory is also backed up by their economic power.]	1.5	1	0
	[Through the skillful use of their wealth in loans and exchanges, they build up a large reservoir of indebtedness on the part of other members of the community,] [and this acts as a strong inducement in getting their own views accepted as the consensus of the group as a whole.] (Foley, EC-TCL)	Dependent clause/clause	Coordinate phrase/T- Unit	Coordinate phrase/ clause
		0	0	0
(4.3)	Expounding: categorizing (written, monologic): Big men’s roles in Sepik society	T-Units/ Sentence	Clauses/ T- Unit	Dependent clause/T- Unit
	[There is little independent justification for a quantificational analysis of pronouns and proper names, which nevertheless (like anaphoric definites) behave like explicitly quantified NPs in existential sentences.] [And even in the case of definite descriptions, it is on the anaphoric uses that they are unacceptable in NEs (for the pragmatic reasons noted above),] [and these are exactly the cases <where a quantificational analysis is the least justifiable>.] (Abbot, EC-TCL)	1.5	1.3	0
		Dependent clause/clause	Coordinate clause/T- Unit	Coordinate phrase/ clause
		0.5	0.33	0.25

Hypotactic complexing has traditionally been associated with advanced literacy, despite studies emphasizing that academic writing is more accurately characterized by nominal group complexity (Halliday, 1985b; Biber & Gray, 2010). Coordination complexity, comprising parataxis within clause complexes, receives lesser attention because it is associated with elementary writing (Norris & Ortega, 2009). Although valid in a general sense, this assumption does not invalidate the fact that paratactic complexing is also an important logical resource in academic writing. Paratactic nexuses allow the Subject of the adjacent clause to occupy the Theme position, assigning it higher informational prominence, as in *and these are exactly the cases* in example 4.2. Parataxis within nominal groups, another important motif in academic writing, has also received scarce attention, with only one cross-sectional study (Lu, 2018) discussing its role in creating recursive postmodifying structures.

Developmental complexity studies usually keep lexical complexity as a separate dimension from overall complexity and subordination/coordination complexity. However, as Norris and Ortega (2009) argue, the composite study of these complexity types can reveal their interdependency in language use and their complementarity as developmental motifs. Lexical complexity measures are based on the rate of occurrence of specific lexical features at the text rank. Lexical density is operationalized in two ways: as lexical items per total running words (Ure, 1971) and as lexical items per total number of clauses (Halliday, 1985b). Both operationalizations indicate the degree of compactness of information in written text, which in academic discourse relates to ideational grammatical metaphor. They are both indexes of incongruence, as academic written text achieves a ‘crystalline’ texture by exploiting grammatical metaphor to package experiential meanings within lexically dense nominal groups. Example 4.4 shows a lexically dense excerpt with lexical items (in bold) forming long nominal groups (*little independent justification for a quantificational analysis*

of pronouns and proper names) and employing grammatical metaphors (*justification, analysis, uses, reasons*).

(4.4) Expounding: categorizing (written, monologic): Big men's roles in Sepik society	Lexical density (Ure)	Lexical density (Halliday)	Lexical diversity
There is little independent justification for a quantificational analysis of pronouns and	47.05	17	0.68
proper names , which nevertheless (like anaphoric definites) behave like explicitly quantified NPs in existential sentences . And even in the case of definite descriptions , it is	Lexical sophistication (general)	Lexical sophistication (specialized)	
on the anaphoric uses that they are unacceptable in NEs (for the pragmatic reasons noted above), and these are exactly the cases where a quantificational analysis is the least justifiable . (Abbot, EC-TCL)	0.38	0.02	

Lexical diversity indicates the range of different words employed in text, one challenge in its measurement being the need to control the influence of text size in the counting of novel words. Given the susceptibility of the traditional Type Token Ratio to text size variation, more sophisticated measures have been created, of which Johnson's (1944) mean segmental type token ratio (MSTTR) is considered among the most reliable (Jarvis, 2013). MSTTR obtains several lexical Diversity scores from multiple chunks of the same text and derives a composite score from them. Lexical diversity measures are thought to indicate language users' level of vocabulary richness, language proficiency, and world knowledge (Berman *et al.*, 2011).

Lexical sophistication measures assess lexical specialization by comparing the target corpus against word lists extracted from large multi-register corpora. The Lexical sophistication measures in Lu's lexical complexity analyzer, based on the British National Corpus, determine the extent to which the target corpus differs from general language use. In addition to these measures, this study includes a specialized lexical sophistication measure which assesses the extent to which individual scholars' lexical choices stand out from the

entire TCL corpus. The specialized lexical sophistication measure is based on the average keyness score for each scholar (computed using Antconc 3.5.8 (Anthony, 2019), contrasting each scholars' sub-corpus with the entire TCL corpus. This measure determines whether the linguists in the TCL corpus become more distinctive in their experiential foci over time, compared to the disciplinary community.

4.1.2. Procedure

The first step involved obtaining syntactic complexity measures and lexical complexity measures for each of the scholars in the TCL corpus. Norris and Ortega's (2009) recommendation to test these constructs simultaneously to account for their ecological interactions guide inclusion of length-based measures, syntactic complexity measures and lexical complexity measures. I obtained the measures through the Web-based Syntactic Complexity Analyzer and Lexical Complexity Analyzer designed by Lu and Ai (2015) and Ai and Lu (2010). The web-based platforms allow automatic measurement of a wide range of complexity features in batch mode. The measures have proven reliable when compared with manual annotator's analyses in prior language development studies (Lu, 2010; Liu, 2018). The final product of this analytical step was an Excel sheet with 75 author names in the first column and scores for each measure, divided into early career and late career scores (the dataset is available in Appendix 4.1).

The next step was determining normality, skewness and kurtosis scores for each complexity measure using the R base function *shapiro.test* and the skewness and kurtosis functions of the *moments* R package. 22 out of the 30 complexity measure data columns submitted for normality assumption check turned out not to have a normal distribution, as determined by Shapiro-Wilk alpha scores beyond 0.05 (Table 4.2). None of the variables had extreme skewness, although clause length and internal lexical sophistication were significantly leptokurtic (i.e. their values were characterized by a pattern of high scores to the

left followed by a long tapering tail of smaller values). These data characteristics make non-parametric statistical tests a more viable option for identifying diachronic variations in early and late career writing. Non-parametric tests have lesser statistical power, which means that generalizations of their results beyond the studied population are unsupported. However, the size and qualitative features of the selected sample still make non-parametric results interesting from a theoretical perspective, as they would provide empirical evidence of the stability or variability of registerial repertoires throughout scholarly trajectories.

Table 4.2: Normality, skewness, and kurtosis tests for selected complexity measures

Measure	Shapiro-Wilk			Skewness	Kurtosis
	Statistic	df	Sig.		
Overall complexity					
Mean T-unit Length (Early career)	.882	75	.000	1.573	6.013
Mean T-unit Length (Late career)	.856	75	.000	1.547	5.449
Mean Clause Length (Early career)	.906	75	.000	1.445	6.734
Mean Clause Length (LC)	.830	75	.000	1.683	5.923
Syntactic complexity					
T-units/Sentence (Early career)	.966	75	.035	0.663	3.245
T-units/Sentence (Late career)	.958	75	.012	0.736	3.840
Clauses/T-Unit (Early career)	.951	75	.004	0.086	2.639
Clauses/T-Unit (Late career)	.986	75	.547	0.318	2.931
Dependent clause/clause (Early career)	.986	75	.581	0.003	2.474
Dependent clause/clause (Late career)	.985	75	.501	-0.062	2.537
Coordinate Phrase/T-unit (Early career)	.937	75	.001	1.078	4.665
Coordinate Phrase/T-unit (Late career)	.960	75	.015	0.792	3.747
Coordinate Phrase/clause (Early career)	.946	75	.002	0.003	2.474
Coordinate Phrase/clause (Late career)	.965	75	.031	0.679	3.145
Lexical complexity					
Lexical Density (Ure) (Early career)	.967	75	.040	-0.644	.310
Lexical Density (Ure) (Late career)	.991	75	.858	0.208	-.022
Lex. Density (Halliday) (Early career)	.959	75	.014	0.670	3.413
Lex. Density (Halliday) (Late career)	.968	75	.049	2.314	12.053
Lex. Sophistication (Early career)	.921	75	.000	1.166	1.541
Lex. Sophistication (Late career)	.959	75	.014	0.791	1.041
Lex. Soph. (Specialized) (Early career)	.968	75	.048	-0.239	2.764
Lex. Soph. (Specialized) (Late career)	.969	75	.056	-0.191	3.012
Lex. Diversity (Early career)	.954	75	.006	-0.888	2.205
Lex. Diversity (Late career)	.970	75	.064	-0.592	.381

I tested complexity measures for multicollinearity, in keeping with Norris and Ortega's (2009) recommendation to remove redundant measures that may inflate statistical effects erroneously. Spearman Rho's correlation values above .900 were identified between T-unit length and sentence length ($\rho = .901$), dependent clauses per clause and dependent clauses/T-unit ($\rho = .987$), and dependent clauses/clause and complex T-unit ratio ($\rho = .959$). I thus removed sentence length, dependent clauses/T-unit and complex T-unit ratio since these are less informative measures.

After the preliminary steps above, I performed nonparametric mixed factorial modelling with *nparLD* (Noguchi *et al.*, 2012), following the procedure described in Chapter III (Section 3.3.1). This chapter focuses on career period effects and cohort-specific effects, both types associated with developmental drifts. Chapter VI picks up the cohort effects reported in this chapter in the discussion of cohort variation in the TCL corpus.

4.1.3. Findings

Table 4.3 presents median values for early and late career writing complexity measures scores in the TCL corpus. Table 4.4. presents the corresponding nonparametric mixed factorial model with *nparLD*. The model shows significant career period and period: cohort interactions for specific measures. Regarding overall complexity, mean T-Unit length shows significant though weak diachronic change, with late career T-units being slightly longer ($F(1,1) = 4.545$, $p = .000$, RTE^4 (Early career) = 0.45, RTE (Late career) = 0.52). Mean length of clause, the standard measure for group/phrase complexity, does not vary significantly.

⁴ RTE = Relative Treatment Effect (See Section 3.3.1)

Table 4.3: Median scores for early and late career complexity measures

	Early career <i>M</i>	Late career <i>M</i>
Length-based measures		
Mean T-Unit Length	23.89	24.79
Mean Clause Length	13.56	13.51
Syntactic complexity		
T-Units per Sentence	1.15	1.16
Clauses per T-Unit	1.79	1.83
Dependent Clause per Clause	0.42	0.42
Coordinate Phrase per T-Unit	0.44	0.51
Coordinate Phrase per Clause	0.24	0.27
Lexical complexity		
Lexical Density (Ure)	0.50	0.50
Lexical Density (Halliday)	6.76	6.85
Lexical Sophistication (General)	0.41	0.42
L. Sophistication (Specialized)	0.023	0.024
Lexical Diversity	0.76	0.77

Table 4.4: Nonparametric mixed factorial model for complexity measures

F1-LD-L1 Model	Effects (ANOVA)			Cohort effects		
	Period	Cohort	Period: Cohort	<1920	<1940	<1960
Mean T-Unit Length	4.535	3.088	3.753	4.116	0.149	6.402
<i>p</i> -value (2T)	0.03*	.213	.153	.042	.699	.011
Mean Clause Length	1.861	0.041	4.592	0.033	0.010	8.268
<i>p</i> -value (2T)	.172	.979	.100	.855	.917	.004
T-Units per Sentence	0.051	3.568	0.598	0.203	0.539	0.230
<i>p</i> -value (2T)	.821	.157	.741	.651	.462	.630
Dependent Clause per T-Unit	2.425	10.755	12.335	13.072	0.117	0.703
<i>p</i> -value (2T)	.119	.004**	.002**	.000**	.731	.401
Coordinate Phrase per T-Unit	16.493	6.189	1.618	9.192	2.842	5.189
<i>p</i> -value (2T)	.000**	.045	.445	.002**	.091	.022**
Coordinate Phrase per Clause	11.758	3.775	0.040	3.242	3.320	5.770
<i>p</i> -value (2T)	.000**	.151	.980	.071	.068	.016*
Lexical Density (Ure)	0.015	3.473	5.056	3.021	1.545	0.505
<i>p</i> -value (2T)	.902	.176	.079	.082	.213	.476
Lexical Density (Halliday)	2.475	0.957	2.855	0.287	0.009	7.254
<i>p</i> -value (2T)	.115	.619	.239	.591	.921	.007**
Lexical Sophistication	0.921	43.287	4.304	0.001	0.076	7.475
<i>p</i> -value (2T)	.337	.000**	.116	0.967	.782	.006**
Lexical diversity	15.747	10.342	1.908	1.748	4.620	12.823
<i>p</i> -value (2T)	.000**	.005**	.385	.186	.031*	.000**

*Significant at .05 level

**Significant at .01 level

In syntactic complexity, it is possible to note that coordinate phrase per T-unit experiences significant -though weak- diachronic change ($F(1,1)= 15.804, p= .000$, RTE (Early career)= 0.42, RTE (Late career)= 0.55), similar to coordinate phrase per clause ($F(1,1)= 11.732, p= .000$, RTE (Early career)= 0.44, RTE (Late career)= 0.55). T-units per sentence, clauses per T-unit, and dependent clause per clause show no significant change. Late career writing in the TCL corpus thus employs slightly more parataxis at the clause complex and group/phrase rank. Finally, in lexical complexity, there is significant yet weak increase in lexical diversity ($F(1,1)=, 15.747, p= .000$, RTE (Early career)= 0.46, RTE (Late career)= 0.56) and specialized lexical sophistication ($F(1,1)= 4.774, p= .02$, RTE (Early career)= 0.47, RTE (Late career)= 0.55). No significant change is observed in Ure-type lexical density, Halliday-type lexical density, and general lexical sophistication. Lexical complexity in late career writing in the TCL corpus remains largely unmodified, except for being slightly more lexically diverse and specialized.

Figure 4.1: Mean T-Unit length in early career (EC) and late career (LC) writing.

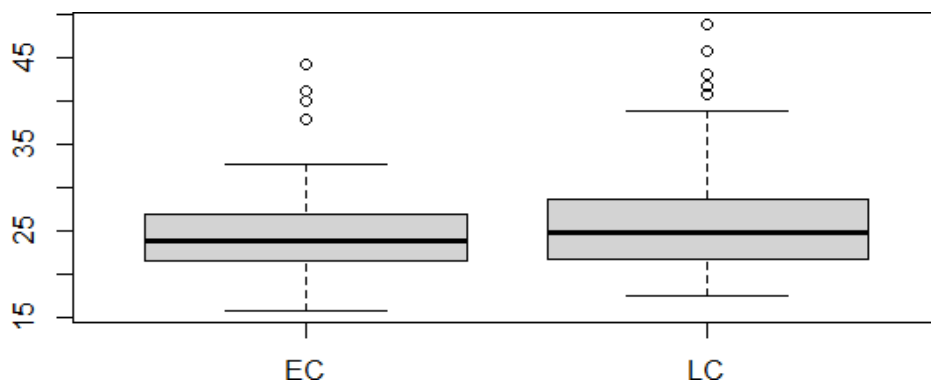


Figure 4.2: Coordinate Phrase per T-unit in early career (EC) and late career (LC).

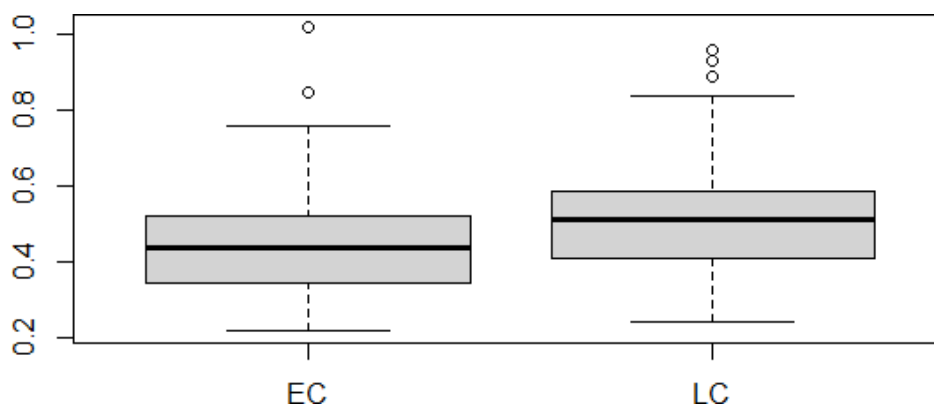
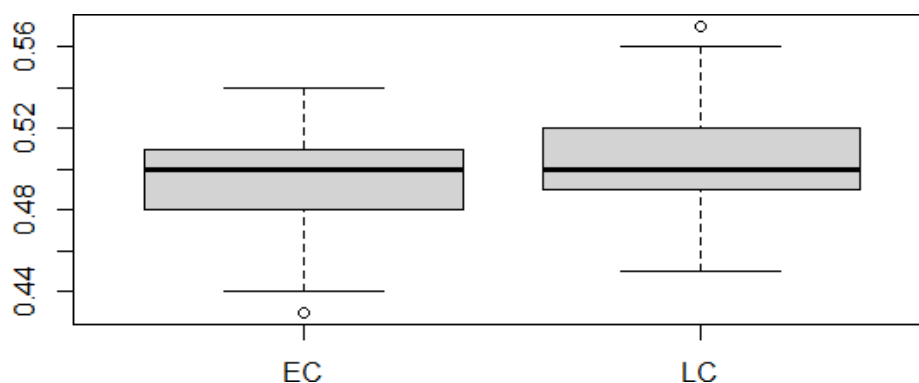


Figure 4.3: Lexical diversity (MSTTR) in early career (EC) and late career (LC) writing



Late career writing in the TCL corpus displays slightly longer T-units and a mild increase in parataxis (as measured by coordinate phrase per clause and coordinate phrase per T-unit). It also shows slightly higher lexical density, lexical diversity, and specialized lexical sophistication. Overall complexity, tactic relations at the clause complex and group/phrase rank, and general lexical sophistication present no significant changes.

The overall developmental drift in the TCL corpus is oriented towards stability in complexity features, with significant though weak changes in specific parameters. Absence of change in most complexity parameters appears to be the unmarked ontogenetic drift in TCL scholars' trajectories, individual variation notwithstanding. Strong diachronic changes would, indeed, have been a surprising finding, since scholarly trajectories would not entail major

breakthroughs in the learning of linguistic resources (as observed in the developmental transition through school and university levels, c.f. Christie & Derewianka, 2008; Schleppegrell & Colombi, 2002). The mild changes observed are, however, indicative of a subtle yet consistent developmental drift in the ideational aspects of scholarly writing affecting the logical aspect (the establishment of relations between experiential figures and elements), and the experiential construal of experience.

The logical drift involves more frequent parataxis within nominal groups, as evident in the finding that coordinate phrase per T-unit and coordinate phrase per clause increase in late career writing. Coordinate phrases are defined in Lu (2010) as any “pattern [that] matches an adjective phrase, adverb phrase, noun phrase, or verb phrase that immediately dominates a coordinating conjunction” (p. 10). Coordinating conjunctions in traditional grammar are those assigning equal status to the coordinated elements, chiefly *and*, *but*, *or* and *so*. Systemic Functional Grammar uses the term “parataxis” to denote both coordination in its traditional sense (*John came and Mary left*) and apposition (*John came; Mary left*) (Halliday & Matthiessen, 2014, p. 440). Parataxis and hypotaxis, intersect with logicosemantic relations of expansion (elaboration, extension, or enhancement) and projection (idea or locution). The examples below (p.475) illustrate the difference:

Table 4.4: Taxis and logicosemantic relations at the clause rank (based on Halliday & Matthiessen, 2014, p. 475)

	Parataxis	Hypotaxis
Elaboration	John didn't wait; he ran away. (apposition)	John ran away, which surprised everyone.
Extension	John ran away, but Fred stayed behind. (coordination)	John ran away, whereas Fred stayed behind.
Enhancement	John was scared; he ran away. John was scared, so he ran away. (coordination)	John ran away because he was scared.
Projection	John said: "I'm running away".	John said he was running away.

The functional mechanism underlying the drift signaled by the increase in coordinate phrase per T-unit/clause values would thus be paratactic extension and, to a lesser extent, paratactic enhancement. The rank at which this drift manifests appears to be the group or phrase, and not the clause complex, given the lack of significant diachronic variation in T-units per Sentence, and the fact that T-units, by definition, consist exclusively of hypotactic complexes (Hundt, 1970). The group rank is one of the fractal environments in which logicosemantic and tactic relations can manifest, involving the formation of nominal group, adverbial group, or verbal group complexes. This rank can also be mapped by the intersection of parataxis or hypotaxis with expansion and projection, as illustrated in Table 4.5. The systemic elaboration of the intersection between taxis and logical relations at the group rank makes it difficult to draw simple functional correlates for the increase in coordinate phrase per T-unit/clause values: the effect may be spread across different ranks and logical relations, or it may focus on a specific functional configuration.

Table 4.5: Taxis and logico-semantic relations (extension and enhancement) at the group rank (based on Halliday & Matthiessen, 2014, p. 559)

	Parataxis	Hypotaxis
Extension	Nominal group: <i>either you or your head</i>	Nominal group: <i>his teacup instead of the bread and butter</i>
	Adverbial group: <i>swiftly and without a moment's hesitation</i>	Adverbial group: <i>on time, instead of two hours late</i>
	Verbal group: <i>neither like nor dislike</i>	Verbal group: <i>try to do</i>
Enhancement	Nominal group: <i>all those on board and hence the crew</i>	Nominal group: N/A
	Adverbial group: <i>calmly enough, although not without some persuasion</i>	Adverbial group: <i>tomorrow before lunch</i>
	Verbal group: <i>tried but failed</i>	Verbal group: <i>hasten to do</i>

The registerial profile of academic writing makes it probable that the observed developmental drift centers on paratactic extension at the nominal group rank. Academic registers rely on nominal groups to construe concrete, abstract or metaphorical Things (technical or non-technical) typically participating in relational clauses of the intensive and identifying type (Halliday, 1998a). English nominal groups allow the packaging of information in the unfolding of expounding texts, those focused on categorizing and explaining general types of experience (Matthiessen, 2013). The packaging strategies at the nominal group rank include recursive premodification and postmodification of Things, the former achieved via Classifiers, Epithets, and post-deictics; and the latter via downranked finite or non-finite clauses or prepositional phrases (Halliday & Martin, 1993). Linguistics academic writing is capable of highly elaborate nominal groups with multiple modification layers:

(4.4)

little	independent	justification	for a quantificational analysis of pronouns and proper names, which nevertheless (like anaphoric definites) behave like explicitly quantified NPs in existential sentences.
post-Deictic	Epithet	Thing	Postmodifier

for	a	quantificational	analysis	of pronouns and proper nouns	which nevertheless (like anaphoric definites) behave like explicitly quantified NPs in existential sentences.
Prep.	Deictic	Classifier	Thing	Postmodifier	
				Thing	Postmodifier

These premodification and postmodification strategies seem, however, not to be at stake in diachronic variation from early to late career in the TCL corpus, as shown by the lack of significant change in the dependent clause per clause parameter (Table 4.3). Coordination at group rank is not a packaging strategy in that its role is not to accumulate experiential meanings around a specific entity. Its role is to extend Things and, to a lesser extent, to

enhance them (Halliday & Matthiessen, 2014, p. 560). The extensive role of nominal group coordination includes adding new entities or qualities (as in lists) (example 4.5), replacing one entity or quality for another (4.6), or alternating two or more entities by disjunction (4.7):

- (4.5) The indicative is used in **both embedded and non-embedded declarative and interrogative sentences**, as can be seen by comparing (59) and (61) with (62) and (64). (Hengeveld, EC-TCL)
- (4.6) But linguistic theory is a higher-level theory, the theory for which the "objects of a premised nature" are, properly speaking, **not texts but languages**, that is, all possible languages. (Lamb, LC-TCL)
- (4.7) Prototypicality is, then, **either a model for the polysemy of lexical items (involving the relationship between the lexical and the conceptual level), or a model of categorization (involving the relationship between the conceptual and the referential level)**. (Geeraerts, EC-TCL)

The enhancing role in nominal group coordination is limited to rather rare cases in which causal or sequential relations are established between elements, and not -as usual- between figures (Halliday & Matthiessen, 2014, p. 563):

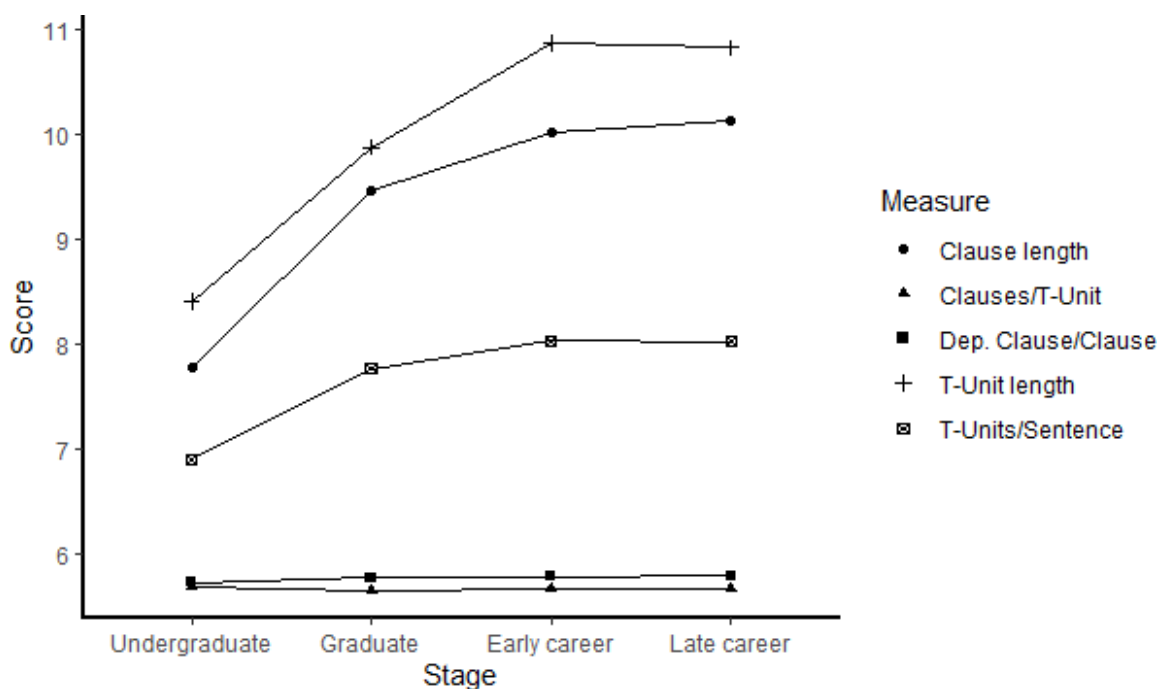
- (4.8) **Their frequent repetition and thus cumulative effect** is language change, but none of these processes is undertaken with the goal of changing the language. (Bybee LC-TCL)
- (4.9) Building on their experience with stories, students learn to produce **recounts**, managing successive settings in time, **and then biographical recounts**. (Matthiessen LC-TCL)

The developmental drift indicated by significant coordinate phrase per T-Unit/clause variation thus arguably concentrates on paratactic extension of the coordination type within nominal groups. Further analysis of the TCL corpus is needed to elaborate on the functional properties exhibited by this resource in linguists' academic writing, and to explain it within the framework of expanding registerial repertoires presented in Chapter II. This finding resonates with previous studies in complexity development throughout instructional contexts, particularly with the hypothesis that advanced language learners' development focuses on

nominal groups (Norris & Ortega, 2009; Biber *et al.*, 2011). The evidence thus far discussed reflects a similar drift in scholars' trajectories, although it shows no trade-off between complexity in clause complexes and complexity within the clause.

A cross-sectional developmental path may be proposed by relating complexity findings from this study to those of prior studies investigating similar complexity parameters (bearing in mind the caveats towards cross-sectional sequences discussed in Chapter III). The undergraduate and graduate data come from Ortega's (2003) meta-analysis of complexity values for second and foreign language college-level writing, and from Liu's (2018) study of applied linguistics graduate theses written in English by Chinese speakers. Figure 4.5 shows steady increases in T-unit Length, Clause-length, and T-units per Sentence from undergraduate to early career scholarly writing, and no apparent change in dependent clause per clause and clauses per T-unit. Early and late career values show stability, except for a mild increase in clause length.

Figure 4.4: Cross-sectional diachronic variation in complexity measures



Regarding lexical complexity, the developmental drift is towards slightly more diverse, specialized and dense lexical choices (Table 4.4). The slight increase in Lexical Diversity could stem either from a more delicate construal of the field, reflected in a more varied range of terms, or from more diverse engagement with disciplinary experiential domains. The former possibility seems more likely when considering the slight increase in specialized lexical sophistication and lexical density, measure indirectly pointing to higher technicality and metaphoricity in late career writing, respectively. Further analysis of the TCL corpus is required to validate these interpretations.

The findings in this chapter should be considered exploratory on account of the analytical limitations of automatic complexity indicators, particularly, their inability to capture the nuances of clausal and nominal group structure beyond traditional syntactic units. Corpus-based and text-analytical techniques in the upcoming follow-up studies will contribute towards a more nuanced understanding of the developmental drifts suggested by the observed trends.

4.2. Follow-up studies

The remainder of this chapter revolves around expanding on the findings from the main study by seeking to relate the observed complexity measure variations to their underlying functional mechanism(s). The three follow-up studies focus on elaborating on the diachronic features of coordinate phrase per T-unit/clause, lexical diversity, and specialized lexical sophistication in the TCL corpus, respectively. The methodological strategies in the studies, described in their respective procedure sections, combine more refined quantitative analyses with functional analyses mainly based on concepts and categories from Systemic Functional Linguistics.

4.2.1. Coordination in early and late career writing

This follow-up study investigates the logico-semantic motif of paratactic extension in the TCL corpus with the aim of illuminating diachronic differences in its functional manifestation in linguists' writing trajectories. The main study pointed to a mild increase in coordinate phrase per T-unit and coordinate phrase per clause, both measures suggesting that late career writing characterizes itself by more frequent usage of so-called "coordinate phrases". Coordinate phrases connect two or more groups (nominal group, verbal groups, or prepositional phrases) using a coordinating conjunction, most commonly *and*, *or*, *but* and *so*. Because these conjunctions also realize logico-semantic relations between different clauses and clause complexes, and the coordinate phrase per T-unit/clause measures are not sensitive to these differences, further analysis is needed to determine the functional mechanism underlying the diachronic variation observed. The specific question addressed in this study is: What differences, if any, exist in linguists' use of coordination in early and late career writing in the TCL corpus?

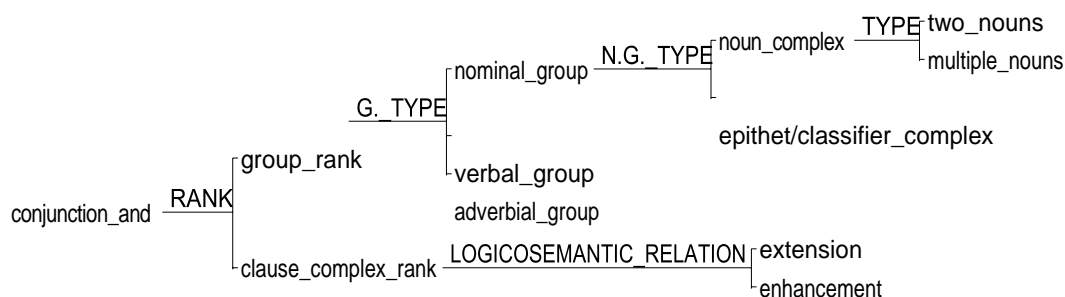
4.2.1.1. Procedure

The study involved a two-step procedure. First, I quantified instances of coordinating conjunctions *and*, *or*, *but* and *so* for each TCL corpus author in both early and late career periods, with the aid of the concordance plot function of Antconc 3.5.8 (Anthony, 2019). I passed the concordance plot counts into a nine-column Excel spreadsheet and normalized it to 1000 tokens based on the overall sum of token for each author's early and late career sub-corpus (Appendix 4.2). I tested the normalized conjunction counts for normality to determine the feasibility of parametric T-tests or non-parametric Wilcoxon's signed-ranked tests: conjunction *and* counts were normal in both career periods (Shapiro-Wilk= .102), thus being appropriate for T-test use, and the counts for the other conjunctions were non-normal,

thus appropriate for Wilcoxon’s signed-ranked tests. The tests revealed that only *and* had significant diachronic variation, so the second analytical stage focused exclusively on this conjunction.

The second stage involved characterizing the functional properties of *and* in early and late career writing, analyzing its most frequent right-adjacent collocates, and using a corpus of 1000 randomly selected instances of *and* to study the type units coordinated by this conjunction. I extracted the right-adjacent collocates using the Collocates function of AntConc 3.58, and subsequently studied them for tactic and logicosemantic function using the categories in Section 4.1.2. I extracted the randomly selected instances using the “Show Every Nth Row” option of the Concordance function in AntConc 3.58 and I exported them into a .txt file for manual analysis in UAM Corpus Tool. The analysis focused on determining the type of units coordinated by conjunction *and* (see annotation scheme in Figure 4.6).

Figure 4.5: Annotation scheme for corpus of randomly selected *and*-instances



4.2.1.2. Findings

Table 4.6 shows overall frequencies for coordinating conjunctions *and*, *or* and *but*. *And* is by far the most employed coordinating conjunction in both early and late career periods, occurring at a mean frequency of 22.13 to 24.64 per 1000 tokens in the TCL corpus. Conjunctions *or* and *but*, with a roughly similar rate of occurrence, are much less frequent. Conjunction *and* varies significantly across periods, with a moderate effect size ($t(74) = -3.567$, $p = 0.001$, $r = .383$). No significant variation occurs in conjunctions *or* ($W(74) = 1.122$, $p = .110$) and *but* ($W(74) = 1.408$, $p = .928$). The diachronic increase in coordinate phrase per

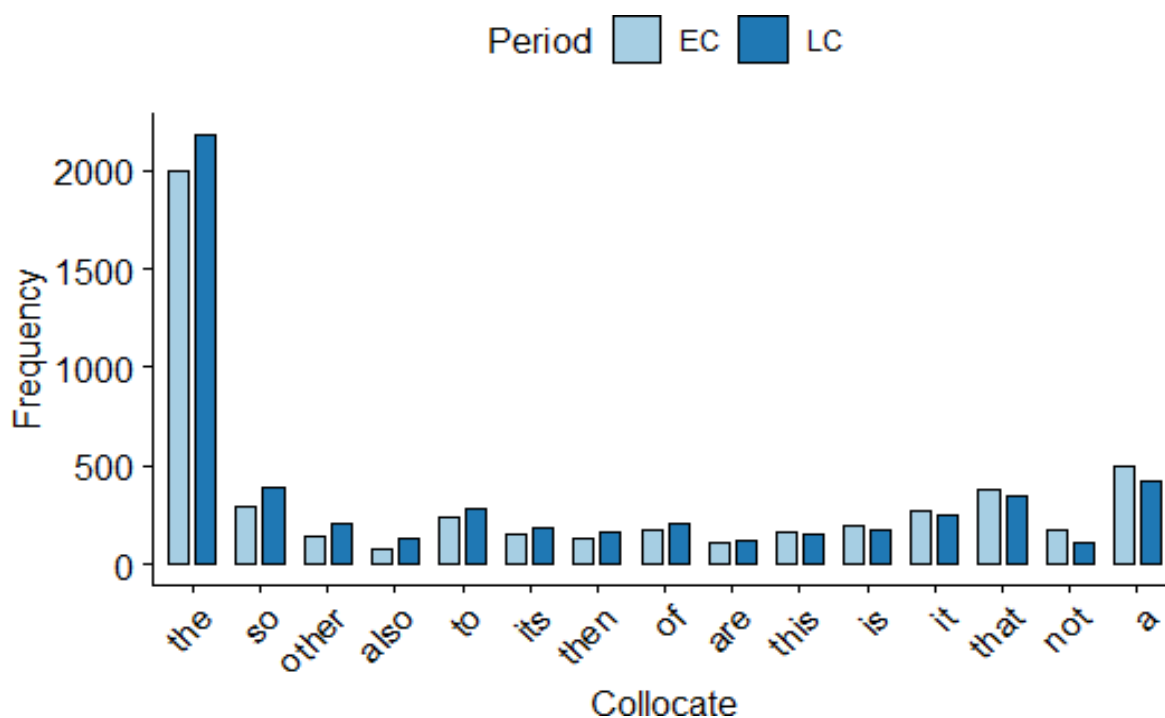
clause and coordinate phrase per T-unit values (Table 4.3) is thus mostly accounted for conjunction *and*., and paratactic extension of the additive type is the functional motif underlying the observed developmental drift.

Table 4.6: Mean and standard deviation values for conjunctions *and*, *or* and *but* in the TCL corpus

Conjunction	Early career		Late career	
	Mean	St. Dev.	Mean	St. Dev.
<i>and</i>	22.13	5.60	24.64	5.68
<i>or</i>	5.83	2.24	5.85	1.68
<i>but</i>	4.04	1.86	4.35	2.49

The usage of conjunction *and* also varies across early and late career. One source of evidence is its right-adjacent collocates, shown in Figure 4.7.

Figure 4.6: Right-adjacent collocates for *and* in the TCL corpus, early career (EC) and late career (LC)



Collocates suggestive of parataxis at the clause complex rank, including *and that*, *and it*, *and this*, and *and are* occur more frequently in early career writing. Collocate *and that* associates with three types of functional environment: reporting nexuses projecting clause

complexes (4.10), additive extension complexes where the first clause is substituted anaphorically by a demonstrative pronoun functioning as Theme in the second clause (4.11) or as Deictic in a substituting nominal group (4.12), and downranked clause complexes postmodifying Things within nominal groups (4.13).

(4.10) Rather, they argue that "phone sized" units are heavily affected by context **and that** a model of holistic processing for words and phrases is more realistic, a point to which we now turn. (Bybee, EC-TCL)

(4.11) Thus definite descriptions are undefined if this existence presupposition is not satisfied, **and that** is crucial to obtaining the result that sentences with definite descriptions of the form of (22) are always tautologies. (Abbot, EC-TCL)

(4.12) The Slavonic data have been analysed in detail elsewhere, **and that evidence** will not be repeated here. (Corbett, EC-TCL)

(4.13) In these cases the infinitive clearly has a modal meaning that can be described as factual" or "irrealis" **and that** distinguishes it from the corresponding finite indicative verb forms. (Haspelmath, EC-TCL)

Collocate *and it* occurs in paratactic clause complexes of extensive addition where *it* substitutes an element from the previous clause (4.14), or it is a Subject placeholder for a postposed fact in an attributive clause (4.15).

(4.14) In discourse the Passive is commonly found when objects are being described, such as artefacts, **and it** invariably communicates a State or generic Situation. (Hopper, EC-TCL)

(4.15) The roles that these nouns play are the argument positions of the verb, **and it** is a logically possible view that each verb subcategorizes these uniquely. (Foley, EC-TCL)

Collocate *and this*, also exclusively occurring in paratactic clause complexes of additive extension, appears in cases where *this* anaphorically substitutes an element (or a higher-ranking semantic unit) from previous text (4.16). This usage also occurs as a paratactic rhetorical complex where *and* functions as a structural additive conjunction

signaling close continuity between two adjacent rhetorical units (4.17). *This* also appears as Deictic in substituting nominal groups (4.18).

- (4.16) Indeed the variations appear to represent a hodge podge from many sources **and this** is probably exactly what they represent, particularly when one recalls the linguistic complexity of the Creek Confederacy as discussed in the first part of this paper. (Haas, EC-TCL)
- (4.17) But it is secondary in terms of the nature of the 'reality' it is deals with; it is concerned with the kind of second order reality that is created by language itself, semiotic reality or reality as meaning. **And this** is significant when we try to understand why its mode of expression is the way it is. (Matthiessen, EC-TCL)
- (4.18) They expect that ease of comprehension will decline down the hierarchy, **and this expectation** is confirmed in an experimental task. (Hawkins, EC-TCL)

Collocate *and the* + Noun is by far the most common in both early and late career corpora, corresponding to nominal groups with paratactic extension in 71.23% of randomly selected instances (4.19, 4.20), and to paratactic clause complexes in 28.77% of instances (4.21, 4.22). Although this collocate is more frequent in late career corpora, as shown in Figure 4.6, the distribution of nominal group and clause complex instances does not vary significantly across career periods ($\chi(1) = 0.812, p = 0.36$), which means that the main difference lies in overall frequency, not in its usage. Less frequent collocates *and other* and *and its*, more frequent in late career corpora, occur within nominal groups in 93.23% of randomly selected instances (4.23, 4.24).

- (4.19) The endings triggering retraction are those of the so-called strong cases: the nominative and accusative of both singular and dual, **and the** nominative of the plural. (Halle, LC- TCL)
- (4.20) These notional roles cannot, however, be wholly ignored (as may be seen from 1.2.3), but it is important to understand the relationships **and the** differences between them **and the** grammatical roles. (Palmer, LC)

(4.21) Thus only the declarative sentence type would have one clear functional correlate; the interrogative would have two; **and the** imperative would be a vague or multifunctional category. (Hawkins, Verschueren EC-TCL)

(4.22) After all, each of these studies is based on the linguistic features found in that language, **and the** corpora analysed include the distinctive registers found in that language. (Biber LC-TCL)

(4.23) But we are also, if we look around in the present, members of another culture that we share: the culture of education, with **its classrooms and its conferences and committees and its books and teaching materials and all the rest.** (Halliday, LC-TCL)

(4.24) There is a huge amount of work to do both in terms of linguistic research and in terms of building bridges between **linguistics and other disciplines.** (Goldberg, LC-TCL)

The analysis of randomly selected *and* instances reveals additional differences concerning the frequency of coordinated elements in coordinate phrases (Table 4.7). Late career writing features more frequent Epithet and Classifier complexes in the premodification structures of nominal groups (4.25, 4.26), and more frequent adverbial group complexes (4.27). Early career writing has a more frequent rate of verbal group complexes (4.27).

Table 4.7: Early and late career frequencies in *and*-complex types in the TCL corpus

Complex type	Early career		Late career	
	Total N=513	%	Total N=359	%
Nominal group complex	308	60.27	194	54.04
Nominal group (two groups)	205	73.21	118	71.95
Nominal group (multiple)	75	26.79	46	28.05
Nominal group: Classifier/Epithet complex	26	8.47	27	14.02
Verbal group complex	10	27.03	11	21.15
Adverbial group complex	26	8.47	27	14.14

(4.25) The other 25% of the time, and most of the time for *see*, they are used in **epistemic and evidential** expressions which show greater variety and diversity, as illustrated in (25). (Thompson, LC-TCL)

(4.26) The most **obvious and straightforward** demonstration that metaphor can impose inferential structure on concept is Gentner and Gentner's remarkable 1983 study of electricity concepts. (Lakoff, LC-TCL)

(4.27) Since the Indo-Aryan family seems not to inherit the pattern from Indo-European, diffusion is postulated from Dravidian both **for the pattern and for some etymological items**. (Emeneau, LC-TCL)

(4.27) We can **modify and enrich** the original Gricean take, so as to try to derive all of these phenomena and observations. (Chierchia, EC-TCL)

To conclude, the analyses performed in this follow-up study indicate some interesting differences in the use of paratactic extension in the early and late career writing in the TCL corpus. First, additive extension with conjunction *and* is significantly more characteristic of late career writing, while contrastive and alternative extension with conjunctions *but* and *or* show no significant variation. Secondly, although no statistically significant differences in the usage of conjunction *and* were identifiable, coordinating clause complexes with *and* are more frequent in early career writing, while coordinating nominal group complexes are more frequent in late career writing. Classifier/Epithet complexes are more frequent in late career writing and verbal group complexes are more frequent in early career writing. These differences, couched in probabilistic and frequency terms, may be too subtle to support categorical inferences about early and late career writing complexity and ideational meaning. The syndrome of features thus far discussed may, however, point to developmental differences in the accumulation of ideational meanings within scholars' repertoires. The fact that late career writing features significantly higher coordinate phrase per clause and coordinate phrase per T-unit measures and *and*-coordination within nominal groups may be a symptom that more experiential elements have populated their repertoires. As linguists accrue experience in construing the field, their repertoires accumulate more experiential entities and they are more likely to consider them in tandem. Early career writing, with its higher

frequency of coordinating clause complexes, may be more concerned with exploring the attributes of experiential entities separately while building theories as interrelated figures.

4.2.2. The functional mechanisms of Lexical Diversity

This follow-up study explores the functional mechanisms of lexical diversity in connection with the main study finding that lexical diversity increases significantly in late career writing ($F(1,1)=, 15.747, p= .000, RTE$ (Early career)= 0.46, RTE (Late career)= 0.56). A guiding hypothesis is that variation in lexical diversity, an index of how many different words an author employs in a textual unit, may stem from discursive reasons pertaining to the nature of the semiotic activity at work. Expounding texts of the categorizing type rely more heavily on lexical cohesion in identifying and assigning attributes to theoretical entities, tending to achieve lexical cohesion via repetition and anaphoric pronouns (two strategies that would reduce lexical diversity). Exploring texts tend to employ less explicit lexical cohesion strategies for tracking participants and would therefore be more lexically diverse, as shown in Johansson (2008). Investigating the relationship between lexical diversity and cohesion strategies provides a window into the influence of the semiotic activity on lexical diversity variation, keeping in mind that academic texts in the TCL corpus are best understood as entailing both expounding and exploring features. Two types of evidence would validate the hypothesis: the existence of negative correlations between lexical diversity and lexical cohesion measure, and diachronic variation in lexical cohesion measures showing a decreasing trend. The questions to be addressed are: 1) Is there a negative correlation between lexical diversity and lexical cohesion? and 2) do lexical cohesion scores decrease significantly in the TCL corpus?

Besides possible differences in the constraints on lexical diversity stemming from different semiotic activities (e.g. categorizing, arguing), lexical diversity effects may be unequally distributed across grammatical categories, as reflected in differential diachronic

trends for specific word types (e.g. noun diversity, verb diversity, adjective diversity, and adverb diversity). One hypothesis is that verb diversity variation would be constrained by the predominance of a small set of relational processes (chiefly *be*), while nouns and adjectives would tend to diversify as experiential meanings accumulate in text (Martin, 2011). The third question for this follow-up study is thus: 3) Do lexical diversity scores for specific word classes experience significant variation between early and late career periods?

4.2.2.1. Procedure

I obtained lexical cohesion and word class diversity data for each of the scholars' early and late career writing corpora by using TAACO 2.0.4 (Crossley *et al.*, 2014) and Lu's web-based Lexical Complexity Analyzer (Ai & Lu, 2010). TAACO (standing for "Tool for Automatic Analysis of Text Cohesion") is an open-source program providing a wide range of cohesion measures, among which latent semantic analysis, repeated content lemmas, and noun-pronoun ratio were included in the analysis to account for synonymy, repetition, and pronominal reference, respectively. The Lexical Complexity Analyzer is, as already discussed in 4.1.1, a web-based platform for measuring lexical complexity, including measures for Lexical Diversity specific to nouns, verbs, adjectives, and adverbs. I extracted the cohesion and lexical diversity measures for each author into a spreadsheet for analysis (Appendix 4.3). I explored Question 1 obtaining bivariate Spearman correlation coefficients between lexical diversity and the means of the mentioned cohesion measures, using the R base function "cor":

```
cor(taa$MEAN_LSA, taa$MEAN_LEXDIV, method= "spearman")
```

I explored Questions 2 and 3 by applying Wilcoxon's signed-ranked tests to the early and late career values of the TAACO and LCA measures, using the R base function "wilcox.test":

```
wilcox.test(taa$RCL.EC, taa$PNR.LC, paired= TRUE)
```

4.2.2.2. Findings

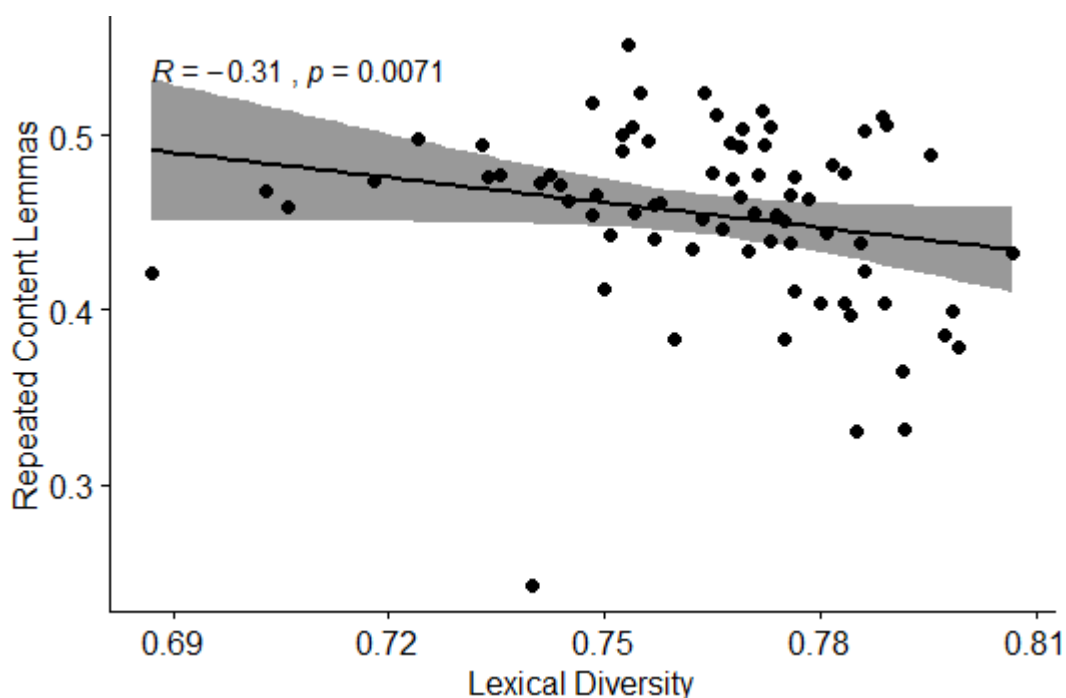
Question 1: Spearman's correlation coefficient values in Table 4.8 show that the only measure correlating significantly with lexical diversity is repeated content lemmas ($\rho = -0.309, p = .007$). This finding indicates that lexical diversity correlates with repetition, but not with synonymy or pronominal reference.

Table 4.8: Spearman's correlations between lexical diversity and TAACO cohesion measures

Spearman's correlation coefficient		Lexical Diversity	Latent Semantic Analysis	Pronoun/Noun Ratio	Repeated Content Lemmas
Lexical Diversity <i>df</i> (74)	Correlation coefficient	1.000	-0.165	0.102	-0.309
	Sig. (2-tailed)		0.158	0.382	0.007
Latent Semantic Analysis <i>df</i> (74)	Correlation coefficient		1.000	0.297	-0.137
	Sig. (2-tailed)			0.010	0.241
Pronoun/Noun Ratio <i>df</i> (74)	Correlation coefficient			1.000	-0.265
	Sig. (2-tailed)				0.022
Repeated Content Lemmas <i>df</i> (74)	Correlation coefficient				1.000
	Sig. (2-tailed)				

The scatter plot in Figure 4.8 indicates that lexical diversity and repeated content lemmas are inversely correlated, meaning that higher lexical diversity tends to entail lower repeated content lemmas, although some outliers fall outside this observation.

Figure 4.7: Inverse correlation between mean Lexical Diversity and mean RCL



Question 2: Wilcoxon's signed-ranked tests in Table 4.9 indicate that latent semantic analysis decreases significantly (yet weakly), pronoun/noun ratio does not change significantly, and repeated content lemmas experiences a significant yet slight decrease — contrary to the expected trend. The slight increase in repeated content lemmas seems contradictory in view of the above discussed inverse correlation between this measure and lexical diversity. The negative correlation apparently applies only in the synchronic perspective, while the actual diachronic contrast would exist between lexical diversity and pronoun/noun ratio. Another interpretation is that the diachronic effects for lexical diversity and cohesion measures are too weak to influence one another in the early career-late career contrast: a slight gain in lexical diversity may develop together with a slightly higher rate of repetition. This interpretation makes sense if it is assumed that late career writing involves a more diverse range of experiential entities which may repeat themselves slightly more often.

Table 4.9: Wilcoxon's signed-ranked tests for cohesion and word class diversity measures

	Early	Late	<i>W</i>	<i>p</i>	<i>r</i>
Length-based measures					
Lexical Semantic Analysis	0.180	0.175	1849	.025*	.183
Pronoun/Noun Ratio	0.124	0.137	1562	.469	
Repeated Content Lemmas	0.463	0.466	1830	.032*	-.175
Noun Variation	0.426	0.458	970	.007**	-.216
Verb Variation	0.102	0.105	1.023	.034*	-.170
Adjective Variation	0.110	0.116	885	.004**	-.228
Adverb Variation	0.052	0.050	1615	.314	

Question 3: Wilcoxon's signed-ranked test results in Table 4.9 show slight increases in noun variation, verb variation, and adjective variation, the only measure remaining constant being adverb variation. These findings suggest that the lexical diversity increase is distributed across different lexical item types, and it is not concentrated on nouns, as hypothesized. Nouns and adjectives do have stronger diachronic variation effects than verbs.

The quantitative findings from this study provide a rather complex picture of the mechanisms associated with lexical diversity increase in scholars' late career writing. Although a negative correlation with repeated content lemmas exists synchronically, it is the pronoun-noun ratio that shows a similar diachronic pattern, while repeated content lemmas increases. A clear connection between lexical diversity and textual cohesion allowing inferences regarding the influence of text type on lexical diversity fails to be substantiated by these analyses. Adding to the complexity, almost all the word class diversity measures show significant diachronic differences, limiting the traceability of lexical diversity effects.

Comparative analysis of excerpts with high and low lexical diversity values indicates that texts with high lexical diversity tend to have a higher number of content terms used only once, whereas low lexical diversity texts show higher repetition of content terms. Repetition

alone does not reduce lexical diversity, since both high and low lexical diversity texts showed varying repeated term percentages. Low lexical diversity texts characterize themselves by a focus on a limited number of content terms, mostly consisting of nouns denoting theoretical entities, without extending the delicacy of specialized taxonomies.

Table 4.10: Comparative analysis of excerpts with low and high lexical diversity

	Excerpt 4.28	Excerpt 4.29	Excerpt 4.30	Excerpt 4.31
Semiotic activity	Expounding: explaining	Expounding: categorizing	Exploring: arguing	Exploring: arguing
Total words	162	163	156	165
Content terms %	48.76	41.71	60.1	49.69
Lexical Diversity	0.65	0.68	0.79	0.80
Repeated terms (3+) %	47.53	50.1	37.82	44.84
Repeated content terms (3+) %	12.96	13.49	9.09	4.34
Repeated non-content terms (3+) %	35.18	33.7	28.20	40.60
Single use terms %	34.56	69.76	46.1	42.4
Single use content terms %	23.31	22.08	32.05	27.87
Single use non-content terms %	11.11	14.72	12.17	11.51
Pronouns per 100 words	2.46	3.06	6.41	2.42

Excerpt 4.28, with a low lexical diversity score (MSTTR: 6.5), is a sequential explanation of the phenomenon of the activation of neural language networks by words, its dominant rhetorical motif being temporal and causal enhancement. Temporal enhancement is realized indirectly by means of a Rheme-to-Theme pattern that creates a sense of temporal flow coinciding with text time. Causal enhancement is realized metaphorically by circumstantial process *result in*, which establishes causality between nominally realized figures (*the activation of the frame element results in the activation of the entire frame/ results in inferences*). The excerpt has a relatively high number of content word repetition for

its size, especially evident for the lemmas *frame* (11), *activat(-e, -es, -ion)* (7), *word(-s)* (4), *element* (3), and *metaphor(-s)* (3). Preference for repetition may stem from the need to maintain unambiguous reference to different variants of the same theoretical entity in a sequence of figures (*every frame, that frame, the entire frame, the frame, other frame, other frames, each of these frames*). The excerpt does not generate a typology of *frame* types, choosing to distinguish instances of *frames* by different deictic forms instead. Pronouns *it* or *them* would be hard to trace back to any of these specific referents.

4.28 **Expounding: explaining: sequential:** language neural network activation

The neural theory of language allows us to understand better why language is so powerful. Let's start with words. Every word is defined via a linking circuit to an element of a frame — a semantic role. Because every frame is structured by a gestalt circuit, the activation of that frame element results in the activation of the entire frame. Now, the frame will most likely contain one or more image-schemas, a scenario containing other frames, a presupposition containing other frames, may fit into and activate a system of other frames, and each of these frames may be structured by conceptual metaphors. All of those structures could be activated simply by the activation of that one frame element that defines the meaning of the given word. In addition, the lexical frame may be in the source domain of a metaphor. In that case the word could also activate that metaphor. In the right context, all of these activated structures can result in inferences. (Lakoff, LC-TCL)

Excerpt 4.29 also shows a low level of lexical diversity (MSTTR: 0.68). Its main semiotic activity is to categorize linguistic anthropology by defining it and associating it with other disciplines. Its global rhetorical motifs are elaboration and contrastive extension, realized directly by conjunctive Adjuncts (*similarly, on either view, yet*), and indirectly by its method of development. Repetition of content terms is also high, especially for terms *anthropology* (7), *linguistics* (5), and *history* (5). Their repetition helps reinforce the motif of contrastive extension used to elaborate on the idea that linguistic anthropology is coordinate with other branches of anthropology.

4.29 **Expounding: categorizing: defining:** Linguistic anthropology

By linguistic anthropology I understand a field coordinate with the other major branches of anthropology in the Anglo-American sense of the term. The field can be briefly defined as the study of language and speech in the context of anthropology. The existence of such a field as a subject for historical study has an empirical, rather than logical, rationale. For some, all linguistics is logically part of anthropology, while for others the two are coordinate. Similarly one may also view all study of language and speech as logically part of linguistics or as apportioned between linguistics and other fields, such as anthropology. On either view, there is no gap in the table of organization of the history of science, once the history of linguistics and the history of anthropology are registered. Yet if the writer of a history is a linguist not versed in anthropology, or an anthropologist not versed in linguistics, his product is likely to skimp the interests of the other. (Hymes, EC-TCL)

Excerpt 4.30, with a high lexical diversity score of 0.79, presents an argument for the use of observations of naturally occurring language as linguistic data. The argumentative orientation of the text is chiefly evident in the use of concessive enhancement complexes with conjunctions *but* and *however*. Repetition of content terms is limited, with terms *real* and *data* occurring four times each to punctuate the contrast between real and invented data. Most of the single use content terms in the excerpt come from evaluative comments towards the types of evidence discussed (*accidental, devil's bargain, sacrificing, dismissed, important, inevitably, insights, lack*).

4.30 **Exploring: Arguing:** natural language data

We might ask whether both data and theories have properties of their own that favor some over others. So far as data are concerned, I suggest that the highest value should be attached to observations that occur naturally and are not themselves products of imagination. In linguistics it has been common to rely on “grammaticality judgments” applied to snippets of invented language. Instead of observing language in action, one speculates on whether and why invented X is “grammatical” and invented Y is not. That procedure has a usefulness that should not be dismissed, but inevitably it misses something important, for observing real language as it is produced by *real* people in the *real* world offers insights that are obtainable in no other way. One sometimes hears that *real* data of that sort are accidental and thus lack the control required by experimental methods based on invented *data*. Sacrificing reality for control, however, is a devil's bargain. (Chafe, EC-TCL)

Finally, excerpt 4.31, with a high lexical diversity score of 0.80, shows prevalence of the rhetorical motif of enhancement of the evidence type, achieved via relational processes indicating proof (*show, support*), and different forms of modalization (*plausible, must have, hypothesis*). Except for the content terms *accentual* and *system*, the excerpt includes no content term being repeated more than twice. Its long tail of single use content terms mostly features nominalizations (*similarity, survival, accounts, reference, proposal, development, views, consignment, change*), technical terms functioning as Classifiers (*tonal, acute, circumflex, intonational*), and Epithets (*striking, plausible, marginal, fundamental*).

4.31 **Exploring: arguing:** The mobile stress system of Sanskrit and Balto-Slavic

In view of this striking similarity among IE languages that are known to have developed independently for millennia, the most plausible hypothesis is that the mobile stress system of Sanskrit and Balto-Slavic is a survival of the accentual system of the IE proto-language. This hypothesis is further supported by Verner's Law, which shows that Proto-Germanic at some point also must have had the same mobile stress system as Sanskrit and Balto-Slavic. Section 7 draws attention to the fact that the accounts developed for these accentual systems require no reference to tonal phenomena and that this supports Saussure's 1894 proposal-as against that of Fortunatov 1880-that intonations such as acute, circumflex, and so on, were later developments in the different languages and provide therefore no insight into the accentual system of the protolanguage. Since Fortunatov's views have dominated the field for the last century, the consignment of intonational phenomena to a marginal role in the IE protolanguage constitutes a fundamental change in how the problems are conceived. (Halle, LC-TCL)

Analysis of the excerpts suggests that texts in the exploring sector of semiotic activity are likely to be more lexically diverse because of their emphasis on supporting claims through evidence from different experiential domains and on evaluating their merits and those of their counterclaims. Texts in the expounding sector appear to be delimited to construing a limited set of entities, posing lesser demand for nominalization and evaluative lexis. However, this evidence is not enough to associate the subtle late career increase in lexical diversity identified in the main study with a shift towards argumentative texts in late

career writing. A better supported conclusion would be that late career writing in the TCL corpus is likely to include a larger variety of content terms, suggestive of a broader and more integrative experiential repertoire in which the individual construal of theoretical entities is not as foregrounded as in early career writing. The diachronic increase in noun, adjective and verb variety identified in this follow-up study amounts to the evidence for this tentative conclusion. The relationship between lexical diversity and measures pertaining to various cohesive strategies needs to be investigated more in depth.

4.2.3. Specialized lexical sophistication

This follow-up study investigates the functional correlates of specialized lexical sophistication in response to the main study finding that this measure experiences a significant, yet moderate, increase in late career writing ($p = .004$, $r = -.228$). Specialized lexical sophistication indicates the level of distinctness in scholars' overall lexical choices when compared with a disciplinary corpus, in this case, the TCL corpus. Specialized lexical sophistication, as explained above, is based on keyness values, specifically the mean Dice Coefficient keyness index obtained from AntConc 3.5.8. A high specialized lexical sophistication score indicates that a scholars' corpus is characterized by including lexical choices which, on average, differ considerably from those of other scholars, while a low specialized lexical sophistication score indicates that the scholars' lexical range falls within the disciplinary mainstream.

The grammatical nature of key terms is one central consideration. Key terms in academic discourse are traditionally associated with Things and, to a lesser degree, Qualities (Matthiessen, Teruya & Lam, 2010). However, the notion of key term encompasses other grammatical types, including prepositions, conjunctions, adverbs, and pronouns. A lexical item having key term status may thus not only indicate emphasis on experiential domains, but also interpersonal and textual motifs having special prominence. Key terms serving as Thing

in the structure of the nominal group are of special interest since these units occupy the most central role in determining the “aboutness” of specialized corpora (Scott & Tribble, 2006).

Things in academic discourse may correspond to technical terms, grammatical metaphors (which may or not function as technical terms), or to general domain entities lacking a direct contribution to the specialized theories. Technicality is predicated upon two central properties: the distillation of specialized meaning and paradigmatic relations within specialized taxonomies (Halliday & Martin, 1993). Technical terms, whether abstract or concrete, allow complex meanings to be condensed within one (or a few) terms, making it possible for theories to accumulate new experiential meanings while relying on prior ones. Their technical valeur derives from their relationship with other technical terms in a specialized taxonomy: a term lacking technical status in commonsense taxonomies may have a technical term status in a specialized taxonomy. This follow-up study explores these issues by focusing on the following questions:

- 1) Do early and late career key terms in the TCL corpus differ significantly in terms of word class?
- 2) Do early and late career key terms in the TCL corpus differ significantly in terms of technicality?
- 3) To what extent do early career key terms correspond with late career key terms in the TCL corpus?

4.2.3.1. Procedure

To determine the grammatical category of early and late career corpora, I extracted the top 50 key terms for each scholars' career period into a txt. file and POS-tagged using TagAnt 1.2.0, an open source tagging program based on Schmid's TreeTagger (Anthony, 2019). I revised the tags manually to ensure classificatory accuracy. I pasted the output into spreadsheets for frequency counts, and normalized them to 1.000 items. I performed a chi-square test analyzing the relationship between period and key term word class to probe for significant early vs. late career differences. I explored Question 2 based on a sub-sample of

key terms from 10 TCL scholars (Appendix 4.4), extracted for manual classification as technical or non-technical terms following the criteria in Matthiessen *et al.* (2010, pp. 6-9). I classified key terms corresponding to word classes other than noun, adjective and verb as non-technical (*broadly, whenever, possibly, whether*), since only these word classes can attain technical status. I also classified nouns, adjectives, and verbs as non-technical when observation of their use in text provided no evidence of their being used to condense specialized meanings in linguistics registers (*elemental, underlying, students, original, heard, chapter*). These include proper nouns, terms used in examples, and evaluative terms (*interesting, important*). I focused on frequency counts to determine early vs. late career differences in technical key term usage. I additionally used a non-parametric repeated-measures Wilcoxon's rank-sum test to determine whether significant keyness score differences occur between technical and non-technical terms. Finally, I determined the rate of correspondence between early and late career key terms by using the "intersect" base function of R, which determines matching key terms in the early and late career key term lists.

4.2.3.2. Findings

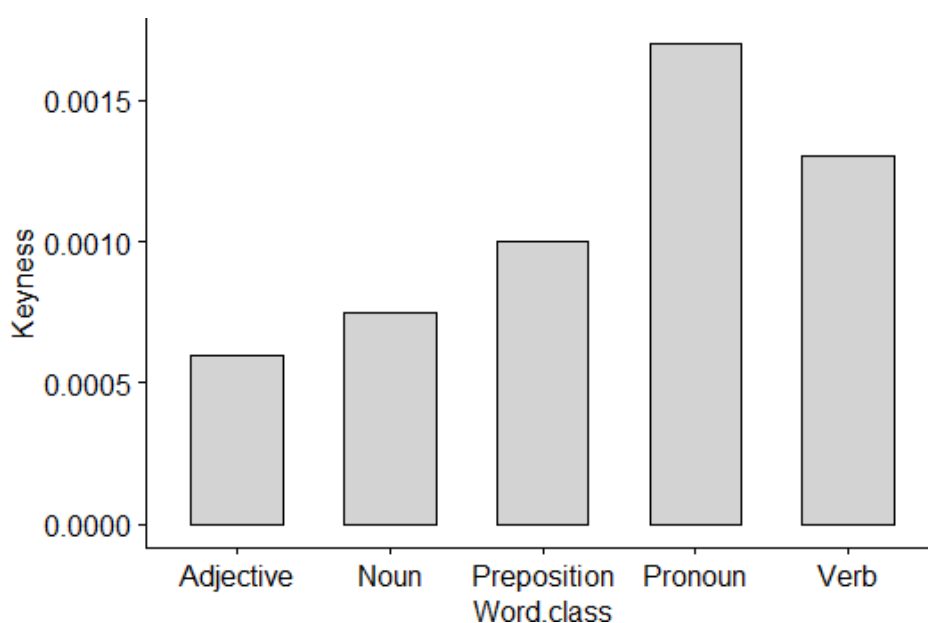
Frequency counts of key terms in the early and late career TCL corpus classified by word class and technicality are summarized in Table 4.11.

Table 4.11: Normalized frequencies of TCL key terms in early (EC) and late (LC) career classified by word class and technicality

Technicality	PERIOD	WORD CLASS									Total
		Adj.	Adjunct	Con.	Det.	Nom.	Noun	Prep.	Pr.	Verb	
Non-technical	EC	36	23	0	2	2	110	16	16	74	277
	LC	57	17	1	2	1	134	16	13	112	352
	Total	93	37	1	4	3	244	32	29	186	629
Technical	EC	50	0	0	0	60	234	0	0	7	353
	LC	51	0	0	0	51	257	0	0	10	371
	Total	101	4	0	0	111	491	0	0	17	724
Total	EC	86	23	0	2	62	344	16	16	81	630
	LC	108	18	1	2	52	391	16	13	122	723
	Total	194	41	1	4	114	735	32	29	203	1353

Question 1: Frequency counts show large frequency increases for verbs (81 vs. 122), adjectives (86 vs. 108), and nouns (344-391), and decreases in nominalizations (62-52) and Adjuncts (23 vs. 18). However, the distribution of key term grammatical categories across career periods is not statistically significant ($\chi(9)= 10.23, p= .249$). The word classes with highest median keyness value are, in descending order, pronouns, verbs, prepositions, nouns, and adjectives (Figure 4.9).

Figure 4.8: Median keyness values per word class in the TCL corpus



Question 2: There is not a significant difference in the distribution of technical key terms in the early and late career periods, both showing rather similar technical key term counts (353-371). Non-technical terms do show a significant frequency in late career writing (277-352), suggesting that the SLS increase shown in the main study could stem from non-technical terms gaining higher distinctiveness in TCL scholars' late career writing. Non-technical verbs and nouns, both showing large increases, account for much of this frequency variation. Although the overall keyness of non-technical key terms is significantly lower than that of technical key terms (NT= 0.013 vs. T=0.015, $W= 3.808, p= 0.001, r= -.172$), non-technical terms show the highest keyness increase while technical term keyness decreases:

Figure 4.9: Keyness for non-technical and technical terms in the TCL corpus

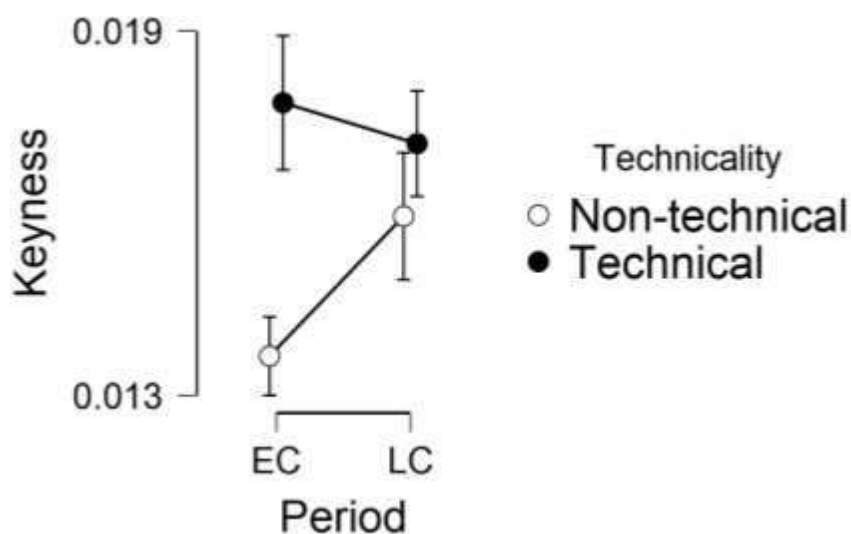
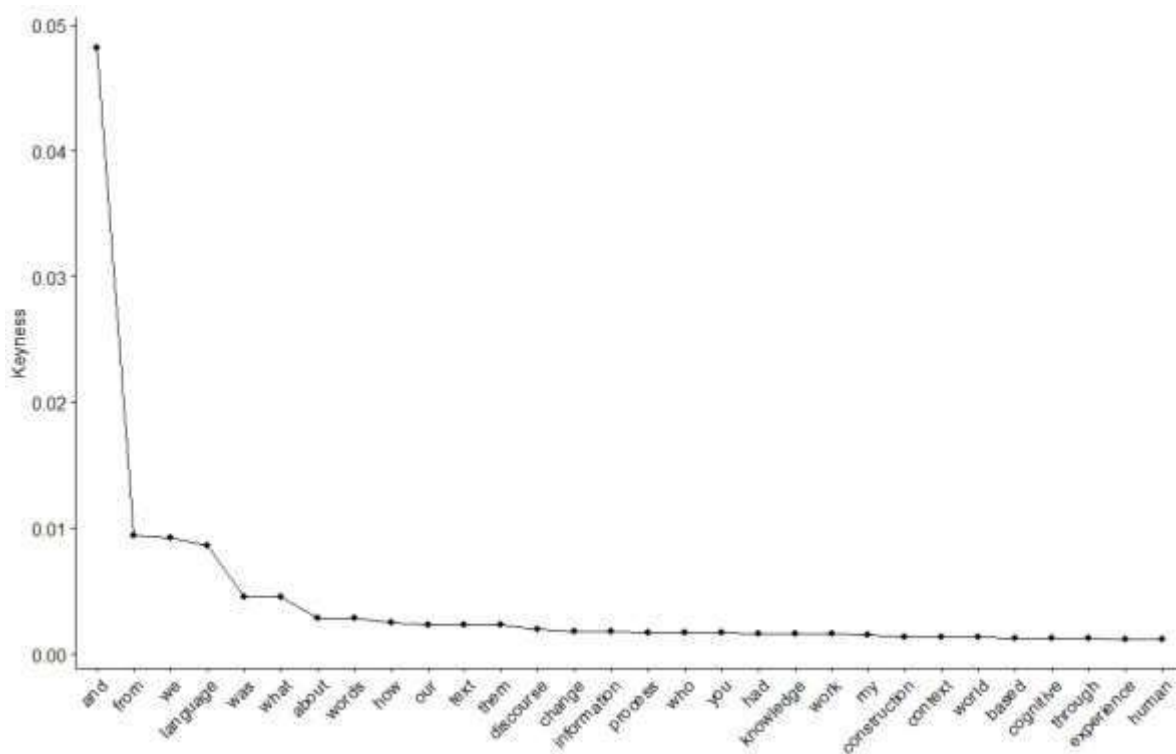


Figure 4.11 illustrates the fact that a few non-technical key terms show the highest keyness values in the late career TCL corpus, most prominently *and*, *from* and *we*. The exceedingly high keyness of *and* in the late career TCL corpus (when contrasted with the early career corpus) coincides with the findings from follow-up study 2, in which additive parataxis with linker *and* within nominal groups was shown to be especially favored in late career writing. Non-technical term *from* associates with a variety of motifs, judging from its collocations in TCL, including the motifs of contrastive extension (*apart/ aside/ separate/ distinct/ differ(ent) from*), spatial enhancement denoting the origin of data (*come/ derive/ extract/ select/ take/ retrieve from*), spatial enhancement denoting transition into a new state (*change/ move/ shift/ start/ transfer/ transition from*) and causal enhancement (*result/ follow/ stem/ emerge from*). The high late career keyness of *from* thus reflects higher engagement with empirical data through the analysis of commonalities and causal relations between entities. Non-technical key term *we* reflects an interpersonal motif to involve the readership as interacting Subjects in written text, particularly in the cohesive management of text contents (*we saw/we shall see/ we have seen*) and in proposing conclusions and courses of action (*we can say/see that, we conclude that, we know/recognize that, we*

could/may/should/must/need to). The high keyness of non-technical terms in TCL late career writing suggests that the developmental drifts are not connected with increasing elaboration of specialized theories, but more centrally with logical and interpersonal motifs.

Figure 4.10: Top 30 key terms in TCL late career (aggregate values)

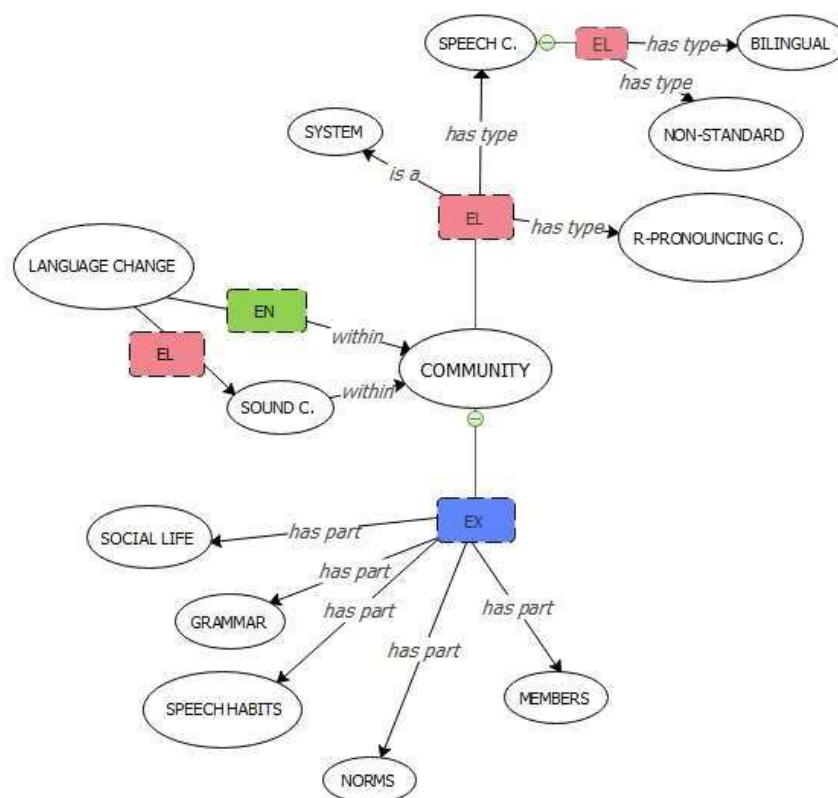


Question 3: Average correspondence between early and late career key terms is 20.10 (range: 12.00 - 24.03), which means that a relatively small proportion of key terms remain important throughout authors' scholarly trajectories. Although no special lexicogrammatical traits are apparent upon inspection of constant key terms, most of them may be considered generic technical terms in the linguistics field (*function, grammar, structure, clause*). The exploration of early vs. late career key term correspondence suggests that there is a small subset of core concepts retaining special relevance throughout scholarly trajectories and a larger subset of concepts relevant only to specific periods.

The scarce continuity between early and late career key terms suggests that TCL scholars' interests and taxonomies tend to vary considerably throughout the career. In the

cases where specific terms have high keyness for scholars in early and late career, it is interesting to observe differences in their construal in each period. Early career key terms realized by nouns appear to be mostly construed through extension and elaboration, the former indicating their abstract or concrete constituents, and the latter indicating their types and attributes. Figure 4.12 illustrates the construal of the key technical term *community* in Labov's early career corpus, showing that the main areas of theoretical elaboration are metonymic extension (blue nodes) and typological elaboration (red nodes).

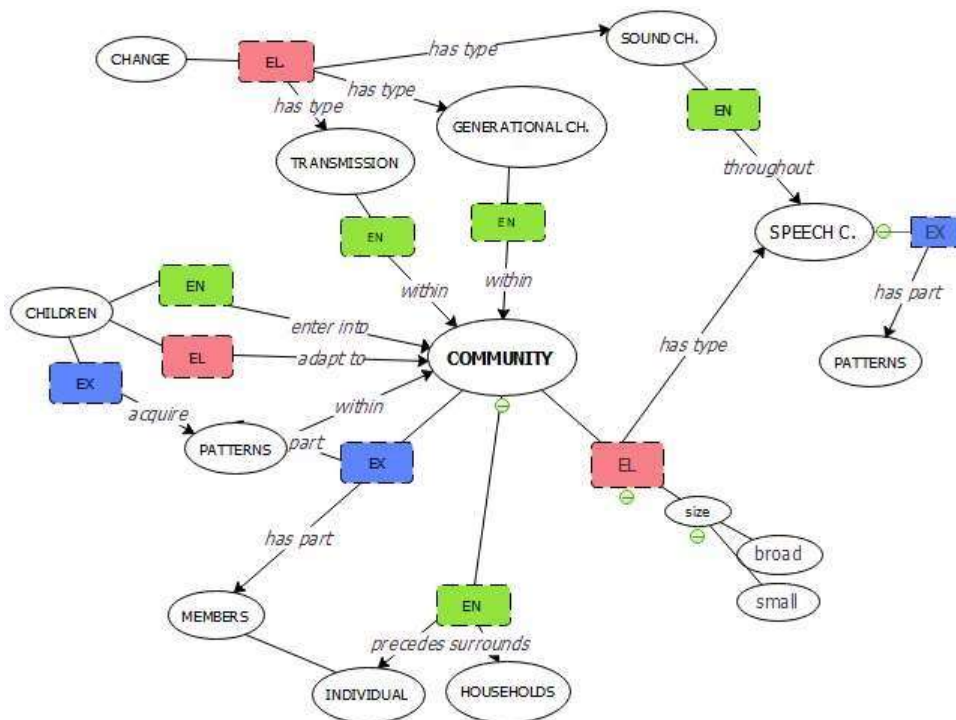
Figure 4.11: "Community" construed in Labov's early career corpus



Late career construal of technical key terms tends to foreground interrelations between entities, mostly through different types of enhancement. Figure 4.13 shows Labov's late career construal of *community*, with most of the expansions consisting of enhancement relations (green nodes) with other theoretical entities that have, in turn, also expanded themselves. The interrelation between entities would partly account for the higher keyness of

non-technical terms denoting logical motifs. This hypothesis also needs to be explored more in depth.

Figure 4.12: “Community” construed in Labov’s late career corpus



Findings from this follow-up study motivate the conclusion that the moderate increase in Specialized Lexical Sophistication in the TCL corpus affects key terms regardless of their grammatical category or technical status, since no statistically significant differences occurred for these factors. Descriptive findings suggest, however, that increasing SPS is not an indicator of increasing specialization, as hypothesized, since the number of technical terms decreased as well as their overall keyness. The key underlying factor seems to lie in non-technical terms, mostly including general domain nouns and adjectives (*students, cost, problems, resultant, missing, adequate*), as well as pronouns and prepositions. The former two categories play a supporting role in theory construction, offering lower level descriptors for empirical data without entering the more stable taxonomic structures composed by technical terms. Pronouns and prepositions as non-technical key terms point, in turn, to

increasing individuation in scholars' discursive interaction with the readership and in their preferred analytical and argumentative strategies. These possible developmental drifts are worth investigating more in depth in future studies.

4.3. Conclusion

This chapter has explored variation in linguists' writing trajectories with a focus on syntactic and lexical complexity and its relationship with ideational lexicogrammar, addressing Research Question 3: "Throughout their scholarly trajectories, to what extent does linguists' writing change regarding its complexity, intricacy, density and sophistication?" The findings from the main study and the three follow-up studies illuminate important principles and point to possible developmental drifts. One principle is that language development is selective regarding the linguistic dimensions in which key adaptations occur: early career and late career writing remain largely similar as per the statistical comparison of most complexity parameters. This predominant similarity in complexity parameters reflects the metastability of registers within individuals' semiotic trajectories. Another related principle is that language development beyond instructional cycles is subtle and complex in nature. Scholars' linguistic development is unlikely to show the dramatic types of change documented throughout the school and university cycles: the bare eye will hardly notice any systematic differences between early and late career texts. The subtle differences are best captured through large scale analysis of cohort sequential corpora, using a combination of automated and manual analysis, as illustrated here.

The complexity measures showing significant, yet subtle, diachronic differences are coordinate phrase per clause, coordinate phrase per T-unit, lexical diversity and specialized lexical sophistication. The first two measures correspond to a developmental drift in TCL scholars' academic writing whereby late career writing involves a significantly larger amount

of coordinate phrases. Analysis reveals that functional mechanism underlying this trend is paratactic extension of the coordinating type, a logico-semantic motif involving two or more elements with equal status within a clause complex or a nominal group complex. Further analysis suggests additional nuances of this developmental drift, most importantly that late career writing shows preference for paratactic extension within nominal groups. This finding resonates with the hypothesis that advanced language development focuses on nominal groups and not on clause complexing (Norris & Ortega, 2009; Biber *et al.*, 2011).

Additionally, extension with conjunction *and* is significantly more characteristic of late career writing, while contrastive and alternative extension with conjunctions *but* and *or* show no significant variation. These subtle differences may stem from the accumulation of ideational meanings within scholars' repertoires, being a symptom of higher saturation of experiential meanings in their repertoires and of a more marked disposition to consider the interrelations between experiential entities.

Variation in lexical diversity and specialized lexical sophistication proved more challenging parameters to explain in terms of diachronic functional variation, partly because of their highly general nature and the subtlety of their change. Lexical diversity appears to be an indicator of the nature of the cohesive strategies employed in text and, by indirect extension, of the nature of the semiotic activity at play. One of its puzzles is that, synchronically, it shows a negative correlation with repeated content lemmas, its diachronic pattern only matches that of repeated content lemmas. The intuitively plausible idea that higher lexical diversity entails fewer repeated terms appears not to hold true from a developmental perspective, in which it appears to co-vary with repetition and pronominal reference. In the same manner, the increase in specialized lexical sophistication resists simple explanations. Its diachronic effects seem to be distributed across key term types without a significant pattern to emerge regarding grammatical categories or their technicality status.

Descriptive evidence suggests that non-technical terms -those lacking direct connection with a specialized taxonomy- account for much of the observed diachronic specialized lexical sophistication variation. The developmental drift indicated by lexical complexity variation in the TCL corpus thus seems to be towards increasing individuation in scholars' engagement with data and with the readership, rather than towards increasing specialization. Further studies analyzing these apparent developmental drifts are needed to determine their extent and occurrence across disciplines.

CHAPTER V: INTERPERSONAL LEXICOGRAMMAR IN EARLY AND LATE CAREER WRITING

This chapter explores interpersonal lexicogrammar in scholars' early and late career instantiation of linguistics academic registers, addressing Research Question 2, viz.: "Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities?" The first section outlines the framework employed in the analysis of interpersonal lexicogrammar, based on the stratified model of language developed by Systemic Functional Linguistics (Halliday, 1979; Halliday & Matthiessen, 2014, Ch. 4; Martin & White, 2005). The organization of study reports is similar to that of Chapter IV, with a general main study expanded by two specific follow-up studies. The main study investigates variation in evaluative resources outlined, including modality and modal assessment. The first follow-up study focuses on comment Adjuncts in early and late career writing, in response to significant differences in modal assessment observed in the main study. The second follow-up study increases analytical delicacy in the study of appreciation-type attitude, in view of the fact that it varies significantly in late career writing. Each of the studies describes its own methodological procedure. The chapter closes with a summary of findings and theoretical implications.

5.1. A stratified model of evaluation

Language is organized into orders of symbolic abstraction whereby meanings (semantics) resonating with social situations (context) are realized by wordings (lexicogrammar) realized in turn by soundings (phonology/phonetics) (Halliday, 1961; Halliday & Matthiessen, 2014, Ch. 1). Evaluation traverses these strata within the semiotic space of the interpersonal metafunction, the one organizing language as a resource for enacting roles and relations between speakers (Halliday, 1978). It is semioticized in context

as systems of **valuation** organized as institutionalized ideologies comprising epistemic, ethic and aesthetic values towards experiential domains. In language, it is semanticized as interpersonal strategies for enacting, expressing and negotiating valuations in text, and it is realized prosodically across a wide spectrum of lexicogrammatical resources within, below, and beyond the clause. This section lays out the theoretical and analytical foundation for the main study and related follow-up studies.

5.1.1. Evaluation in context

Evaluation is semioticized in context as systems of epistemic, ethic and aesthetic values covered under the contextual parameter of VALUATION. Matthiessen, Teruya and Lam (2010) define VALUATION as the “assignment of positive and negative value loadings to different aspects of field” (p. 217). Although SFL context frameworks do not deal with this parameter explicitly, seminal papers on context of situation suggest relevant hints. Halliday (1978) indicates that the evaluation of objects “lies on the borderline of Field and Tenor” (p. 117), pointing to the orientation towards Field of experience as one of the defining features of VALUATION. While Tenor parameters such as SPEECH ROLE and SOCIO-SEMIOTIC DISTANCE relate to the social conditions regulating the exchange of meanings, VALUATION entails the enactment of values towards experiential domains within the exchange itself. VALUATION may be inferred to be part of the “cluster of socially significant relationships” mentioned in his later definition of Tenor (Halliday, 1989, p. 12), the relevant relationship in this case being that which obtains between knowers in a speech fellowship. Academic socialization entails enculturation into criteria for assessing the subjective values of truth, relevance, usefulness, righteousness, and beauty (Duff, 2010). Scholars’ participation within academic speech fellowships entails varying degrees of engagement with institutional values regarding knowledge and ways of knowing, most of which are unconsciously enacted in evaluative choices in academic text (Banks, 2005b).

VALUATION can also be usefully approached through the dimension of instantiation. At the systemic end of culture, VALUATION entails evolved or designed value systems entrenched as ideologies within and across social institutions. The epistemological dimension of VALUATION pertains to values around the nature and production of knowledge, encompassing ideologies such as rationalism, empiricism, logical positivism, esotericism, and common sense. Epistemological VALUATION determines not only the values at stake within a disciplinary institutional context (e.g. rigour, elegance, authenticity, applicability), but also which aspects of experience are available for evaluation and which ones are not. It thus acts as a filter through which communities and individuals separate matters at issue from matters deemed as settled or as background knowledge (Fairclough, 2003). At the instantial end of contexts of situation, VALUATION determines the epistemological, axiological or aesthetic biases that interactants bring into the situation which predispose them attitudinally towards foregrounding specific values and target experiential domains (Banks, 2005b). Halfway between culture and contexts of situation lies the VALUATION potential associated with specific institutions, which resonates with the evaluative prosodies characteristic of their associated registers. The explicit and implicit evaluative choices that individuals make in text are largely grounded on the VALUATION sub-potentials of the institutional contexts in which they get to participate throughout their lives (Lemke, 2003).

5.1.2. Evaluation in semantics

While VALUATION is the non-linguistic contextual parameter pertaining to institutionally maintained epistemological, axiological, and aesthetic value systems, evaluation may be defined as the set of semantic strategies available to speakers for enacting these values in the exchange of meanings. Hunston and Thompson (2000) define evaluation as “the broad cover term for the expression of the speaker or writer’s attitude or stance towards, viewpoint on, or feelings about the entities or propositions that he or she is talking

about” (p. 5). Evaluation is thus the subjective semantic dimension through which language users position experience against their internalized measures of what is good, truthful, right, or beautiful. The evaluative target may be within the material order of reality, concerning abstract and concrete entities and figures. It may also be within the social order of reality, referring to attitudes towards acts of meaning (Halliday, 1985; Thompson & Hunston, 2000).

The interpersonal enactment of VALUATION is grounded on the semantics of exchange, with the system of SPEECH FUNCTION offering the basic starting point in the specification of strategies for assigning values to experiential domains. SPEECH FUNCTION involves the semantic choice to orient an interpersonal move towards giving or demanding **information** or **goods-&-services**, and the semantic choice to **initiate** a new turn or to **respond** to a prior turn (Halliday, 1984). The nature of the commodity being exchanged yields the options **proposition** and **proposal**: proposition includes giving information (statements) and demanding information (questions), and proposals includes demands for goods-and-services (commands) and giving goods-and-services (offers).

Most acts of meaning in academic discourse lack an explicit evaluative orientation, being what Lyons (1977, in Martin & White, 2005, p. 94) calls “bare assertions”. Bare assertions resonate contextually with the subset of VALUATION corresponding to the knowledge taken for granted in the ongoing context of situation, the experiential representations not at issue enacted as shared truth. They correspond to what has been called declarative knowledge, encyclopedic knowledge or “knowing that”, prototypically associated with definitions, categorizations or explanations in the so-called hard sciences. Despite their lack of overt evaluative resources, they indirectly convey the interpersonal evaluation of knowledge as indisputable timeless truth, standing in contrast with enactments recognizing dialogic alternatives. In academic text, sequences of bare assertions create evaluative prosodies in which the epistemic status of propositions is presented as lying beyond

discussion. These prosodies help establish the epistemic base on which the theoretical and empirical arguments of the text rest. Bare assertions do most of the categorizing and explaining work associated with expounding registers, constituting the prototypical presentation of knowledge which is stable, not at stake:

- (5.1) ||| The word 'girl' in 'the girl he saw' **plays** two functions simultaneously. ||| It **is** the head of the including noun phrase, ||| and it **is** also the object of the verb 'saw'. ||| The third use of double function **occurs** || when an endocentric construction takes its minimum form, || when, for example, a noun phrase is realized as a single noun. ||| Thus, the word 'men' in the clause 'men are rational animals' **is** at one || and the same time a noun and a noun phrase. ||| As a noun, 'men' **fills** the function of head of the noun phrase; ||| as a noun phrase, it **fills** the function of subject of the clause.||| (Fries, EC-TCL)

Complementing bare assertions in academic registers are a variety of interpersonal strategies for enacting epistemic values regarding the status of truth. These interpersonal strategies gear academic text towards an internal orientation referring to the establishment of relations with the speaker and addressee (Teruya & Matthiessen, 2015). They typically involve the provision of evidence increasing readers' belief of a claim, the central interpersonal motif in academic registers being modalization (the negotiation of degrees of certainty) (Martin, 1992), coupled with the logicosemantic motifs of elaboration and causal enhancement. A rhetorical pattern commonly motivating evaluative strategies in academic discourse is that of evidence, whereby a proposition is supported by one or more propositions serving as proof, with the intended effect of increasing its credibility (Mann, Matthiessen & Thompson, 1992). The strategies in this case resonate with contextual VALUATION of experience as facts in the process of being intersubjectively validated. Evaluative strategies may alternatively seek to naturalize epistemic positions by explicitly declaring their factual status, what Martin and Rose (2005) call "contraction" in the system of ENGAGEMENT. Besides the intersubjective negotiation of truth and factuality, a wide range of evaluative meanings concern the evaluation of propositions and entities in terms of their significance, relevance, clarity, appeal, usefulness, completeness, etc. The strategic deployment of these

meanings in academic texts mainly serves to create a research space by aligning readers with specific positions and disaligning with competing voices (Hood, 2010). These latter meanings may be enacted interpersonally through evaluative prosodies, or they may be construed ideationally as experiential figures (as illustrated in Matthiessen's (2006) lexicogrammar of emotion and attitude in English).

5.1.3: Evaluation in lexicogrammar

Language users have at their disposal a variety of lexicogrammatical resources for realizing the evaluation of propositions and entities within, below and beyond the clause, encompassed within the system of MODAL ASSESSMENT (Halliday & Matthiessen, 2014, Ch. 4). Within the clause, MODAL ASSESSMENT resources occur across the functional elements of interpersonal clause structure, namely the Mood (Subject + Finite) and the Residue (Predicator, Complement, Adjunct). MODAL ASSESSMENT resources within the Mood include DEICTICITY and MOOD ASSESSMENT (the system of Mood Adjuncts) (p. 139). Also within the clause, but outside the Mood + Residue structure, MODAL ASSESSMENT includes the system of comment Adjuncts, which realize evaluations targeting the ideational content of propositions (PROPOSITIONAL ASSESSMENT) or its interpersonal speech-functional orientation (SPEECH FUNCTIONAL ASSESSMENT) (p. 190). Below the clause, lexicalized MODAL ASSESSMENT resources can realize evaluative meanings within nominal groups functioning as Subject or Complement or (as part of) Adjuncts, and within verbal groups functioning as Predicator. Beyond the clause, MODAL ASSESSMENT includes interpersonal grammatical metaphors of MODALITY, SPEECH-FUNCTIONAL ASSESSMENT and PROPOSITIONAL ASSESSMENT which expand the potential for evaluating propositions.

Within the clause, the most grammaticalized MODAL ASSESSMENT system is DEICTICITY, the choice to specify the validity of the proposition with respect to temporal reference (temporal deixis) or the speaker's own judgment of its certainty (modal deixis)

(Halliday & Matthiessen, 2014, p. 144) . Present temporal DEICTICITY in declarative clauses is the prototypical realization of statements classified as bare assertions in academic text.

Modal DEICTICITY in declarative clauses typically realizes propositions assessed for MODALITY, the continuous semantic space between negative and positive polarity (p. 172). Probability-type MODALIZATION is a highly grammaticalized system in modern English, its realization drawing on a system of modal operators within the Finite (*can, could, may, would, might*), as well as on mood Adjuncts of modalization (*possibly, certainly, perhaps*).

Outside the Mood + Residue structure, comment Adjuncts expand the range of resources for realizing a variety of evaluative meanings (Halliday & Matthiessen, 2014, p. 190). Comment Adjuncts within the system of PROPOSITIONAL ASSESSMENT realize evaluations of the experiential content of the proposition in terms of its obviousness, predictability, evidential support, or the moral character of the Subject. Comment Adjuncts of SPEECH-FUNCTIONAL ASSESSMENT realize speakers' evaluation on the interpersonal act of exchanging meanings, enacting the interpersonal degree of disclosure, intimacy, expertise, or individuality invested in the exchange.

Below the clause, evaluative meanings can be realized as Qualities or Things functioning as (or within) the Subject, Complement or Adjunct elements of the clause. MODAL ASSESSMENT systems may be realized in nominal groups, besides their congruent realization as modal operators, mood Adjuncts and comment Adjuncts. Adjectives functioning as Post-deictics can realize probability-type MODALIZATION (*certain, possible, probable*) and different types of PROPOSITIONAL ASSESSMENT (*alleged, expected, evident, obvious*) (Halliday & Matthiessen, 2014, p. 374). The same holds true for attitudinal Epithets, which can realize a variety of assessments, especially in PROPOSITIONAL ASSESSMENT subdomains (On Subject= *wise, clever, correct, right*; qualificative: prediction= *surprising, predictable*); and desirability= *hopeful, unfortunate, interesting*) (p. 680).

A variety of evaluative meanings in English can only be realized by Epithets lacking agnation with MODAL ASSESSMENT systems (i.e. lacking an agnate Adjunct or Finite operator). The Epithets fall within the system of ATTITUDINAL EPITHESES. Attitudinal Epithets express speakers' subjective opinion about Things. They distinguish themselves from experiential Epithets, among other features, by their inability to define Things in terms of recognizable experiential attributes (Halliday & Matthiessen, 2014, p. 376). While *red* and *large*, as experiential Epithets, can aid in recognizing one glass from another, attitudinal Epithets *splendid* and *adorable* cannot, precisely because their contribution to the description of the glass is purely subjective. Attitudinal Epithets also tend to be reinforced by other interpersonal features, such as intensifiers, swear-words and intonational contours (*awfully rich, damn hot, plain boring*).

Martin and White's (2005) system of ATTITUDE may be usefully incorporated to add delicacy to the analysis of attitudinal Epithets. While it is clear that ATTITUDE is originally conceived of as a [discourse] semantic system, its descriptive resonances with the lexicogrammatical system of ATTITUDINAL EPITHESES can be exploited for analytical purposes, given the natural relationship held to exist in SFL between semantics and lexicogrammar (Martin, 1992). Of special interest in the analysis of academic registers is the ATTITUDE type known as appreciation, having to do with the evaluation of entities and natural phenomena. The three types of appreciation, as glossed by the authors (p. 56), are reaction (*Did it grab me? Did I like it?*), composition (*Did it hang together? Was it easy to follow?*), and valuation (*Was it worthwhile?*). Attitudinal Epithets can thus be subcategorized as reaction Epithets (*captivating, fascinating, dull, unremarkable*), composition Epithets (*balanced, harmonious, discordant, irregular*), and valuation Epithets (*deep, innovative, creative, exceptional, shallow, conventional*).

Beyond the clause, interpersonal grammatical metaphors extend the potential for evaluating propositions mainly by co-opting the logical motif of projection and the experiential motifs of mental and relational transitivity. The most widely studied interpersonal metaphor type is that involving the use of mental projection clause with speaker as interactant Subject to realize probability-type MODALIZATION in declarative clauses (*I think, I believe*) (Simon-Vandenberg *et al.*, 2003; Taverniers, 2008; Davise & Simon-Vandenberg, 2008). These bi-clausal constructions are classified as explicitly subjective modality because they directly inscribe the speaker's subjectivity in the evaluation. Relational attributive clauses with downranked clauses as Carrier ("fact-clauses") realize, in turn, explicitly objective metaphorical modality by enacting the evaluation as emanating from an outside neutral source, and not from the speaker (*It is likely/ possible that*).

Metaphorical realizations of other types of MODAL ASSESSMENT have received less attention in SFL grammatical theory and registerial description. Halliday and Matthiessen (2014, p. 193) indicate that their description of PROPOSITIONAL and SPEECH FUNCTIONAL assessment is based on a perspective "from the same level" which only considers the realization of these systems by modal Adjuncts, leaving out alternative realizations by mental/verbal clauses (*I regret/admit*) and relational clauses (*It is regrettable*). Along the same line, the authors (p. 186) categorize biclausal constructions agnate with these modal assessment systems as "incongruent" and realizing explicitly subjective (*I'm happy, I tell you*) and explicitly objective (*it's fortunate*) realizations. IFG Chapter 10 provides a more detailed chart of realizations of MODAL ASSESSMENT systems, including a range of biclausal constructions involving mental and verbal projection (*I hope, I expect, I assure*) and relational attributive clauses (*it is surprising/ arguable/ wonderful that*). The notion of interpersonal grammatical metaphor of PROPOSITIONAL and SPEECH-FUNCTIONAL

assessment thus seems well grounded in the theory, though not discussed or studied explicitly.

This section has, in summary, presented a stratified model of evaluation which considers this dimension from context, as institutionalized attitudes towards experiential domains (valuation); from semantics, as the strategic deployment of interpersonal moves to attain social goals in text, and from lexicogrammar, as a diversified range of lexicogrammatical resources realizing evaluative meanings within, below and beyond the clause. The latter perspective is favored in the studies reported in this chapter because it is hypothesized that language change in scholars' trajectories primarily concerns the lexicogrammatical realization of meanings (Chapter II, Section 2.3.2).

5.2. The main study: evaluative lexicogrammar in early and late career writing

This study is based on the analysis of the evaluative lexicogrammatical resources employed by TCL scholars in their early and late career writing periods. Its aim is to identify significant differences in the use of these resources along scholars' trajectories which illuminate possible developmental drifts in the interpersonal metafunction. It is generally accepted that, alongside its ideational and textual organization, text is also structured by patterns of interpersonal meaning choices which create evaluative prosodies of varying degrees of explicitness (Halliday, 1979; Martin, 1992; Thompson & Hunston, 2000; Martin & White, 2005; Hood, 2010). The lexicogrammatical resources creating these prosodies in academic text are thought to index a variety of attitudinal values towards fields of experience and towards the tenor of the social relations enacted by the writer (Sinclair, 1981; Halliday, 1984; Vande Kopple, 1985; Geisler, 1994; Hyland, 2000). Some of these resources evaluate speakers' attitudes towards propositions (e.g. their degree of certainty, credibility, verifiability), including finite modal operators and modal Adjuncts (Biber & Finegan, 1989;

Conrad & Biber, 2000); while others evaluate attitudes towards experiential entities through attitudinal Epithets and implicitly evaluative ideational choices (Thetela, 1997).

The cumulative patterning of evaluative resources over a sustained period of speakers' semiotic trajectory is reflective of the identities constructed in association with specific social roles (Ivanič & Camps, 2001). Identity, according to Lemke (2003, p. 72), is "the performance, verbally and nonverbally, of a possible constellation of attitudes, beliefs, and values that has a recognizable coherence by the criteria of some community". Firth's (1950) conception of individuals as bundles of personae can be brought in to illuminate the composite and socially sanctioned nature of identities:

The meaning of person in the sense of a man or woman represented in fictitious dialogue, or as a character in a play, is relevant if we take a sociological view of the persona or parts we are called upon to play in the routine of life. Every social person is a bundle of persona, a bundle of parts, each part having its lines. If you do not know your lines, you are no use in the play. It is very good for you and society if you are cast for your parts and remember your lines. (p. 45)

Identities are performed through non-linguistic indexes in aspects such as body hexis, clothing, artistic preferences, consumption choices, and political affiliation; and they are enacted linguistically through choices signalling alignment with specific value systems and cultural communities (what Fairclough, 2003, p. calls the "texturing of identities"). Our identities as scholars accordingly reflect our attitudes and values towards knowledge and knowers and are textured by the semantic choices we make in evaluating propositions and entities.

The individuation of value systems and interpersonal repertoires for their expression derives into recognizable ideolectal variants which, generalized across individuals, reflect "styles" of performing particular roles (c.f. Firth, 1950; Fairclough, 2003, p. 112). Scholars'

enactment of scientific identities in text is known to vary synchronically along mode, field of activity, and disciplinary dimensions. Gilbert and Mulkey's (1984) characterization of "empiricist" and "contingent" repertoire in biochemists' research papers and informal lab discussions illustrates mode-related variation in the texturing of scientific identities. The empiricist repertoire is characteristic of discourse in which "neither the author's own involvement with or commitment to a particular analytical position nor his social ties with those whose work he favours are mentioned" (p. 56) and which "denies its character as an interpretative product" (p. 56). The contingent repertoire, in contrast, is that in which "the scientists' actions are no longer depicted as generic responses to the realities of the natural world, but as the activities and judgments of specific individuals acting on the basis of their personal inclinations and particular social positions" (p. 57). Across disciplines, the empiricist framework may be associated with the written discourse of disciplines with vertical knowledge structures, while the contingent framework would be reflected to a higher extent in disciplines with horizontal knowledge structures (Bernstein, 1999). This assumption is supported by research comparing evaluative language across disciplinary fields (Hyland, 2004; Hood, 2012).

The historical and inter-individual stability of repertoires within disciplines and modes of communication has been called into question by recent research. Historical linguistic studies exploring the evolution of scientific registers in recent decades have documented a tendency for scientific texts to become more informal and interactive as reflected in the more frequent use of first person, vague language, and attitudinal adjectives (Seoane & Loureiro-Porto, 2005; Leech *et al.*, 2009; Hyland & Jiang, 2016, 2020), although this trend is slower than in other more "agile" registers (Hundt & Mair, 1999). These historical changes may be interpreted as scientific identities and their textual enactment evolving at a collective scale towards what Fairclough (1992) calls "democratization", the

relaxation of boundaries between specialized and everyday discourse. A sound conclusion from these studies is that there is wiggle room for diachronic variation in the textual enactment of scientific identities, despite the constraints in identity expression posed by field of activity, mode and discipline parameters. This claim is coherent with contemporary understanding of identity as a dynamic construct associated with individuals' performances of multiple roles throughout their lives (Lemke, 2003); and with a view of language as a complex dynamic system undergoing change across different timescales, including that of individuals' semiotic trajectories (Halliday & Matthiessen, 1999/2006).

A guiding belief in this chapter is that scholars' enactment of their identities in text - what Ivanič (1998) calls "authorial selves"- undergoes changes throughout their scholarly trajectories, and that these changes can manifest as developmental drifts in the diachronic comparison of their use of evaluative resources in early and late career texts. Scholars' diachronic enactment of scholarly identities involves variation along the empiricism-contingency continuum, two possible drifts being a) towards a more empiricist or monoglossic style, and b) towards a more contingent or heteroglossic style. This study sets out to explore which area(s) of English evaluative lexicogrammar are most of risk of undergoing significant change in trajectories of scholars in the Twentieth Century Linguists' corpus.

5.2.1. Procedure

The identification of statistically significant differences between early and late career writing was based on the manual analysis of 12,453 clauses extracted from the early and late career corpora of 30 scholars from the Twentieth Century Linguists (TCL) corpus (See Chapter III). The early career clause corpus included 6,371 clauses and the late career clause corpus 6,078. I selected the scholars so as to maintain the same proportion of cohorts in the original TCL corpus. The first step involved manually extracting orthographic sentences from

complete texts written by the selected scholars in both career periods and pasting them into a spreadsheet. I manually subdivided the sentences corresponding to clause complexes into their constituent ranking clauses for analysis. I did not separate non-finite bound clauses and finite clauses downranked as Postmodifier for analysis given their limited potential for interpersonal negotiation (Halliday & Matthiessen, 2014, p. 134). Analysis proceeded in two rounds. First, I analyzed all the sentences in the corpus for the presence or absence of evaluative features and for their speech-functional category. In the first aspect, I classified clauses with at least one explicit evaluative feature (e.g. modality, interpersonal Adjunct, attitudinal lexis) as “evaluative” and those lacking any of these specific features as “non-evaluative”. In the second aspect, I analyzed clauses as realizing propositions, questions, commands, or offers (Excerpt 5.2 and Appendix 5.1).

(5.2) Expounding: categorizing: differentiating: Corpus linguistics	Evaluation	Speech Function
So, does it make sense for recent research under the umbrella of ‘corpus stylistics’ to disregard the research of previous decades, carried out under the umbrella of computational analyses of style?	Evaluative	Question
While there are important differences,	Evaluative	Statement
I would argue that the answer to this question is ‘no’.	Evaluative	Statement
That is, despite the differences, these are clearly related research traditions that could benefit from greater integration. (Biber LC-TCL)	Evaluative	Statement

An important consideration was approaching each clause from above, considering its semantic intent, especially when realized as a different speech functional category through interpersonal metaphors of MOOD (Halliday & Matthiessen, 2014, Section 10.4.2). Congruently, a statement move is realized by a ranking declarative clause, a question by an interrogative clause, and a command by an imperative clause. In the incongruent realizations characteristic of written academic registers, a statement may be realized by a projection nexus with imperative mood in the independent clause (5.3, 5.4). The primary commodity being

negotiated in such cases is information, not goods and services, and the imperative projecting clause can be interpreted as a strategies for making the statement more forceful and salient:

- | | | | |
|-------|---|---|-------------------------------|
| (5.3) | Note that the degree of semantic motivation of concordial class assignment differs from language to language. (Aikhenvald, LC-TCL) | Evaluation
Non-
evaluative | Speech F.
Statement |
| (5.4) | We must conclude that this form is more thoroughly lexicalized than any we have considered so far (Kay, LC-TCL) | Evaluation
Evaluative | Speech F.
Statement |

Another possibility is for proposals (5.5) and questions (5.6) to be grammatically realized as if they were propositions. In this case, the range of realizational possibilities at the clause rank and below are fairly wide, but the main analytical consideration from above is whether the meaning being negotiated concerns the regulation of behavior or a request for information (which is generally satisfied by the subsequent moves in the text):

- | | | | |
|-------|---|---------------------------------|------------------------------|
| (5.5) | Again, it is to examples such as these that we must turn in attempting to evaluate alternative theories of linguistic structure. (Chomsky, LC-TCL) | Evaluation
Evaluative | Speech F.
Command |
| (5.6) | This assumption raises the obvious question of what constitutes phonetic similarity. (Garvin, EC-TCL) | Evaluation
Evaluative | Speech F.
Question |

The classification of evaluation and speech function categories in the first round of analysis showed an adequate level of intra-rater reliability as revealed by Cronbach's alpha values= 0.79 in the coding of 200 randomly selected instances on three coding rounds spaced by 8-10 days.

The second round of analysis focused on the instances identified in the first round as having at least one evaluative feature (See Appendix 5.1). Since statements made up more than 95 percent of evaluative instances, this analysis focused on the statement category and excluded questions, commands and offers. I devoted specific columns in the spreadsheet to

probability-type modalization, the different comment assessment types (asseverative, qualificative, on Subject, speech-functional), and appreciation types (reaction, composition, valuation). I analyzed an initial sample of 150 clauses three times as a pilot to test intra-rater reliability, reordering the clauses and removing the previous analysis in the second and third pilot analyses. Cronbach's Alphas for the retests were 0.87 and 0.93 respectively, indicating an optimal level of intra-rater reliability. I then analyzed the rest of the instances were then analyzed, making annotations for lexicogrammatical resources one at a time and reviewing the analysis at least three times for each annotation column. A sample of the analysis is shown below and in Appendix 5.2.

(5.7)	Exploring: arguing: evaluating linguistic hypothesis: the grammatical basis of intransitive constructions	DEICTICITY	Comment assessment		Attitudinal lexis
			Propositional	Speech-functional	
	And yet I do not believe that any such type as " <i>this dress doesn't rumple</i> " could have led to " <i>he won't knock out so easy</i> ".	Modal	X	X	X
	that it may be depended upon to withstand the wear-and-tear of every-day life.	Modal	X	X	X
	This dramatic negative type could hardly come straight from such a banal negative as " <i>this dress doesn't rumple</i> ".	Modal	X	X	Reaction
	Perhaps " <i>he won't knock out so easy</i> " is not, after all, based upon a negative type;	Modal	X	X	X
	perhaps it goes back to the affirmative type met with so often in popular advertisements. (Granville, EC-TCL)	Modal	X	X	X

The numeric data for this main study consists of the normalized counts of each of the grammatical features analyzed in scholars' early and late career writing periods (see Appendix 5.2). I submitted these data to normality, kurtosis, skewness and outlier tests to determine the appropriate statistical tests. The non-normality of the data, as shown by Levene's test alphas below .05, made non-parametric tests the more viable analytical option. As in Chapter IV, I used a mixed factorial model with *nparLD* R package (Noguchi *et al.*, 2012) to model general and cohort-specific developmental effects in the dataset. I set the significance level to 0.0025 by dividing 0.05 into 17 (the number of tested variables), following the Bonferroni correction procedure in cases where multiple comparisons are performed from a single dataset.

5.2.2. Findings

Table 5.1 shows descriptive results for the interpersonal variables under study, including the speech functional categories identified in the first analytical round and the specific evaluative resources for modality, modal assessment and appreciation.

Table 5.1: Median values for interpersonal lexicogrammatical variables in early and late career TCL corpus

	Early career <i>M</i>	Late career <i>M</i>
Speech Function		
Statement	96.7	95.59
Question	0.21	0.82
Command	2.86	2.45
Evaluation (general)		
Bare assertions	74.1	81.5
Evaluative statements	19.47	12.89
Evaluation (Specific)		
Modalization (probability)	7.46	8.00
Comment assessment	9.5	5.2
Appreciation	7.00	9.00

Table 5.2 shows results from the non-parametric factorial mixed model with R package *nparLD*, which provides a more nuanced picture of the career period, cohort and period: cohort interaction effects.

Speech-functional category: Regarding statement frequencies, the model shows no significant career period or cohort effects, but it shows a combined period + cohort effect ($F(2)= 6.041$, $p=.048$), which is explained by the significant within-persons effect observed for cohort 2 (scholars born between 1920 and 1940) ($F(1)=4.451$, $p= .03$). Scholars in this cohort used significantly more statements in their late career writing than those in other periods. However, the change does not mean the Bonferroni-adjusted significance level.

Table 5.2: Mixed factorial *nparLD* model for interpersonal lexicogrammar variables

F1-LD-L1 Model	Effects (ANOVA)			Cohort: Period effects		
	Period	Cohort	Period: Cohort	<1920	<1940	<1960
Statement	0.000	0.331	6.041	1.426	4.451	0.311
<i>p</i> -value (2T)	.988	.847	.048*	.232	.034*	.576
Command	2.509	0.770	9.923	0.344	15.767	0.026
<i>p</i> -value (2T)	.113	.680	.006**	.557	.000**	.869
Evaluative statements	22.388	5.575	4.370	2.228	11.053	10.412
<i>p</i> -value (2T)	.000**	.061	.112	.135	.000**	.001**
Probability	0.000	4.819	2.027	0.918	1.086	0.072
<i>p</i> -value (2T)	.977	.089	.362	.337	.297	.337
Comment assessment	18.053	2.439	4.067	1.127	11.835	7.078
<i>p</i> -value (2T)	.000**	.212	.213	.282	.000**	.007**
Appreciation	0.622	1.201	0.820	0.775	0.916	0.083
<i>p</i> -value (2T)	.430	.584	.663	.378	.338	.772

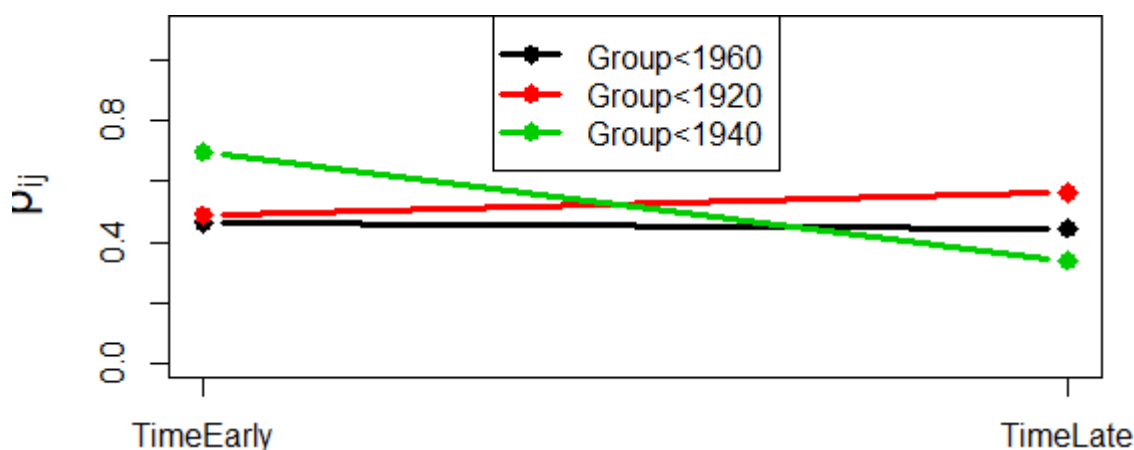
*Significant at .05 level

**Significant at .01 level

Commands show significant period + cohort interaction ($F(2)= 9.923$, $p= .034$), explained by the significant within-persons effect observed for the >1940 cohort ($F(1)= 15.767$, $p= .000$). This cohort's early career period showed a high frequency of command moves in their early career writing ($RTE^5= 0.69$), which dropped significantly in their late career period ($RTE= 0.33$), as shown in Figure 5.2:

⁵Relative Treatment Effect

Figure 5.1: Cohort effects in normalized command frequencies.



The nonparametric mixed factorial model suggests that the linguistics scholars born between 1920 and 1940 differed significantly from the other two cohorts regarding the overall distribution of speech-functional moves. Their early career period was characterized by comparatively more frequent requests and fewer offers of information, while their late career period has a high rate of offers of information and a lower rate of commands. These scholars' trajectories can thus be characterized as foregrounding regulation at the beginning of their careers, which suggests their early positioning as authoritative experts. This cohort-specific developmental drift may partly be explained by the fact that some of the linguists born between 1920 and 1940 were the pioneers of linguistic paradigms (e.g. Halliday, Chomsky, Dik, Chafe), which may have motivated a higher use of moves regulating readers' actions. The realization of commands in the TCL corpus is almost entirely metaphorical, with moves foregrounding regulation of activity drawing on different forms of modulation, including necessity, ability, convenience and obligation (5.8, 5.9, 5.10).

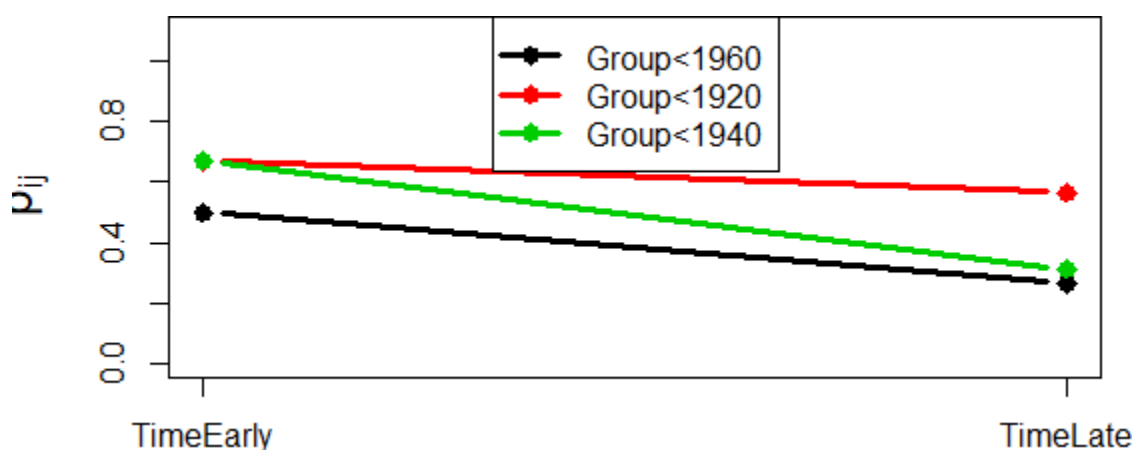
(5.8) Having developed ways of studying sociocultural phenomena, their patterning, their diffusion, etc. (not without some common roots, historically, with history itself), anthropologists **should be prepared** to use and test such ways of study when the sociocultural phenomena in question are constituted by their own profession. (Hymes, EC- TCL)

(5.9) So situational description **does well to** concern itself initially with what are constant features of the extra-textual circumstances of language events which have high potential contextual significance. (Gregory, EC-TCL)

(5.10) In short, I think that the development of the theory of grammar, and intensive application of this theory, **is a necessary prerequisite to** any serious study of the problem of language acquisition and many other problems of immediate psychological significance. (Chomsky, EC-TCL)

General evaluation: There are significant effects for career period ($F(1)= 22.388, p= .000$), with a subtle decrease from early career (RTE= 0.53) to late career (RTE= 0.46). The cohort and career period: cohort interaction effects are not significant. The three cohorts observed decreases in the overall evaluativeness of their writing, which were stronger for linguists born between 1920 and 1940 (Early career RTE= 0.59, Late career RTE= 0.42), and those born between 1940 and 1960 (Early career RTE= 0.40, Late career RTE= 0.33) (Figure 5.3)

Figure 5.2: Cohort effects in normalized general evaluation



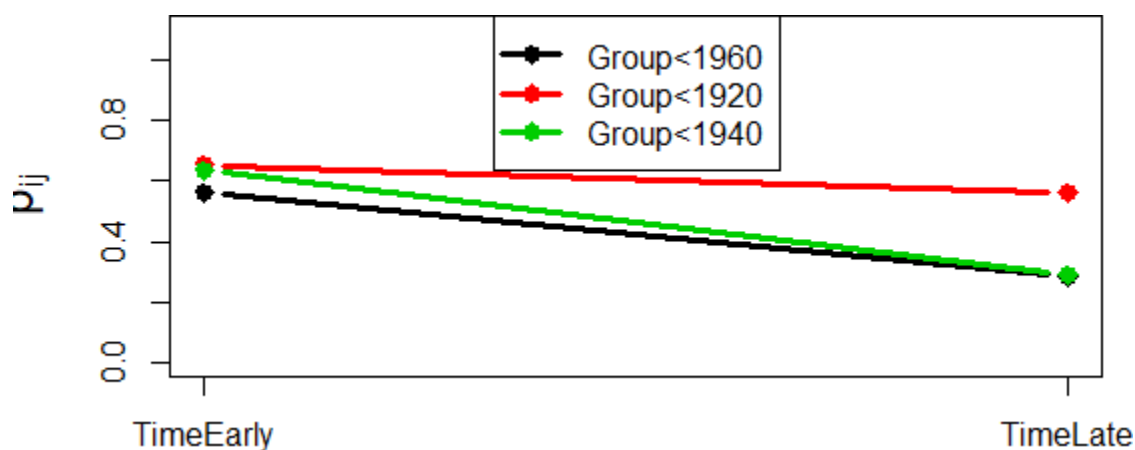
The nonparametric mixed factorial model finding coinciding with the contrastive finding above suggests that significantly lower evaluation in late career writing is a robust trend, both within persons and across cohorts. Evaluation seems to play a more important role in early career writing, especially in the semiotic trajectories of linguists born between 1920 and 1960. Scholars' enactment of their 'authorial selves' (Ivanič, 1998) appears to be more dynamic in their initial scholarly years. One possible reason concerns the dynamic nature of authorial positioning throughout semiotic trajectories: as the writer-readership relationship progresses, there would be a lesser need for scholars' identity to be indexed in text.

Evaluative choices also have a niche carving function in academic registers, which would be more patent in the writing of early career scholars.

Probability type modalization: The mixed factorial model identified no significant effects for probability-type modalization, making it clear that probability-type modalization lacks any developmental relevance in the trajectories of the TCL scholars investigated. TCL scholars' writing does not become more or less uncertain: it retains a constant level of certainty in their epistemic positioning. One possible reason concerns the nature of probability-type modalization as a core registerial feature of academic registers, which is less likely to change in a significant manner because it reflects the constant practice of evaluating propositions in terms of certainty.

Comment assessment: The model shows significant career period effects for comment assessment ($F(1)= 18.822, p= .000$), but no significant cohort or career period+ cohort effects, which indicates that the trend shown in the contrastive model above exclusively pertains to the within-persons change construct. The size of its developmental variation is the largest among evaluative lexicogrammar variables (Early career RTE= 0.61, Late career RTE= 0.37). The largest differences occur for scholars in the >1940 cohort (Early career RTE=0.63, Late career RTE= 0.29) and the > 1960 cohort (Early career RTE= 0.55, Late career RTE= 0.27) (Figure 5.4).

Figure 5.3: Cohort-specific effects for comment assessment



The decrease in evaluative statements appears to be mostly motivated by the late career decrease in comment assessment resources. Comment assessment expands the range of evaluative meanings beyond the Mood by allowing the evaluation of propositions in terms of obviousness, clarity, expectancy, and desirability (Halliday & Matthiessen, 2014, Ch. 4). Its significantly higher use in early career writing points to a greater concern with explicitly enacting the credibility, expertise, and knowledgeability of the writer as a source of authority. Early career writing may be characterized by a more restrictive engagement with alternative voices, what Martin and White (2005) call “contraction”, yet it could still be considered more dialogistic than late career writing, which involves substantially more bare assertions. The developmental drift towards less explicit marking of evaluation may stem TCL scholars’ early career interpersonal repertoires favoring comment assessment as a strategy to create epistemic niches for their theoretical proposals. Such epistemic niches create an intersubjective space in which scholars’ endorsement of propositions through interpersonal enactments of authoritativeness satisfy the conditions for the validity of the propositions to be accepted:

(5.11) At the explicit level of meaning there is a conscious concern with positive self- presentation. This means that, **predictably**, one is inclined to refrain from ascribing to oneself opinions or attitudes about which one knows that they will meet general condemnation. (Verschueren, EC)

(5.12) Bloomfield parallels TAXEME with PHONEME in that both are said to be meaningless: 'Like a phoneme, a taxeme, taken by itself, in the abstract, is meaningless' (166); also, the PHEMEME includes phoneme and taxeme (264). **Obviously**, a phoneme means nothing by itself. It is only occasionally that a single phoneme is a morpheme (as in -s plural, etc.); the occurrences are, in a sense, mere coincidences. (Pike, EC)

Appreciation: The model shows no significant career period, cohort, or combined effects in the use of appreciation. The lack of change in this evaluative domain indicates that evaluation of entities experiences no significant variation in scholars’ trajectories. A valid interpretation of this finding, as in the case of probability-type modalization, is that appreciation remains an

important evaluative resource throughout, but it is not a likely area for developmental adaptations.

The findings from this study support the preliminary conclusion that TCL scholars' developmental drift is towards what Gilbert and Mulkey (1984) call an "empiricist repertoire", characterized by lesser interpersonal intrusion into text, particularly regarding the use of comment assessment. This interpretation does not entail that their late career work is more empirically oriented or that they drift towards adoption of empiricism as an epistemological ideology. The implication is, rather, that the enactment of their scholarly identities via evaluative resources in text tends to become less visible, while the predominance of statements increases (compared to other speech-functional moves). The 1920-1940 cohort, whose writing between 1965 and 1995 is analyzed, appears to show a more dynamic pattern regarding the use of evaluative resources throughout their careers. The upcoming follow-up studies elaborate on these findings by adding more delicate categories to key evaluative lexicogrammatical systems.

5.3. Follow-up studies

The remainder of this chapter revolves around expanding on the findings from the main study, chiefly the decreasing use of comment assessment and the apparent stability in evaluative lexis (appreciation). The follow-up studies, like the main study, rely on nonparametric longitudinal modelling with R package *npadLD* to identify possible career period, cohort, or combined effects.

5.3.1. Comment assessment

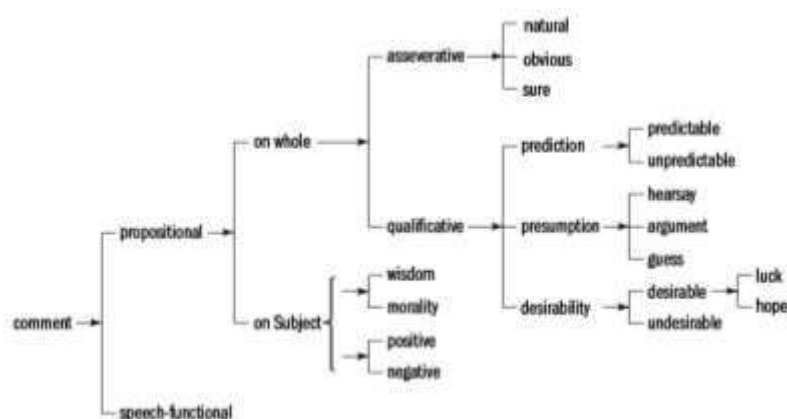
This follow-up study explores the systems of comment assessment in response to the main study finding concerning the significance of this evaluative dimension in TCL scholars' semiotic trajectories. Comment assessment is generally not considered a prominent registerial feature of academic registers. Biber and Finegan (1989) associate the lack of comment

Adjuncts in academic prose with its “faceless style”, in which “all evidence necessary for evaluating assertions is assumed to be explicit in the text” (p. 23). Studies of academic writing have shown, however, that writers in some disciplines tend to employ comment Adjuncts and other interactional resources to involve readers in their ongoing arguments by positioning them to accept their viewpoints (Thompson, 2001). In linguistics, Freddi (2005) associates comment Adjuncts, among other lexicogrammatical features, with what she calls a “lexicogrammar of argumentation”, noting their occurrence within interpersonal prosodies oriented towards defending some positions and arguing against others. Along these lines, the significance of comment assessment could be interpreted as evidence of a more argumentative orientation in TCL scholars’ early career writing, or as evidence of a tendency to make explicit their intersubjective positioning regarding their own and other authors’ voices in the discipline.

Comment assessment covers the range of resources through which language users make comments on the ideational content of the proposition (propositional assessment) or on the interpersonal act of exchanging information (speech-functional assessment) (Halliday & Matthiessen, 2014, p. 190) (Figure 5.5). These comments enact a variety of values having to do with the reliability, credibility, predictability, desirability, or validity of propositions, complementing modal assessment resources associated with temporal and modal deixis. Propositional assessment may target the entire ideational content of the proposition (on whole) or the evaluation of the experiential entity corresponding to the Subject element. In the first case, propositional assessment can evaluate the proposition by making the speakers’ evaluation of its naturalness or obviousness explicit (**asseverative**) (example 5.13), or by qualifying its source of information or affective impact (**qualificative**) (5.14). In the second case, propositional assessment can target the wisdom, morality, or typicality of the Subject (5.15).

- (5.13) Bloomfield parallels TAXEME with PHONEME in that both are said to be meaningless: 'Like a phoneme, a taxeme, taken by itself, in the abstract, is meaningless' (166); also, the PHEMEME includes phoneme and taxeme (264). **Obviously**, a phoneme means nothing by itself. It is only occasionally that a single phoneme is a morpheme (as in -s plural, etc.); the occurrences are, in a sense, mere coincidences. (Pike, EC)
- (5.14) At the explicit level of meaning there is a conscious concern with positive self-presentation. This means that, **predictably**, one is inclined to refrain from ascribing to oneself opinions or attitudes about which one knows that they will meet general condemnation. (Verschueren, EC)
- (5.15) Bernstein knew that the codes were not different linguistic systems; so he tried locating them in performance. But, equally clearly, they were not sets of random instances; so **wisely**, he gave up the attempt of mapping them into the Chomskyan framework. (Halliday, LC)

Figure 5.4: System of comment Adjuncts (from Halliday & Matthiessen, 2014, p. 190)



Speech-functional assessment targets the interpersonal act of exchanging meanings. It can evaluate the honesty or validity of the exchange (as in *I tell you in an honest/serious/certain/confidential manner that...*) (**unqualified**) (5.16, 5.17), or it can evaluate the validity scope or the degree of personal engagement between the writer and reader (**qualified**) (5.18. 5.19). In the former case, it is frequent for speech-functional Adjuncts to be followed by *speaking* (5.19), which reflects a connection with the meaning of projection.

- (5.16) At this point, I **admittedly** take a linguistically biased point of view. (Lakoff, EC-TCL)
- (5.17) Orwell required prose to be 'like a window pane', and his own writings have been praised for this quality. **As a matter of fact**, transparency does not come naturally to language: the structure of the linguistic medium tends to shape our apprehension of what is being communicated. (Fowler, LC-TCL)

- (5.18) An etymology for Malay tiga 'three' has not yet, **to my knowledge**, been suggested. (Dyen, EC-TCL)
- (5.19) In the past, mechanisms of semantic extension such as metaphor and metonymy have sometimes been cited as ultimate functional causes of change. **Properly speaking**, however, they only indicate the associative mechanisms that define and delimit the set of possible semantic changes. (Geeraerts, EC-TCL)

Comment assessment is congruently realized by a variety of interpersonal comment Adjuncts, which distinguish themselves from mood Adjuncts by their inability to occur in moves other than propositions. This restriction reflects the fact that comment assessment is inherently related to the negotiation of interpersonal meanings in the exchange of information. Besides Adjuncts, other resources can realize comment assessment incongruently (Table 5.2), including bi-clausal constructions functioning as interpersonal grammatical metaphors, phasal verbs functioning as Predicator, and post-Deictics and Epithets in the nominal group.

This follow-up study sets out to investigate differences in the use of comment assessment in TCL scholars' early and late career writing, with a focus on the comment assessment types showing statistic significance across the periods. It also delves into the role played by comment Adjuncts in linguists' positioning towards the content of propositions and towards the readership, and how this positioning enacts their scholarly identities as experts.

Table 5.3: Lexicogrammatical realization of comment assessment domains (based on Halliday & Matthiessen, 2014, Chapter 10)

TYPE OF MODAL ASSESSMENT	Domain of manifestation						
	Clause					Nominal group	
	Clause + Clause			Clause		Post-Deictic	Deictic
	Verbal clause	Mental clause	Rel. clause	Modal Adjunct	Pred.		
Propositional On Subject			<i>it is wise/ foolish/ right/ typical of</i>	<i>wisely, cleverly, foolishly</i>	<i>x is wise/ clever/ foolish to</i>		<i>wise, clever, right, typical</i>
Propositional On whole: Asseverative		<i>I + not + doubt</i>	<i>it is natural/ obvious/ indubitable that</i>	<i>naturally, inevitably, of course, clearly</i>		<i>obvious, clear</i>	<i>natural, inevitable, indubitable</i>
Propositional On whole: Qualificative	<i>they say, It's said, I argue</i>	<i>I (not) expect,</i>	<i>it is predictable, surprising, wonderful that I'm confident that</i>	<i>predictably, surprisingly, presumably, arguably, sadly</i>		<i>alleged so-called presumed</i>	<i>surprising, predictable, wonderful, fascinating</i>
Speech- functional Qualified	<i>I admit, I assure, I tell you</i>			<i>admittedly, certainly, honestly</i>			
Speech- functional Unqualified	<i>I tell you + in general terms, I tell you + in terms of the law</i>			<i>generally, broadly, legally, academically + speaking</i>			

5.3.1.1. Procedure

This follow-up study extends the delicacy of the analysis of comment assessment performed in the main study, considering the subtypes discussed above (asseverative, qualificative, on Subject, and speech-functional) (See Appendix 5.3). The analytical procedure initially involved using grammatical and semantic tests to determine the specific function of Adjunct instances. One grammatical test to rule out the circumstantial Adjunct status of an instance is to transform the clause into a predicated Theme clause. If the resulting version turns out ungrammatical, its function in the clause is most likely to be interpersonal

or textual, not experiential. In example 5.20, the ungrammatical reading of the predicated Theme variant indicates that *certainly* does not function as a circumstantial Adjunct, but as a modal Adjunct:

(5.20) Keltic is **certainly** very archaic. (Garvin-EC-TCL)

It is **certainly** that Keltic is very archaic (?)

The distinction between mood Adjuncts of probability and comment Adjuncts requires more analytical subtlety. The main criterion in this case involves agnation patterns. Semantically, the meaning of mood Adjuncts of probability pertains to the evaluation of propositions in terms of degrees of certainty, which makes them agnate to mental clauses with first person Subject (*I think*) or relational clauses (*it is likely that*). Comment Adjuncts, whose meaning covers speakers' attitude towards the proposition or towards the speech-function, have different agnation patterns, as shown in Table 5.1. These include a variety of bi-clausal constructions associated with mental and verbal projection.

In most cases, the distinction between modal Adjuncts and comment Adjuncts was straightforward based on semantic criteria alone. The main analytical challenge occurred with Adjuncts having more than one possible classification. A special case involves adverbial groups *actually*, *in fact* and *indeed*, which can function as verifactive conjunctive Adjuncts, as mood Adjuncts of intensity: counter-expectancy, or as speech-functional modal Adjuncts (see footnote in Halliday & Matthiessen, 2014, p. 616). Their contribution can thus be textual or interpersonal, depending on the context. When functioning as verifactive conjunctive Adjuncts, these adverbial groups create a non-structural cohesive link with the preceding clauses, typically one of elaboration-clarification. Their contribution to text is purely textual and resembling that of other non-structural constructions with an internal orientation (that is, an orientation to connect two or more experiential figures or sequences). When functioning as modal Adjuncts, their contribution is purely interpersonal: they are an enactment of the

speakers' attitude, as in *I am telling you for a fact that*. Examples 5.21, 5.22 and 5.23

illustrate this point:

- (5.21) Was James misleading himself by relying on data we now know to be hopelessly unreliable? Introspection was vehemently rejected during the years that followed him, and by the early twentieth century psychologists were being warned that introspection, consciousness, and **in fact** any interest in mental states and processes led nowhere.
- (5.22) There are languages in which neither tense nor number is marked grammatically. Theoretically, then, it might be possible for a language to lack any grammatical marking of the roles. It has, **in fact**, been suggested that there is at least one language that does not regularly make a clear grammatical distinction between the two basic arguments of a sentence. (Palmer, LC-TCL)
- (5.23) The second consequence of accepting these assumptions is that a single structural representation per sentence is not enough, since the utterances we actually encounter in normal speech include some which do **in fact** involve discontinuity or double-motherhood. (Palmer, LC-TCL)

The instances of *in fact* in the excerpts fall into the mood Adjunct, conjunctive Adjunct, and comment Adjunct, respectively. The Adjunct *in fact* in example 5.21 functions as a mood Adjunct of counter-expectancy within the underlined nominal group, reflecting the author's expectation that "any interest in mental states or processes" does lead somewhere. *In fact* in this case could be exchanged for counter-expectancy Adjunct *even*. In example 5.22, *in fact* functions as a cohesive device to mark the relation of clarification obtaining with the previous clause. It is additionally clear that the author is not expressing an attitude towards the proposition because *in fact* occurs in a projecting clause which reports other people's message. In example 5.23, *in fact* functions as a speech-functional assessment Adjunct, agnate to saying "which do *really* involve", with the author assessing the proposition for its validity (and reinforcing with the marked Finite operator *do*).

These and similar cases where multiple classification of an Adjunct was possible required considering its broader co-textual environment, particularly to determine 1) whether the instance realized the meaning of intensity or counter-expectancy (thus ruled out as mood

Adjunct); 2) whether it was linking two segments bound by a logico-semantic relation of clarification (thus ruled out as conjunctive Adjunct); and whether its agnation pattern corresponded to that of comment assessment domains in Table 5.1 (thus confirmed as comment Adjunct). The two test re-codings performed within a space of one week each yielded acceptable intra-rater reliability scores (Cronbach's alphas 7.1-7.9). As in the main study, the final dataset consisted of the normalized frequency counts for each comment assessment type (Appendix 5.3), and a nonparametric longitudinal model from the *nparLD* R package was used to bring out possible career period, cohort, and mixed effects in the data. Salient patterns were further explored through analysis of specific instances in text.

5.3.1.2. Findings

Table 5.3 presents the nonparametric mixed factorial model with *nparLD* for different comment assessment types, indicating ANOVA-type statistics and *p*-values for career period, cohort and mixed effects, as well as cohort-specific effects.

Table 5.4: F1-LD-F1 model for comment assessment types

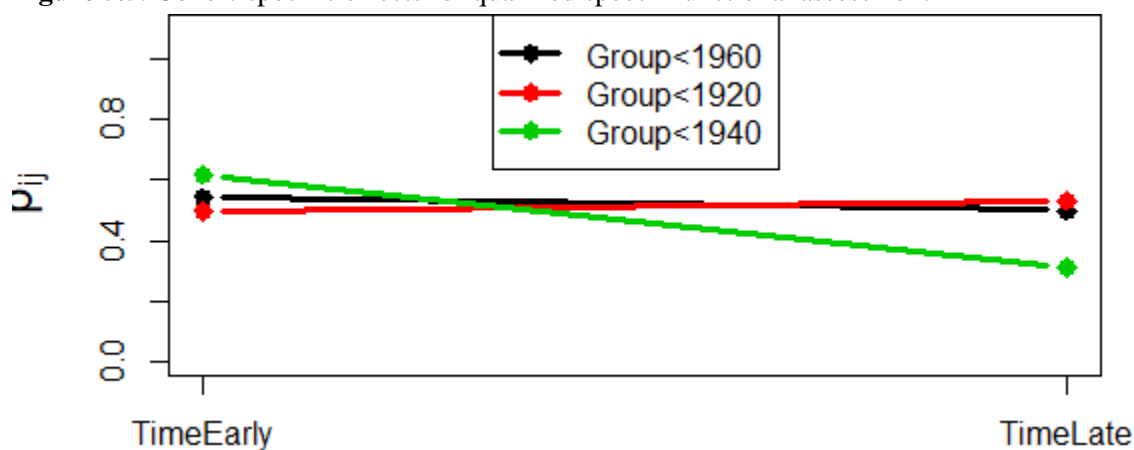
F1-LD-L1 Model	Effects (ANOVA)			Cohort		
	Period	Cohort	Period: Cohort	<1920	<1940	<1960
Propositional-Asseverative	0.338	0.908	1.149	2.299	0.026	0.285
<i>p</i> -value (2T)	.560	.601	.315	.129	.870	.593
Propositional-Qualificative	0.109	10.324	0.853	0.002	1.624	0.822
<i>p</i> -value (2T)	.740	.005**	.416	.960	.202	.364
Propositional-On Subject	2.320	11.375	2.490	0.168	2.253	6.941
<i>p</i> -value (2T)	.127	.003**	.287	.681	.133	.008**
Speech-Funct.- Qualified	6.370	1.786	0.100	0.349	0.964	1.443
<i>p</i> -value (2T)	.018*	.409	.950	.554	.326	.229
Speech-Funct-Unqualified	5.083	0.430	10.149	0.147	16.289	0.367
<i>p</i> -value (2T)	.024*	.806	.006**	.700	.000**	.540

*Significant at .05 level

**Significant at .01 level

Career period effects are significant for qualified speech-functional assessment ($F(1)=6.370, p=.018$) and for unqualified speech functional assessment ($F(1)=5.083, p=.024$). The later assessment type is significant for the 1920-1940 cohort ($F(1)=16.289, p=.000$), which observed a significant decrease in the use of this assessment type in their late career period (RTE= 0.31) (Figure 5.6). The other cohorts showed no significant variation. Cohort effects are significant for propositional qualificative assessment ($F(2)=10.324, p=.005$) and propositional on Subject assessment ($F(2)=11.375, p=.003$). These cohort effects are discussed in Chapter VI.

Figure 5.5: Cohort-specific effects for qualified speech-functional assessment



The comment assessment types with significant developmental variation are thus the ones under the speech-functional assessment system, that is, those whose evaluative target is the interpersonal act of meaning exchange (Halliday & Mathiessen, 2014, p. 190). Speech-functional assessment enacts expertise by indicating the angle or perspective from which the proposition holds true, or the nature of the source that authorizes the proposition. Its interpersonal effect is to delimit the validity scope of the proposition or the author's personal involvement with it, enacting expertise or interpersonal closeness. The valuation enacted is one whereby disputability varies according to perspective and is not all encompassing. Speech-functional assessment positions the reader as having a closer relationship with the writer through enactments of honesty (e.g. admitting, acknowledging lack of knowledge), and

authoritativeness, the latter seen in the delimitation of the validity scope of propositions (as in “in general terms”, “legally speaking”). The realization of these evaluative domains relied exclusively on Adjuncts, with no instance of incongruent realizations of the *I tell you* type in the data.

Despite being a minor motif in academic writing, speech-functional assessment is one of the most explicit lexicogrammatical strategies for the enactment of scholars’ epistemological stances and social roles. In the early career TCL corpus, the significance of qualified and unqualified speech functional assessment thus suggests a more explicit positioning of novice authors as experts vis-à-vis the readership:

(5.24) Most of the rest of this paper will document further the existence of a subject-matter for a history of linguistic anthropology. There exists, indeed, not only a subject matter for a history of linguistic anthropology, but also a definite need. **To my mind**, there is a general need in the current study of language for codification, articulation as well as exploration. **From a humanistic viewpoint**, such work might be seen as the reconstitution of a general philology. **In strictly anthropological terms**, such work might be seen as the framing of a provisional general theory of language and culture. In either case, the work of criticism and interpretation would have to draw for perspective equally as much on the history, or development, of the study of language as on a survey of current knowledge and research.
Hymes, EC-TCL

The excerpt (from Hymes, 1963, p. 60) is part of the introduction of a paper putting forward the case for the study of the history of linguistic anthropology, which in a previous excerpt he describes as “an informal, rather than finished survey”. The prepositional phrases analyzed as speech-functional assessment (in bold) serve, in the first instance, to project the author’s voice as a source of legitimation for the claim that there is “a definite need” for a history of linguistic anthropology; and, in the second and third instances, to project the putative voices of two fields – the humanities and anthropology- as more specific external sources of legitimation. Rhetorically, the propositions realized by the clauses in which the bolded Adjuncts occur are bound by an external orientation to increase readers’ willingness

to adopt the proposal being made (to study linguistic anthropology). Speech-functional Adjuncts help create a prosody of authorizing sources reinforcing the validity of the proposal.

Speech-functional assessment also helps reinforce evaluative prosodies at the rhetorical unit level, including concessive arguments:

- (5.25) One particular point where intuition may be misleading is the question of performance models. The straight-line model of grammar (1.1) is **admittedly** very appealing in that it makes a performance model look easier to construct, particularly if we (pointlessly) reverse the direction of the upper arrow in (1.1). The performance model that comes to mind, however, one in which the language user actually performs derivations in his head - is open to serious doubt in any event. Jackendoff, EC-TCL

The excerpt, part of a broader theoretical argument concerning the integration of semantic accounts within linguistic description, evaluates an abstract entity (the “straight-line model of grammar”) through a concessive move in which its upsides (being “very appealing”) are contrasted with the negative evaluation which the writer eventually endorses (that the resulting performance model “is open to serious doubt”). The bolded speech-functional Adjunct softens the writer’s eventual negative evaluation by aligning him with voices appraising the entity positively. Thompson (2001) argues that this strategy helps writers involve readers in their ongoing arguments while potentially reducing the face-threatening act of criticizing readers potentially aligned with the targeted voice.

Speech-functional assessment is also used in delimiting the validity scope of a proposition, in some cases co-occurring with other assessment types:

- (5.26) Unlike, for instance, French, which has a morphological Future Tense, i.e. a moneme as a constituent of the verb, Dutch, English, and German, do not have a future tense as such, though, of course, like probably in any language, **semantically speaking**, future "time" can be expressed. (Mulder, EC-TCL)

If the Adjunct “semantically speaking” were to be removed from the excerpt, the validity of the claim that “future time can be expressed” could be generalized to all possible

perspectives, including the morphological one discussed in the dependent clause. The authors' making the semantic perspective explicit acknowledges the difference between semantic notions like time and morphological notions like tense, an area of potential dissent in the discipline. The Adjunct also occurs within a concessive rhetorical unit, accompanied by an asseverative propositional Adjunct and a mood Adjunct of probability (underlined). The resulting prosody thus combines a comment on the obviousness of the proposition (*of course*), a medium value evaluation of certainty (*probably*), and a comment on the validity scope of the interpersonal move (*semantically speaking*). This interpersonally loaded proposition shows the writer's awareness of the diversity of theoretical positions in the discipline and the difficulty of making categorical claims about as broad a phenomenon as is language. The use of speech-functional assessment to recognize alternative voices is also illustrated by excerpt 5.27:

(5.27) Finally, I should not leave this extremely brief survey of social factors without acknowledging all the issues of social identity (e.g. gender, class, and ethnicity) tied up with language use. These concerns about language **certainly** arouse greater passions than does the proper formulation of subject-auxiliary inversion. However, they are relatively remote from my concerns here, though not because of lack of intrinsic importance. And **to be sure**, research on the cognitive structure associated with language has been brought to bear on these issues, for example in the social legitimation of African-American varieties of English (e.g. Labov 1972); Rickford 1999) and the signed languages. (Jackendoff, EC-TCL)

As in the previous excerpts, what is at stake is authors' positioning towards alternative voices in the discipline. The qualified speech-functional Adjuncts in the excerpt enact the author's assurance towards propositions which recognize bodies of research which the author does not engage with directly, yet acknowledges for their importance. The rhetorical organization of the excerpt is also concessive, as marked by internal conjunction *however*, which, in Hood's (2006) terms, creates a "disruption of the prosody" that enables the author's actual positioning to be expressed ("relatively remote from my concerns").

The significance of speech-functional assessment in TCL scholars' late career writing is therefore an indication of the relative importance of explicit positionings towards alternative voices in early career writing. Parallel to creating a research niche, early career TCL scholars make explicit the presence of the reader-in-text (Thompson, 2001) by acknowledging the value of alternative perspectives. A recurrent strategy for achieving this aim is the use of concessive arguments combining high assurance towards the proposition acknowledging the alternative voice, and negative appreciation of one of its aspects. Speech-functional Adjuncts also enact epistemically contingent stances recognizing lack of knowledge or the greater breadth of the issue at hand. One possible function of these strategies in early career writing concerns the necessity for scholars to delineate research agendas and theoretical stances within the broad disciplinary landscape.

5.3.2. Appreciation

This follow-up study variation in the more delicate subcategories of appreciation, the evaluative dimension having to do with the assessment of elements construed as objects, whether concrete or abstract (Martin & White, 2005). Although the main study found no significant career period or cohort effects for appreciation, its more specific subtypes may show developmental significance in scholars' trajectories. One of the reasons supporting this hypothesis concerns the role played by different appreciation types in scholars' enactment of roles and relations with readers. For example, negative polarity appreciation is used to signal gaps in the literature, while positive appreciation is used to promote theoretical positions and courses of action (Hood, 2006). Potential developmental drifts may associate with these different purposes in scholars' trajectories (e.g. promoting one's views gaining prevalence over signaling existing gaps). Appreciation types targeting specific evaluative meanings (e.g. importance, relevance, completeness) could also become more or less prominent as scholars gain expertise.

The areas examined in this study are appreciation type, polarity, and scope.

Appreciation type includes the categories proposed in Martin & White (2005): Reaction, Composition and Valuation. **Reaction** is the most immediate layer of appreciation, relating to the perceptual and desiderative sub-domains of mental transitivity: what the Senser perceives aesthetically as appealing or likeable. Reaction connects with the enunciation of aesthetic values based on perception or the channeling of perception towards a stimulus. Reaction: Impact covers evaluative domains related to the ability of the Phenomenon to grasp speakers' attention (*arresting, captivating, engaging, uninviting, unremarkable*), or interest (*interesting, fascinating, dull, boring, rare, monotonous, predictable, pedestrian*). Reaction: Quality encompasses language users' aesthetic evaluation of the effect produced by the Phenomenon as degrees of pleasantness (*lovely, enchanting, welcome, nasty, repulsive, off-putting*), beauty (*beautiful, enchanting, splendid, ugly, plain*) or conformity to standard (*OK, fine, good, bad, terrible*).

In contrast with the spontaneous and relatively unmediated nature of Reaction, **Composition** presupposes a more thoughtful approximation to the Phenomenon as a structured object, foregrounding aspects such as its consistency, cohesiveness and orderliness – the properties accessible to the Senser via perceptual processing of its formal makeup, the properties through which speakers' are able to make sense of the Phenomenon as a message. Composition: **balance** covers the dimensions of symmetry (*balanced, harmonious, unified, proportioned, irregular, shapeless*) and consistency (*consistent, logical, considered, contradictory*), responding to the question “did it hang together?” Composition: **complexity** responds to the dimensions of simplicity (*simple, elegant, ornate, byzantine*), clarity (*clear, lucid, arcane, unclear*) and sufficiency (*precise, detailed, sufficient, extravagant, vague, sketchy*). The evaluative dimensions of composition apply both to concrete and abstract Things, including semiotic objects like texts and theories.

Composition entails appreciation of form, but not an appreciation of the Phenomenon in terms of its function or accomplishment of effects across orders of reality. Such evaluation corresponds to the third type of appreciation, called **Valuation**, which pertains to the cognitive domain of mental transitivity, referring to the assessment of the Phenomena based on reasoned opinion (rather than on desires or perceptions). Valuation has an ideational metafunctional orientation, covering the ample spectrum of properties elaborating the Phenomenon by allusion to its depth (*penetrating, profound, shallow, superficial*), uniqueness (*innovative, original, conventional, prosaic*), or authenticity (*real, genuine, fake, bogus*); those alluding to projected appraisals of its importance or value (*important, relevant, valuable, insignificant, worthless*); and those enhancing the Phenomenon by relating to its appropriateness (*adequate, appropriate, inadequate*), usefulness (*helpful, handy, useless*) or effectiveness (*powerful, practical, ineffective, fruitless*).

Besides appreciation types, appreciation polarity and scope are analytical aspects with potential developmental significance. Polarity indicates whether the evaluative dimension refers to a Positive or Negative value: e.g. *beautiful/ugly, good/bad*. The evaluative scope includes nominal groups with Things as Head (5.28), nominalizations (5.29), and downranked clauses (5.30):

- (5.28) The peculiar and unique **cultural logic** expressed in the script provided by these verbs is readily apparent. (Foley, LC-TCL)

- (5.29) Again, this constitutes a radical and, in part, quite justified **departure** from the orientation of earlier linguistic theories. (Dik, EC-TCL)

- (5.30) **That there should be a scientific law applying to a sociological phenomenon** is a matter of some importance, for it implies a prediction about future states. (Dyen, LC-TCL)

This follow-up sets out to explore two questions: 1) How does TCL scholars' use of appreciation type, polarity and scope vary along career period and cohort factors? and 2) What role do the appreciation aspects with significant developmental variation play in TCL scholars' enactment of values and social relations with readers?

5.3.2.1. Procedure

As in the previous studies in this chapter, the analytical technique consists of performing a nonparametric mixed effects longitudinal model based on R package *nparLD* on the frequency counts of the target analytical aspects, which in this case correspond to appreciation type (reaction, composition and valuation), appreciation polarity (positive or negative), and appreciation scope (Thing, nominalization, downranked clause) (see dataset sample in Appendix 5.4). Analysis of each of the aspects proceeded according to the analytical criteria presented above. Intra-rater reliability was adequate for all the analytical aspects, with Cronbach's alphas ranging between .74 and .86. To study the interrelation between appreciation types and polarity values, I performed a log-linear analysis on the categorical data derived from this aspect, using the *loglm* base R function and performing a follow-up cross-tabulation of the aspects in the loglinear model using the *xtabs* base R function. I use specific excerpts for illustration in the discussion of key findings.

5.3.2.2. Findings

Table 5.4 shows median and interquartile range values for early and late career frequencies in appreciation type, appreciation polarity and appreciation scope. Table 5.5 shows the corresponding Wald Test and p-values for the corresponding nonparametric longitudinal model.

Table 5.5: Median and IQR values for TCL early and late career appreciation parameters

Appreciation	Early career		Late career	
	Median	IQR	Median	IQR
Appreciation: Reaction	1	6	1	6
Appreciation: Composition	2	10	1	10
Appreciation: Valuation	2	23	3	20
Positive polarity	3	20	4	30
Negative polarity	2	18	1	10
Scope: Thing	3	16	2	16
Scope: Nominalization	1	12	1	14
Scope: Meta/Macro-Thing	1	7	1	6

Table 5.6: Nonparametric mixed factorial model for appreciation parameters

F1-LD-L1 Model	Effects (Wald Test)			Cohort effects		
	Period	Cohort	Period: Cohort	<1920	<1940	<1960
Appreciation: Reaction	0.013	1.863	0.272	0.242	0.040	0.006
<i>p</i> -value (2T)	.393	.393	.393	.622	.839	.839
Appreciation: Composition	2.416	0.744	10.009	0.890	0.092	11.728
<i>p</i> -value (2T)	.120	.590	.006**	.345	.761	.000**
Appreciation: Valuation	1.044	14.844	5.903	11.029	0.426	0.715
<i>p</i> -value (2T)	.306	.000**	.052	.000**	.513	.397
Positive polarity	12.279	28.718	2.379	5.327	1.521	1.107
<i>p</i> -value (2T)	.001**	.000**	.305	.020*	.217	.743
Negative polarity	12.388	0.772	9.492	1.629	1.327	11.726
<i>p</i> -value (2T)	.002**	.679	.008**	.201	.249	.000**
Scope: Thing	0.060	4.311	3.956	1.965	0.676	1.658
<i>p</i> -value (2T)	.805	.115	.138	.160	.410	0.197
Scope: Nominalization	0.007	0.929	1.954	3.473	0.004	1.992
<i>p</i> -value (2T)	.993	.389	.144	.062	.945	.158
Scope: Downranked clause	0.006	29.186	0.518	0.491	0.050	0.082
<i>p</i> -value (2T)	.937	.000**	.937	.483	.822	.774

*Significant at .05 level

**Significant at .01 level

Cohort-specific developmental effects can be observed for appreciation: composition and negative polarity, both affecting the cohort born between 1940 and 1960 ($F(1)= 11.726$, $p= .000$). Cohort effects can be seen for valuation, positive polarity, and the appreciation of downranked clauses (see Chapter VI for discussion of these cohort effects). The only aspect of appreciation with a statistically significant diachronic difference is polarity, both the positive ($F(1)=12.279$, $p= .000$) and negative type ($F(1)=12.388$, $p= .001$). Negative polarity is higher in early career writing (RTE= .62) than in late career writing (RTE= .42), while positive appreciation only varies slightly (Early career RTE= .58, Late career RTE= .43).

Positive and negative evaluation both play the role of aligning language users with a set of values relevant to a speech community, negotiating solidarity and dialogic positioning (Hood, 2006). The way this function is accomplished differs, however, in that negative evaluation disrupts solidarity by presenting one aspect of experience in a critical light, often with the aim of opening space for an alternative perspective. In the early career TCL corpus, such interpersonal strategies for advancing alternative perspectives are important given the co-existence of multiple theoretical perspectives within the discipline, operating under distinct guiding principles and assumptions about the object of study (Wignell, 2007). A common area of departure from consensus in the analyzed data is the assignment of classificatory labels (such as “sentence”, “speech”, “writing”, “metaphor”), with authors calling to question the grounds on which linguistic phenomena have been labelled and classified. Examples 5.31 and 5.32 illustrate this use of appreciation.

(5.31) Both Fodor and Lycan point to a number of grammatical parallels observed by Vendler (1972) between verbs of saying and propositional attitude verbs. Quoting Fodor: "Rather generally, the things we can be said to believe (want, hope, regret, etc.) are the very things that we can be said to say (assert, state, etc.)" (1978, p. 47). His and Lycan's conclusion, of course, is that in both cases these things are sentences. I find their argument here **somewhat specious**. (Abbott, EC)

(5.32) The presence of noun classes has often been associated with an inflectional or agglutinating morphological type, and classifiers (especially numeral classifiers) were once considered a property of isolating languages par excellence, a premise that also appears to be **simplistic** when viewed cross-linguistically. (Aikhenvald, EC).

Negative Appreciation also serves to critique longstanding methodological practices, as illustrated in Example 5.35, where Biber explicitly indicates the need to introduce a new methodological approach (“a typology of texts”) and proceeds to enumerate the problems with isolated analysis of text types. As in Abbott’s example above, he nominates some of the authors incurring in the discussed imprecisions -including citations to some of his earlier work-, providing explicit indications of the work whose approach his paper differs from.

(5.33) It is easy to illustrate the need for a typology of texts; many discourse studies analyze particular sets of texts without specifying their relations to other kinds of texts, often making the **unwarranted** assumption that findings can be generalized to 'discourse' as a whole. For example, there have been numerous **contradictory** conclusions concerning the linguistic characteristics of speech and writing due to this methodological shortcoming (many studies compare only face-to-face conversation and academic exposition but assume that their results characterize all speech and writing; see Tannen 1982; Biber 1986). Similarly, **contradictory** claims are common concerning the linguistic characteristics of 'complex' versus 'simple' discourse or 'formal' versus 'informal' discourse (Finegan and Biber 1986; Besnier 1986). (Biber, EC)

Negative Appreciation thus plays a niche building role in academic discourse, negotiating the status of current scholarship with a view to making room for alternative conceptions or approaches. It is an important semantic resource in gaining and consolidating a space within the disciplinary fellowship since it marks the contrast between existing knowledge/practice and new contributions claiming to address what is represented as a gap (Hood, 2006). It is natural for early career scholars in disciplinary fields founded primarily on descriptive consensus to use explicit negative evaluation of existing categorizations and approaches as a warrant for their contribution.

Positive Appreciation reflects a different orientation to the speech fellowship and the knowledge and practices it rests upon, which could be described as persuasively motivated. An important goal for scholars is to highlight the relevance or value of the proposals they have introduced or espoused as a means to induce their adoption by other researchers. In example 5.34, Biber's characterization of register as "fundamentally important" argues for the adoption of this concept in research seeking to characterize lexical sequences within text types. Dik's positive Appreciation in "a promising strategy" in example 5.35 similarly plays up the appeal of an approach to the issue of automatic translation. Late career writing appears more focused in the use of positive Appreciation to win over followers of a specific approach than it is to pinpoint the pitfalls of alternative conceptions or approaches.

(5.34) In sum, register is **fundamentally important** for the description of frequent lexical sequences, to a much greater extent than previously anticipated. In fact, the sets of common lexical bundles are nearly disjunctive between conversation and academic prose. (Biber, LC)

(5.35) The FG underlying clause structure, in other words, appears to provide a natural level of analysis for bridging the gap between two languages. This yields a **promising strategy** for developing a system of automatic translation. (Dik, LC-TCL)

Some instances of positive Appreciation in late career writing occur within concessive rhetorical moves, those involving the enunciation of positive aspects of a position prior to criticizing it. Praise in this context has more of a conciliatory than persuasive effect, in that it recognizes the merits or value of the object of criticism (in contrast with the more critical appreciation observed in the early career corpus):

(5.36) It is common in several lines of work today to transcribe narratives as sequences of lines. The task with such material is to discover that it has shape. Syntax is not simply a sequence of words. Sentences have parts and internal relations. The same is true of stories. They have parts and internal relations. The parts and internal relations frequently are signalled. Yet much **valuable** work proceeds as if it did not notice the signals. (Hymes, LC-TCL)

(5.37) While **applauding** Lamb's recognition that statements about the speaker's knowledge are relevant to linguistic inquiry and the description of the texts people produce and understand, I have reservations about some of the implications of his position. (Gregory, LC)

The last line in Hymes' excerpt, for instance, makes the point that, despite stories having internal structures whose parts should be accounted for, a large proportion of existent work on the subject fails to account for this fact. The author avoids the face-threatening act of criticizing a large part of the existing scholarship by assigning a positive evaluation of its importance. Gregory's excerpt resorts to the same strategy, conceding relevance to Lamb's position before elaborating on his reservations towards it. This approach to criticism bespeaks the discursive need for establishing continuity between authorized theoretical positions and reformulations of disciplinary knowledge.

The log-linear model (Table 5.6) throws additional light on the associations between appreciation type, polarity, and scope. The model shows an association between polarity and Appreciation type, and a three-way interaction involving Appreciation type, polarity, and scope. Because the association involves at least one less variable and it fits better to the data, it is more suitable to focus on analyzing the association between Appreciation type and polarity.

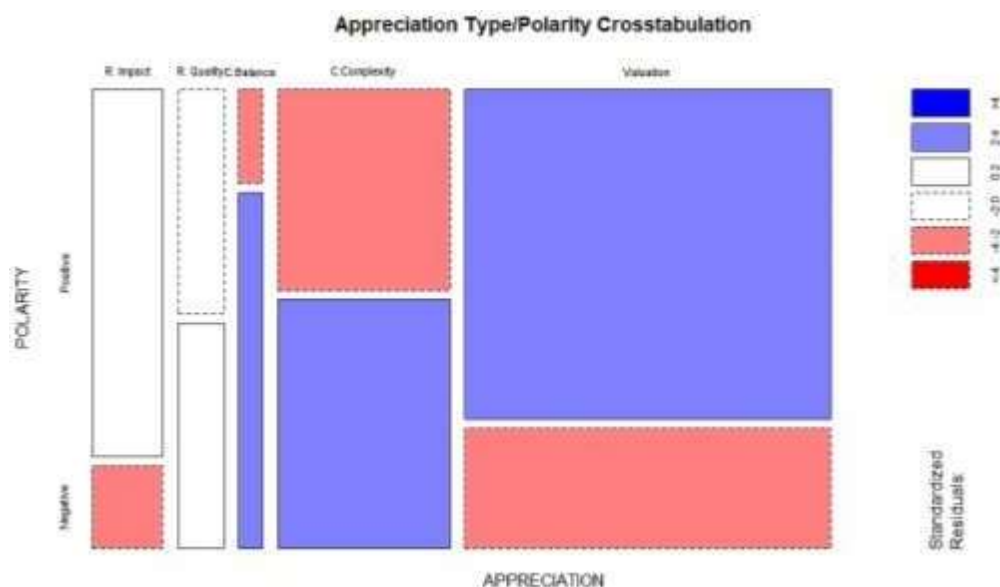
Table 5.7: Log-linear model for appreciation type, polarity and scope.

ANOVA					
	df	Deviance	Residual df	Residual Deviance	p
NULL			34	629.915	
POLARITY	1	47.747	33	582.169	< .001
APPRAISAL	4	318.394	29	263.775	< .001
DOMAIN	3	183.883	26	79.891	< .001
POLARITY * APPRAISAL	4	52.361	22	27.530	< .001
POLARITY * DOMAIN	3	0.883	19	26.647	0.829
APPRAISAL * DOMAIN	11	7.467	8	19.180	0.760
POLARITY * APPRAISAL * DOMAIN	8	19.180	0	0.000	0.014

The model indicates that specific appreciation types have a more than random probability to co-occur with positive or negative polarity, as the mosaic plot in Figure 5.7 illustrates. Reaction: Impact has a more than random chance of not occurring with negative

polarity, whereas Reaction: Quality shows no significant variation from the fitted distribution. Balance and Complexity were found to co-occur non-randomly with negative evaluation, in contrast with the non-random co-occurrence between Valuation and positive polarity. The pattern in the expounding field of linguistics is thus for appreciation of the Composition type – referring to formal evaluative aspects such as symmetry, consistency and consistency- to be critical, and for appreciation of the Valuation type – indicating such properties as importance, usefulness and effectiveness- to be positive.

Figure 5.6: Mosaic plot⁶ showing association between appreciation type and polarity



This interesting patterning of appreciation type and polarity in the expounding register of linguistics adds a more nuanced perspective on the possible developmental significance of Appreciation in scholars' writing trajectories. As already discussed, negative Appreciation connects with niche building strategies featuring overtly critical positionings towards existing scholarship. The association model suggests that the criticism entailed by negative Appreciation is most likely to target the Balance and Complexity dimensions of semiotic objects such as theories and concepts, targeting their sufficiency, clarity, and consistency.

⁶ Blue represents higher probability of non-random co-occurrence. Red represents the opposite probability.

- (5.38) It is also **unclear** how large the set of semantic relations must be: proposals have ranged from six (Fillmore, 1968) to over thirty (Ostler 1979). (Foley, EC-TCL)
- (5.39) It is feared that our citation orthography, despite strenuous efforts, has remained **somewhat inconsistent**. (Givón, EC-TCL)
- (5.40) The dichotomy of a concordial noun class as an "obligatory grammatical system where each noun chooses one from a small number of possibilities" and noun classification as a system in which "noun classifiers are always separate lexemes which may be included with a noun in certain syntactic environments" (Dixon 1986:105) appears to be rather **simplistic**, especially in the light of data from Amazonian languages. (Aikhenvald, EC-TCL)

As the examples above illustrate, criticism targeting the Balance and Complexity dimensions of Appreciation characteristically addresses formal aspects of theories, hypotheses, and concepts. In example 5.38, Foley's commentary on the lack of clarity regarding the adequate number of semantic relations in existing proposals signals the need to improve semantic relation taxonomy by tuning the existing proposals to an optimal number of dimensions. Givón's criticism of the inconsistency of "citation orthography" in example 5.39 similarly seeks to justify the need for more logical consistency of the existing framework. Example 5.40 points out "simplistic" nature of the proposed dichotomy by pointing to existing contradictory data.

Critical targeting of the valuation of semiotic objects is, in contrast, highly disfavored: scholars in linguistics are least likely to criticize such aspects as importance, effectiveness, usefulness or practicality. Positive Valuation has, in fact, a high probability of occurring in expounding registers of linguistic, with late career writing being especially likely:

- (5.41) Though the **fundamental** outlines of what we discovered remain as **valid** today as they were then, developments in brain science and neural computation have **vastly enriched** our understanding of how conceptual metaphor works. (Lakoff, LC)
- (5.42) That procedure has a **usefulness** that should not be dismissed, but inevitably it misses something **important**, for observing real language as it is produced by real people in the real world offers **insights** that are obtainable in no other way. (Chafe, LC)

The analysis of appreciation subtypes in this study within the early and late career corpora has illuminated the fact that the two polarities differ in deeper ways beyond their semantic orientation. They serve distinct purposes in scholars' positioning vis-à-vis existing disciplinary knowledge and the speech fellowship that sustains it. Negative Appreciation often serves to signal gaps needing to be addressed by what is presented as a relevant contribution at the theoretical or methodological level. Positive Appreciation may occur in prosodies of persuasion geared towards motivating the adoption of a new position or approach, enacting authors' legitimacy to influence other researchers' beliefs or actions. It may also function as a strategy to balance the face-threatening potential of criticism with a recognition of the value of the targeted positions, blending disciplinary unity with the possibility of dissent.

5.4. Conclusion

This chapter has explored the variation of interpersonal grammatical resources for the evaluation of propositions and entities, addressing Research Question 4: Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities? The findings from the studies reported illuminate some of the possible areas for developmental variation in scholars' trajectories, while pointing to areas showing stability within and across cohorts. The general principle that language development is selective regarding the loci of adaptations is upheld by the finding that some of the key interpersonal features of academic registers show no significant differences across career periods, including the overall distribution of speech-functional moves and evaluation mostly focusing on modalization. The findings reflect the general profile of academic registers as functional varieties backgrounding the explicit expression of evaluative stances and generally foregrounding the writer's role as a distant expert. The chapter also reinforces the principle, introduced in Chapter IV, that

developmental adaptations in scholars' trajectories involve subtle disturbances in the probabilities of more delicate lexicogrammatical subsystems. Such disturbances fall outside the consciousness of readers or scholars themselves, which is partly why introspective or purely qualitative studies of scholarly development may fail to capture them (see Chapter II, section 2.2). The comprehensive and delicate analysis performed in this chapter point to some subtle developmental differences.

Three developmental drifts in TCL scholars' use of evaluative lexicogrammar include a general decrease of evaluative statements across the three studied cohorts, a general decrease in the use of comment assessment, and a cohort-specific decrease in the use of negative evaluation. TCL scholars' early career writing thus tends to include more frequent evaluation of propositions and entities while late career writing could be considered, in Martin and White's (2005) terms, more monoglossic. Comment assessment and appreciation polarity are the evaluative resources showing the most significant differences across periods, which indicates that the early career significance of evaluative statements stems from these more delicate subsystems. The comment assessment type showing most the most significant career period effects is speech-functional assessment. This assessment type associates with textual phases characterized by an internal rhetorical orientation, that is, phases oriented towards increasing readers' belief of a proposition of willingness to adopt a proposal. Negative polarity being significantly more frequent in early career writing reflects novice scholars' intent to create a niche for themselves by pointing to existing gaps or faults in the literature.

CHAPTER VI: REGISTERIAL CHANGE AND SCHOLARLY LANGUAGE DEVELOPMENT

This chapter shifts attention from the within-persons perspective of developmental change to the between-persons perspective of registerial change across times of measurement and cohorts, tackling Research Question 5: What is the relationship between language change within linguistics scholars' trajectories and the evolution of academic registers? It comprises two main sections, the first of which discusses linguistic change in academic registers during the twentieth century, summarizing key trends illuminated by corpus-based and text analytical studies. This discussion precedes a study examining variation in complexity and interpersonal lexicogrammar across times of measurement in the Twentieth Century Linguists corpus. The second section focuses on between cohort variation by picking up on the cohort effects identified by the nonparametric longitudinal models in Chapters IV and V. The chapter closes by summarizing key findings and discussing their implications.

6.1. Language change in academic registers

The development of meaners' linguistic strategies for performing roles across social contexts is embedded within the larger timescales of linguistic evolution and registerial change (Halliday & Matthiessen, 1999). I use "linguistic evolution" and "registerial change" as glosses for what Matthiessen (2008, P. 46) calls "cyclical" and "unidirectional" language change, respectively. "Cyclical" change (e.g. linguistic evolution) concerns lexicogrammatical and phonological change driven by language-internal mechanisms marginally related to societal change, e.g. the passage from voiced to unvoiced consonants described by Grimm's laws, or the grammaticalization of modal operators in Old English. "Unidirectional" change (e.g. registerial change) refers to language change primarily driven by the emergence and reconfiguration of registers in connection with societal transformation (e.g. the emergence of scientific registers concomitant with the formation of the scientific communities, c.f. Halliday, 1988). One problem with the term

“unidirectional” is that it can suggest that registerial change is happening at the same time and in the same direction for all individuals in the speech community, which is precisely the assumption that this chapter intends to challenge. Both types of change are of course interrelated, although they have been studied by separate traditions, including historical linguistics (c.f. Campbell, 1999), grammaticalization studies (c.f. Traugott, 1995), historical rhetorics (c.f. Bazerman, 1988), diachronic register studies (c.f. Biber & Gray, 2016), and historical functional linguistics (c.f. Banks, 2006).

The evolution of language and registerial change permeate the semiotic material for the construction of personalized meaning potentials, including academic registerial repertoires (Lemke, 1993). Language is a complex dynamic system co-evolving with social and material systems, a condition reflected in the adaptation of its semantic and lexicogrammatical features to changes in social institutions throughout history (Beckner *et al.*, 2009;). Registerial change entails disturbances in the systemic probabilities of linguistic features associated with functional varieties of language over the course of decades or centuries (Halliday, 1988/2004). The twentieth century, with its profound societal, political, scientific, and technological transformations, witnessed a substantial amount of linguistic change across registers, as attested by various studies in the English language (Biber & Finegan, 1997; Mair & Leech, 2006; Leech *et al.*, 2009; Hyland & Jiang, 2016; Banks, 2017; Hyland, 2020). Academic registers have been no exception to this trend, reflecting the dynamism of the disciplinary fellowships instantiating them over time (Butt, 2019)⁷.

Language change may be approached from at least two perspectives (Figure 6.1). The dominant perspective targets general change manifesting as differences in the frequency of specific linguistic markers across cross-sectional text samples organized as diachronic

⁷Matthiessen (Personal Communication, July 26, 2020): “One aspect of academic registers is of course that many of them are “international” in the sense that they are produced and consumed by internationally engaged academics — so as an aside, one interesting question is to what extent academic registers in languages other than the ones used in international publications have changed along the same lines.”

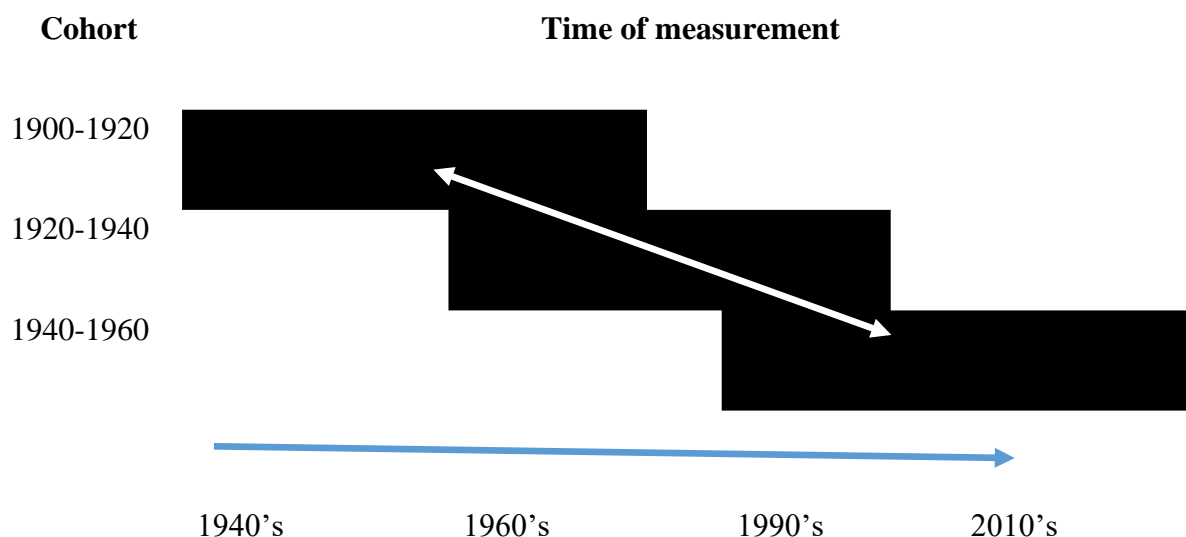
corpora (e.g. Leech *et al.*, 2009). This perspective assumes the corpus to be a reliable snapshot of language use by a community at specific historical periods, emphasizing representativeness and comparative validity. While diachronic corpora allow useful explorations of registerial change, their ability to inform accounts of language change within speech communities is constrained by their disregard of intraindividual and cohort considerations. Diachronic corpora confound developmental and generational factors with the general change construct (Fruehwald, 2017), ignoring underlying differences in the distribution of language change within communities.

The second perspective, mostly applied in sociolinguistic and lifespan development research (Kemper, 1987; Alwin & McCammon, 2001; Baxter & Croft, 2016), approaches language change through the description of differences between cohorts representing generations within a community. Cohort sequential corpora, such as the Twentieth Century Linguists (TCL) corpus, comprise language data from individuals belonging to different cohorts in at least two data collection points (Schaie & Caskie, 2005). This design allows accounting for the fact that communities are made up of language users with various ranges of linguistic expertise who may, by virtue of their trajectory lengths and exposure to historical linguistic trends, exhibit cohort-specific linguistic patterns.

This chapter integrates both perspectives with a view to providing a contextualized account of the relationship between developmental drifts in scholars' trajectories and language change in academic registers. Part of the emerging picture includes identifying drifts which are purely developmental in nature and those specific to general change and cohort variation. From the general change perspective, the aim is to explore the TCL corpus for evidence of the trends identified in prior studies of academic registers, labelled "colloquialization", "densification", and "specialization". From the cohort variation perspective, the aim is to characterize the cohort-specific patterns of syntactic and lexical

complexity and interpersonal lexicogrammar use identified by the nonparametric longitudinal models in Chapters IV and V. The upcoming sections deal with each perspective separately before the summary and discussion of key issues in the concluding remarks.

Figure 6.1: General change (blue line) and cohort variation (white line) in the TCL corpus



6.1.1. General diachronic change in the TCL corpus

This study investigates general change in the written academic registers of linguistics with a focus on complexity and interpersonal lexicogrammar parameters in the TCL corpus by comparing data from three times of measurement in the TCL corpus, corresponding to the 1960's, 1990's and 2010's decades. Two main trends in registerial change are documented to have occurred since the second half of the twentieth century, labelled “colloquialization” and “densification” (Leech *et al.*, 2009; Biber & Gray, 2016). Colloquialization refers to the adoption by traditionally formal registers of informal features associated with spoken language, including the increase in the use of first and second person pronouns (*I, we*), semi-modals (*have to, want to, be going to*), contractions (*let's, it's*) and evaluative Epithets (*mistake, advantage*); and the gradual decline in the use of modal verbs and *be*-passive. Colloquialization has been most evident in spoken language use and what Mair and Hundt

(1999) call “agile written registers” (such as the news report and e-mail). Academic registers have, in contrast, shown the opposite trend and seem, in general, to be drifting towards lesser presence of writers’ subjectivity in text (Seoanne & Loureiro-Porto, 2005; Leech *et al.* 2009). The only traditional marker of formality with an apparent declining trend in academic registers is the use of *be*-passives (Seoanne & Williams, 2006; Banks, 2017), but the driving mechanism has been associated with stylistic regulations against excessive passive voice use (especially in US American English), and a late twentieth century trend for academic writing to become more “democratic” or accessible to readers beyond disciplinary boundaries (Leech, 2004).

Disciplinary variation is an important factor in the hypothesized colloquialization trend. Hyland and Jiang (2017) found physical and biological sciences adopting linguistic markers of informality since the second half of the 20th century, whereas social science has become less subjective in the same period. Applied linguistics is a case in point, with dramatic reductions since 1965 in self-mention (-27.2), modal assessment of propositions (-36.0), attitudinal epithesis (-26.2), and reference to shared knowledge (-29.5) (Hyland, 2020). Thus, while a higher degree of informality suggestive of colloquialization is evident for the physical and biological sciences, social sciences appear to be drifting towards higher objectivity. Colloquialization in academic registers, Biber and Gray (2013) argue, mostly took place throughout the 19th century, when the grammatically intricate style of academic prose, highly reliant on hypotaxis and embedding, gradually gave way to preference for a more readable style based on clauses with dense nominal groups that is still prevalent (c.f. Halliday, 1988). The focus on assessing the colloquialization of academic writing based on informality markers of speech, the authors add, reflects the misguided assumption that linguistic innovation exclusively originates in the “agile” spoken registers.

The innovations affecting written academic registers during the twentieth century would reflect densification, rather than colloquialization. Biber and Gray (2016) show that noun phrases across disciplines have seen a dramatic increase of noun + noun structures and non-finite embedded clauses, as well as a steady decline in Finite embedded clauses in recent decades. Leech *et al.* (2009) report similar findings for “learned prose”, concluding that the trend since the second half of the twentieth century has been to “pack ever more information into a given length of text and then to ‘sell’ this fairly heavy intellectual diet in a somewhat more informal/colloquial style than used to be the case” (p. 252). Halliday’s (1988) study of scientific registers associates this historical change with increasing use of ideational grammatical metaphor, which creates affordances for placing long nominal groups as thematic clause position in the unfolding of scientific arguments. The social sciences would observe this trend, but coupled with an increasingly detached interpersonal style.

Besides colloquialization and densification, it is worth commenting on the trend towards specialization and diversification in academic disciplines. The experiential realms of disciplines have become more permeable and interrelated compared to the 19th and early 20th century, partly due to technological advances allowing more integrative explorations of phenomena, and partly as a result of an increasing interconnexion of scientific communities (Christie & Maton, 2011). Teich *et al.* (2015) explore this trend in relation with the emergence of transdisciplinary fields reflecting the convergence of two or more traditional disciplines. The linguistic imprint of this trend is evident both in the increasing lexical differentiation of emerging transdisciplinary fields, symptomatic of higher specialization, and in the growing divide between scientific and non-scientific lexis.

Linguistics has experienced major developments since the 1960’s, including the emergence of contemporary theoretical paradigms, the expansion of its object of study to account for the relationship between phonology, lexicogrammar, semantics and context; and

the incorporation of various methodological approaches (Seuren, 1998; Campbell, 2002). Although these changes affected linguistics circles differently across traditions and geographical locations, the general change drifts described for other social sciences may also be reflected in linguists' writing across cross-sections of the twentieth and twenty first centuries. These possible trends would provide a picture of how linguistic change has affected the disciplinary community of linguistics, which at any time point comprises a heterogenous mixture of scholars from different generations and trajectory lengths.

6.1.1.1. Procedure

This study is based on the complexity and interpersonal lexicogrammar data from the TCL corpus presented in Chapters IV and V. Instead of comparing numeric data in early and late career writing, it compares numeric data across three chronological cross-sections: 1960-1969 (1960's), 1990-1999 (1990's) and 2010-2018 (2010's), grouping all observations for each decade regardless of career period or cohort distinctions. The justification for the focus on these decades lies in their convenience for comparing findings with those reported in prior studies comparing the same time periods. The resulting data frame includes one column with three categorical values corresponding to the mentioned decade periods, and fifteen columns with numeric data for the lexical and syntactic complexity and interpersonal lexicogrammar variables.).

Most of the variables do not meet the normal distribution assumption (given Shapiro-Wilk test scores below .05), preventing the use of parametric tests like ANOVA. I thus used the Kruskal-Wallis test, a non-parametric option to test differences between independent groups when failing to meet the assumptions for one-way ANOVA. It is based on the sum of ranks procedure whereby individual scores are given a rank from highest to lowest within the entire data set, and then get reassigned to their groups for rank scores within groups to added,

squared and divided by the group sample size (for details on the mathematical procedure, see Field, 2015, pp. 559-563). I then analyzed variables with significant Kruskal-Wallis H score using pairwise Mann-Whitney's U tests with Benjamini-Hochberg correction to determine the period(s) in which significant differences exist. I performed the tests in R with the base functions *kruskal.test* and *wilcox.test*.

6.1.1.2. Findings

Table 6.1 shows median values and Kruskal-Wallis statistics for the language parameters with significant variation across the three decades investigated.

Table 6.1: Median frequency and Kruskal-Wallis statistics for interpersonal variables

	<i>Median</i>			Chi-square	df	<i>p</i>
	1960's	1990's	2010's			
Evaluative statements	20.0	11.3	11.2	6.562	2	0.03*
Probability	11.6	7.04	6.19	4.554	2	0.10
Comment assessment (Total)	7.12	5.14	3.66	8.392	2	0.01**
Positive appreciation	5.2	6.0	6.0	5.081	2	0.07
Negative Appreciation	3.0	3.1	3.1	2.760	2	0.25

Table 6.2: Median frequency and Kruskal-Wallis statistics for syntactic and lexical complexity variables

	<i>Median</i>			Chi-square	df	<i>p</i>
	1960's	1990's	2010's			
Lexical Density (Halliday-type)	12.6	13	12.5	0.520	2	0.77
Lexical Density (Ure-type)	52.0	51.3	53.5	12.386	2	.002*
Mean T-Unit Length	24.0	25.4	24.6	0.021	2	0.98
Mean Clause Length	13.3	13.4	14.4	0.935	2	0.62
Clauses per Sentence	1.95	2.19	2.16	2.267	2	0.32
Clauses per T-Unit	1.83	1.86	1.79	3.344	2	0.18
Dependent Clause per T-Unit	0.75	0.79	0.29	3.573	2	0.16
T-Units per Sentence	1.11	1.18	1.20	4.693	2	0.09
Lexical Diversity	0.71	0.68	0.68	10.543	2	.005*
Lexical Soph. (Specialized)	0.005	0.007	0.006	10.883	2	.004*
Lexical Sophistication	0.02	0.02	0.02	3.632	2	0.16

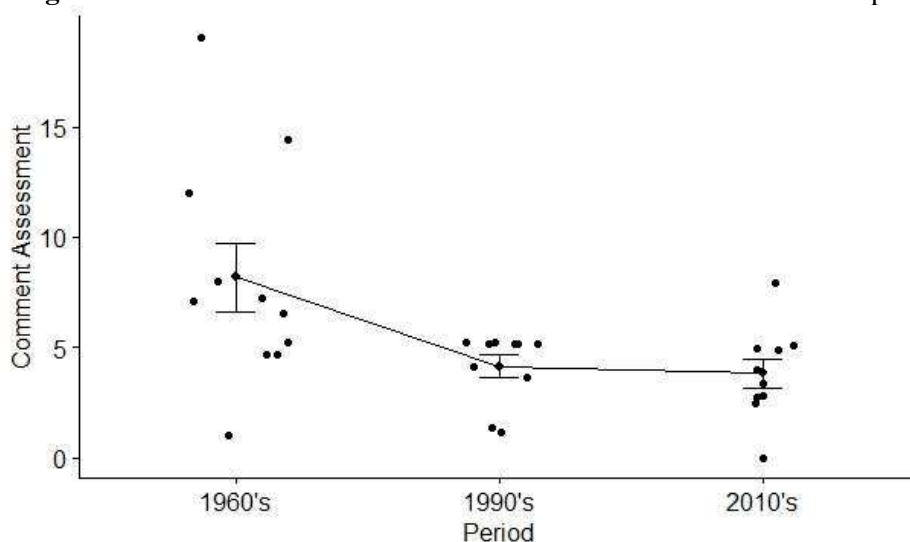
Table 6.3 shows p -values for post-hoc pairwise comparison test with BH correction applied to variables with significant Kruskal-Wallis scores.

Table 6.3: Post-hoc pairwise comparison p -values.

	p value		
	1960's-1990's	1960's-2010's	1990's-2010's
Evaluative statements	.109	.045*	.730
Comment Assessment (Total)	.029*	.029*	.210
Lexical Density (Ure)	.030*	.110	.000**
Lexical Diversity	.006*	.030*	.180
External Specialization	.009*	.788	.009*
Pronoun/Noun Ratio	.740	.060	.031*
Repeated Lemmas	.020*	.030*	.004**

In interpersonal lexicogrammar, significant diachronic variation is found for evaluative statements and comment assessment. The only significant pairwise contrast for evaluative statements occurs in the contrast between the 1960's and 2010's period, indicating higher prevalence of non-evaluative statements in the most recent decades. Comment assessment is the lexicogrammatical strategy most affected by the trend, exhibiting decline since the 1960's (Figure 6.2).

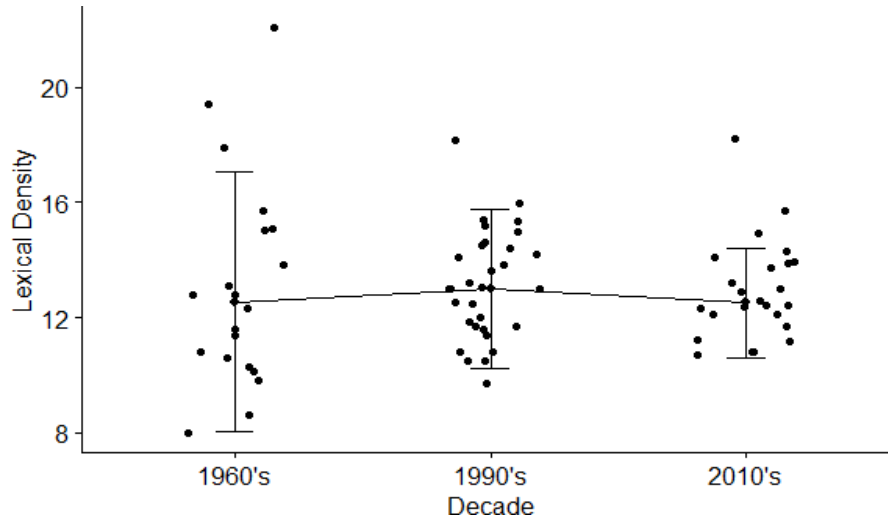
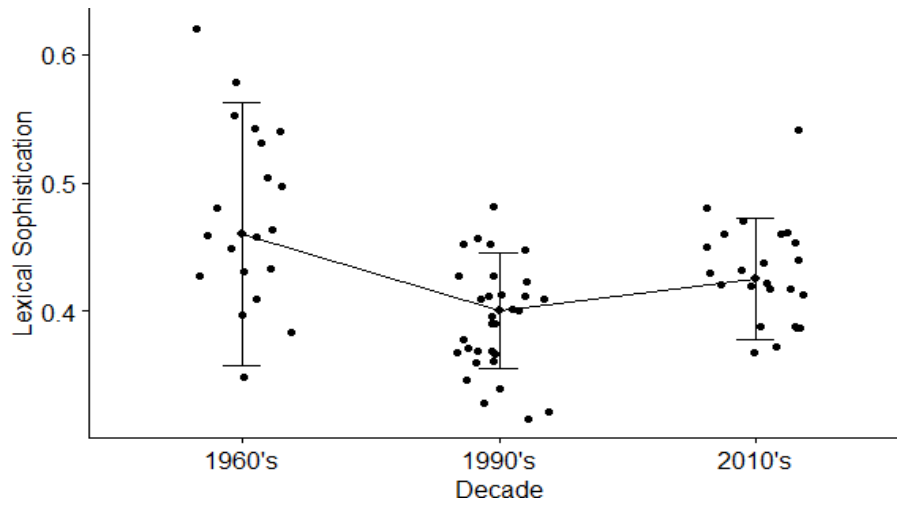
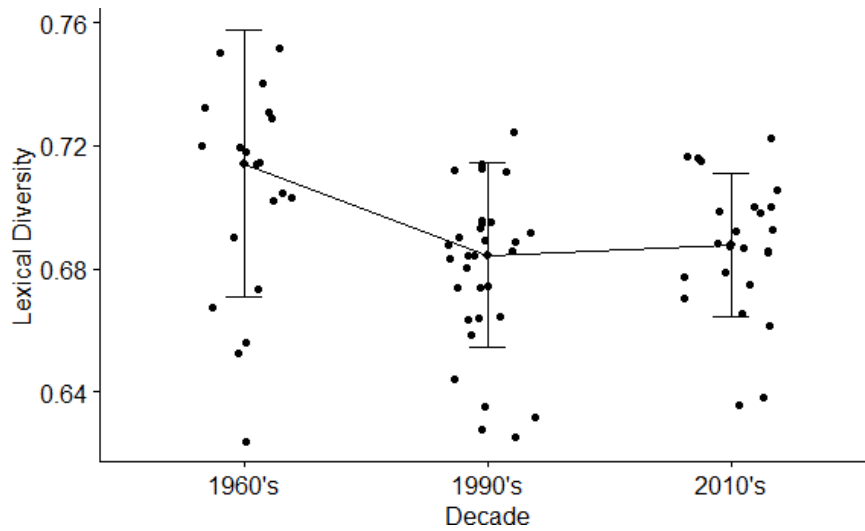
Figure 6.2: Diachronic variation in comment assessment in the TCL corpus



The observed decline in general evaluation and comment assessment is consistent with studies reporting a gradual reduction in markers of interpersonal engagement across

written registers of the social sciences (Hyland & Jiang, 2017; Hyland, 2020). Comment assessment covers a wide range of resources for the evaluation of propositions (see Section 5.3.1), through which writers negotiate their positioning towards alternative voices and enact dialogic scholarly identities in text. The observed decline suggests a general drift towards what Gilbert and Mulkay (1984) call an “empiricist repertoire” backgrounding the nature of academic writing as an interpretive product. The scatter of points in Figure 6.1 suggests high variability in linguists’ use of comment assessment during the 1960’s, with some of them figuring as considerable outliers from the group median. The more reduced scatter of points in the 1990’s and 2010’s indicates more uniformity across linguists regarding comment assessment use.

As for lexical complexity, significant values concentrate on Ure-type lexical density, lexical diversity, and lexical sophistication. Ure-type lexical density increases significantly from the 1960’s to the 1990’s and it decreases slightly into the 2010’s (Figure 6.3). Lexical sophistication (the difference between disciplinary and general language use) and lexical diversity (the rate of new words employed) are significantly higher in the 1960’s as compared with the two subsequent periods, and they increase slightly from the 1990’s to the 2010’s (Figure 6.4 and 6.5). The inter-quartile range for all lexical complexity measures has narrowed down in recent decades, suggesting higher homogeneity over time.

Figure 6.3: Diachronic variation in comment assessment in the TCL corpus**Figure 6.4:** Diachronic variation in Lexical Sophistication in the TCL corpus**Figure 6.5:** Diachronic variation in Lexical Diversity in the TCL corpus

Lexical complexity findings support to some extent the language change patterns observed in previous historical studies of academic registers. The lexical density finding partly reflects the drift of academic registers towards densification in recent decades⁸. The trend is not continuous, however, the increase from the 1960's to the 1990's being followed by a slight decrease towards the 2010's. The large decrease in lexical sophistication between the 1960's and the 1990's could be interpreted as reflecting democratization (Leech, 2004) in that the lexical choices in more recent decades are less sharply differentiated from general language use. This interpretation is especially applicable to the 1990's, while the 2010's shows an upward trend. The reduction in lexical diversity could, in turn, relate to the ongoing trend for specialization whereby a focus on the study of a limited set of domains reduces the overall range of new words employed.

This study has, in summary, identified diachronic changes in the TCL corpus which coincide with the trends toward objectivization, densification, and democratization observed in prior historical linguistic studies of academic registers. The findings reflect the fact that the academic registers of linguistics have adapted in consonance with the evolution of its knowledge base and changing social roles within its disciplinary speech fellowship. Interestingly, the diachronic trends reported show coincidences and mismatches with the developmental drifts discussed in Chapters IV and V.

The only coincidence is the decreasing trend in evaluation and, particularly, in comment assessment, the interpersonal system encompassing resources for the evaluation of propositions outside the Mood element. This coincidence resonates with the “interpersonal first principle” (Halliday, 1993), whereby the interpersonal metafunction acts as a gateway

⁸ Matthiessen (Personal Communication, July 26, 2020): “One interesting question is if ‘densification’ is the ‘target’ of this drift (well, evolutionary processes never have targets). If Halliday is right about the increasing use of ideational grammatical English over the last 500 years, then ‘densification’ is an inevitable consequence”.

into semiotic activity by providing strategies for the enactment of new social roles at the logogenetic, ontogenetic and phylogenetic timescales. Although modern linguistics emerged at the beginning of the 20th century (and the scholarly study of language dates back to Antiquity), the 1960's and 1970's marked a key transitional period for the emergence of contemporary theoretical paradigms, chiefly Chomskyan generativism and its offshoots (during the so-called “linguistic wars” in the US American scene) and Hallidayan functionalism. Parallel to the emergence of new paradigms, scholars within earlier structuralist/descriptivist traditions strove to uphold their scholarly identities amidst an increasingly multipolar disciplinary fellowship. Excerpt 6.1 illustrates what Fruewhald (2017) calls the “zeitgeist” of linguistics academic registers around the mid part of the 20th century, a period during which expressing (dis)alignment with emerging or established disciplinary paradigms was a specially important aspect of scholarly identity enactment, both for early and late career linguists (bolded terms indicate evaluative terms):

- (6.1) As linguistics on the American scene is passing, at this very moment, through one of its most **violent convulsions**, there is every reason to expect that the long-endangered balance between the static and the dynamic approaches to language will in the end be restored. In their quest for a **fairer** hearing, students of evolutionary, especially of genetic, linguistics **must** remind themselves that, almost by definition, they have tended, **to their own lasting detriment**, to **scatter** their talents and energies on factual details **devoid of broad implications**. While the complexity of historical processes, by its nature, demands **unremitting** attention to **minute intricacies**, the recognition of major trends—mutually interwoven, hence, as a rule, difficult of strict isolation and direct inspection as they are—seems **no less imperative**. (Malkiel (1968) LC-TCL)

The decline in explicit evaluative resources in recent decades suggests that making such alignments explicit has become less common for linguists, presumably because each tradition has become more internally cohesive. TCL scholars' trajectories reflecting the same diachronic trend, with more evaluative resources used in their early career writing, underscores the gateway opening role of interpersonal strategies at the ontogenetic scale.

The diachronic trends in lexical complexity follow the opposite direction of developmental drifts for this dimension reported in Chapter IV: whereas the general trend is for linguistic registers to become less lexically sophisticated and lexically diverse over time, TCL scholars drift towards more lexically sophisticated and diverse writing in their late career period. Regarding lexical sophistication, one difference concerns the fact that scholars' writing becomes specialized with respect to writing *within* the disciplinary community, but its degree of sophistication compared to general language use outside the discipline remains constant. It is the aggregate lexical sophistication value that decreases for the discipline, not within scholars' trajectories but across times of measurement⁹. The same pattern applies to lexical diversity, which increases *within* cohorts but decreases across the decades compared. The exploration of cohort differences in the second part of this chapter helps illuminate these apparently contradictory trends by showing that, besides decreasing across times of measurement, lexical complexity measures also decrease *across* cohorts. Thus, while lexical diversity increases from early career to late career in the TCL corpus, this increase occurs in the broader context of a diminishing pattern across cohorts and times of measurement. A similar pattern has been found in diachronic sociolinguistic studies (e.g. Brook *et al.*, 2018), where sounds and morphemes are gradually phased out over the course of several generations, each generation's peak in their usage being slightly lower than that of the antecedent generation.

⁹ A potential threat to the validity of diachronic comparisons based on the lexical sophistication index in the Lexical Complexity Analyzer is the fact that it is based on the BNC corpus, which represents language use from the 1980's and early 1990's. While using a single reference corpus may be a more solid and practical methodological choice than comparing with multiple diachronic corpora of diverse compositions and sizes, it needs to be born in mind that this measure more strictly indicates sophistication with respect to language use during the 1980's and early 1990's. There are no empirical or theoretical reasons to believe that general language use during that period is more or less lexically sophisticated compared to other periods in the 20th century. This observation, added to the large size and registerial balance of the BNC, justifies the LS index as a valid tool for the purposes of this diachronic study.

6.1.2. Cohort variation in the TCL corpus

Cohort variation in language use has been widely studied within sociolinguistics and lifespan development research, both traditions assigning central importance to the relationship between individuals and the community. The sociolinguistic tradition explores intra and inter-cohort variation in individuals' uptake of discrete phonological and grammatical features in oral registers. An influential hypothesis is that of incrementation, whereby adolescents adopt and expand the linguistic innovations of prior cohorts before becoming gradually more conservative as they move into adulthood (Labov, 2001; Brook *et al.*, 2018). The lifespan development tradition focuses on language ability decline from a cognitive perspective, distinguishing between fluid and crystallized abilities (Salthouse, 2010). The former, referring to the online processing of linguistic stimuli of varying degrees of syntactic complexity, are known to decline throughout the lifespan, but not across cohorts (Kemper, 1987; Kemper *et al.*, 2003). The latter, referring to stable lexical knowledge stored in long-term memory, have been found to be sensitive to both lifespan and cohort variation (Alwin & McCammon, 2001). Cohort-specific factors, such as overall duration of schooling and exposure to specific educational policies, have been shown to affect cohorts in lifespan studies of crystallized abilities, such as lexical recall.

Studies of cohort variation in complexity and lexicogrammatical parameters in academic registers are non-existent, mainly because historical linguistic studies have taken texts, not individual speakers, as the unit of analysis -Nevalainen *et al.* (2011) is an interesting exception. This study is the first one to address the issue of cohort differences in the written registers of an academic discipline (linguistics) by examining differences across three cohorts in the TCL corpus. A cohort is, simply put, a set of individuals treated as a group by virtue of shared historical characteristics, such as decade of birth or year of graduation. The non-parametric longitudinal model applied to TCL corpus data groups

linguists into three cohorts corresponding to three two-decade periods: 1900-1919, 1920-1939, and 1940-1960. The grouping roughly coincides with the periodization of generations in the pulse-rate generational classification (e.g. scholars born between 1940 and 1960 may be called “Baby Boomers”) (Jaeger, 1985). This rationale is not, however, the one informing cohort groupings in this study.

The division of cohorts is based on the approximate period of TCL linguists’ academic trajectory milestones, including graduate study, professorial affiliation, and retirement. The historical context of scholars’ trajectories arguably affects their disciplinary apprenticeship, the relevant research issues and activities, and exposure to theoretical paradigms. The scholars in the 1900-1919 cohort mostly completed their doctoral degrees in the 1930’s, began their academic careers in the early 1940’s and retired in the late 1960’s. Most of their academic trajectories unfolded during the structuralist period of US American linguistics, during which a central concern was developing accurate descriptions of the phonology and morphology of specific languages, without recourse to general linguistic theories or appeals to meaning. Those in the 1920-1939 completed their PhD’s between the late 1950’s and early 1960’s, initiated their academic tenures during the 1960’s and retired by the late 1980’s. The scholars in this cohort are recognized as pioneers of different theoretical paradigms, developing their initial theoretical formulations and apprenticing the first scholars into them. Those in the 1940-1960 cohort mostly completed their PhD’s during the 1970’s and 1980’s, initiated their tenures between the mid 1980’s and 1990’s, and retired (or will retire) between the late 2010’s and early 2020’s. Although this cohort is diverse in terms of their paradigm affiliation, one common feature is their role as contributors and developers of existing disciplinary paradigms.

The division of cohorts in this study reflects the specificities of the scholars in the TCL corpus and by no means is proposed as a classificatory scheme generalizable to the

entire population of linguists born during the first six decades of the twentieth century. The true underlying motivation is not to validate any such scheme, but to explore whether cohorts of linguists with distinct trajectory experiences differ in their use of academic registers.

6.1.2.1. Procedure

The statistical tests on which this study is based come from the non-parametric longitudinal models performed in Chapters IV and V using the R package *nparLD*. The nonparametric mixed factorial model in *nparLD* models three types of longitudinal trend: within persons change (from early to late career), between persons change (between the three cohorts considered), and mixed trends (career period change within specific cohorts. This study is based on the second type of trend. Besides yielding an ANOVA-type nonparametric statistic, the model offers as a measure of effect size the Relative Treatment Effect, a measure from 0 to 1 in which the middle (0.5) represents non-significant difference between the compared groups and the extremes (>0.6 , <0.4) represent a high probability of a randomly selected element from one group having a higher or lower value than one from the second group (See Section 3.3.1) . This study does not perform the model again: it revisits the models ran in Chapters IV and V and attempts to consolidate and interpret the cohort-related trends identified therein.

6.1.2.2. Findings

Table 6.4 presents the variables with significant cohort effects according to the nonparametric longitudinal models performed in chapters IV and V, together with the pairwise contrasts for the three cohorts compared.

Table 6.4: Nonparametric longitudinal model with significant cohort effects and cohort contrasts

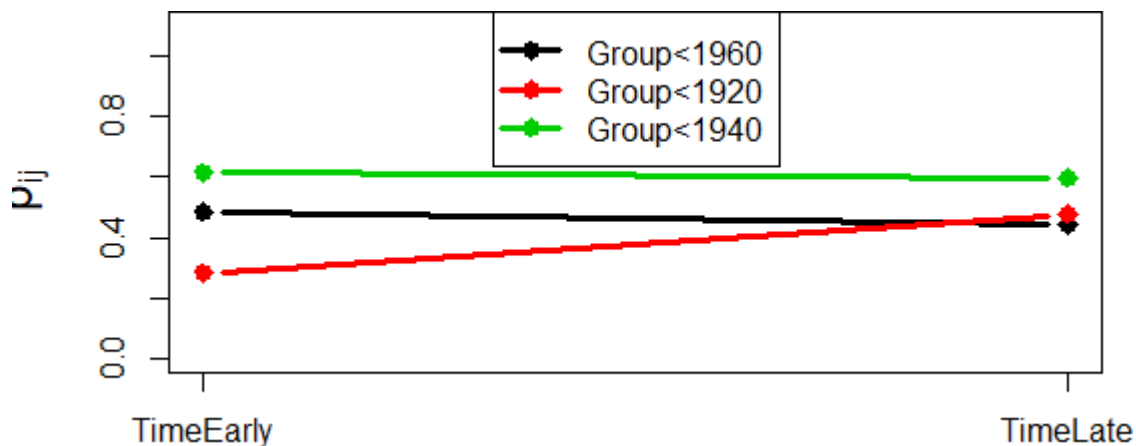
F1-LD-L1 Model	Effects (ANOVA)		Cohort contrasts	
	Cohort	>1960/>1920	>1960/>1940	>1920/>1940
Dependent Clause per T-Unit	10.755	1.217	5.126	9.345
<i>p</i> -value (2T)	.004*	.269	.023*	.002**
Lexical Sophistication	43.287	13.236	7.343	43.176
<i>p</i> -value (2T)	.000**	.000**	.006**	.000**
Lexical diversity	10.342	5.826	1.100	10.254
<i>p</i> -value (2T)	.005**	.015*	.294	.001**
PNR	11.224	0.132	9.981	4.585
	.003**	.715	.001**	.032*
Propositional: Qualificative	10.324	1.599	2.101	10.259
	.005**	.106	.147	.001**

*Significant at .05 level

**Significant at .01 level

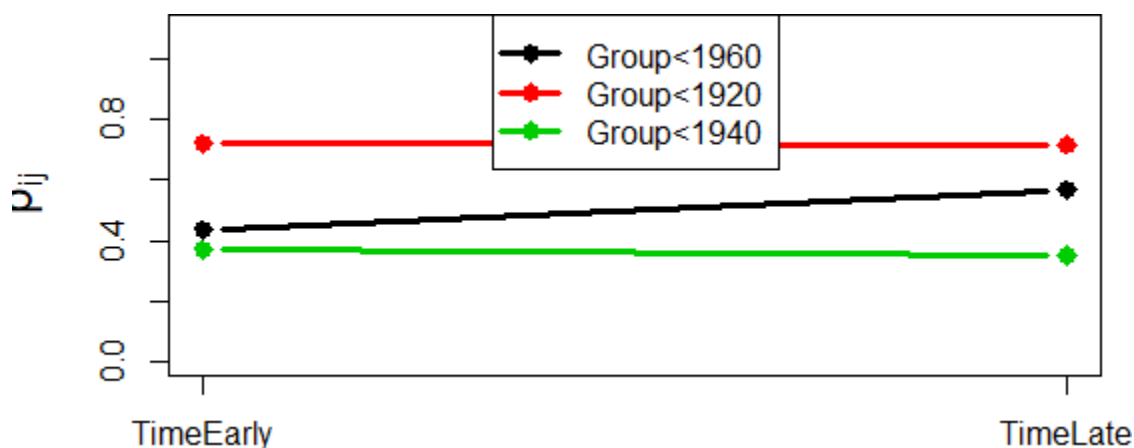
The complexity variables with significant cohort effects include dependent clause per T-Unit, lexical sophistication, lexical diversity, and pronoun/noun ratio. The only interpersonal variable with significant cohort differences is propositional qualificative assessment.

In dependent clause per T-unit, the pairwise comparisons are especially significant for scholars born between 1900-1920 and those born between 1920-1940. The >1920 cohort has a significantly lower score for this measure in their early career period than the other cohorts, while the >1940 cohort maintains a significantly higher score throughout their trajectories. Although the >1920 cohort's Dependent Clause per T-Unit score increases in their late career period, it still remains lower than that for the >1940 cohort.

Figure 6.6: Cohort differences in Dependent Clause per T/Unit

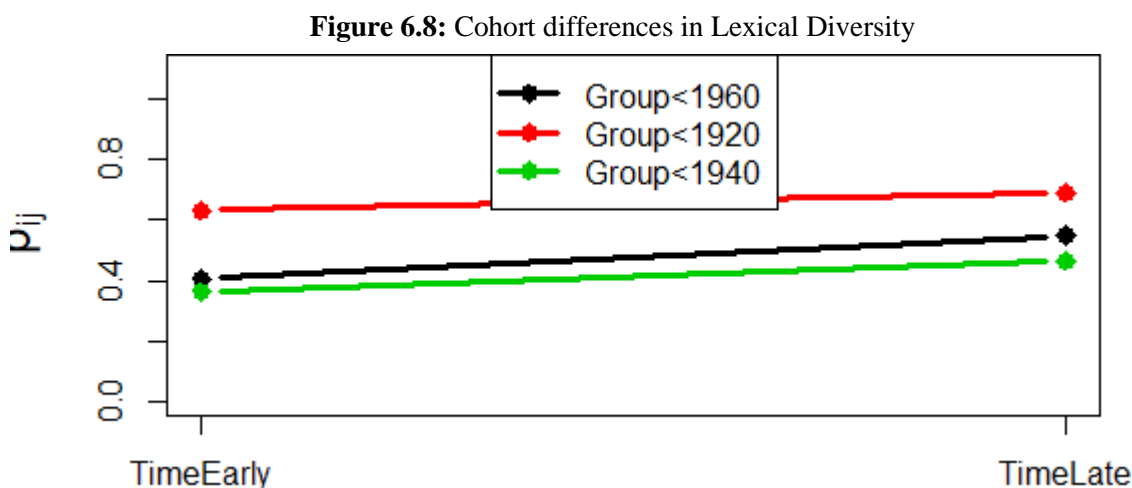
Dependent Clause per T-Unit shows no significant developmental or global change effect, which means that its significance exclusively pertains to differences between linguistics scholars generations in the TCL corpus. A high score in this measure appears to be characteristic of scholars in the second cohort, indicating a higher level of hypotaxis compared to the other cohorts.

The rest of the measures with significant cohort differences are of the lexical complexity family. In Lexical Sophistication, the pairwise contrasts are significant for the three cohorts, as shown in Table 6.4. The strongest contrast is between the >1920 cohort, with a significantly high Lexical Sophistication score, and the >1940 cohort, with the lowest scores on this measure.

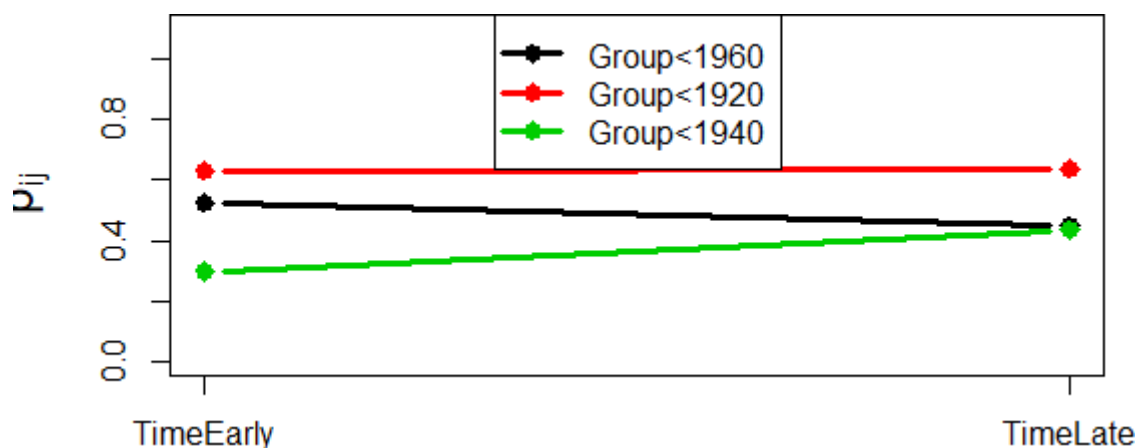
Figure 6.7 Cohort differences in Lexical Sophistication

It is interesting to note that lexical sophistication shows significant differences across cohorts, but not between early and late career writing. Its patterning is opposite to that of specialized lexical sophistication, which is developmentally significant but shows no cohort or global change variation. The cohort differences for this measure indicate that lexical sophistication does not follow a directional phylogenetic drift: the writing of more recent generations of scholars would not necessarily be more differentiated with respect to general language use than that of earlier generations, although it makes intuitive sense to assume that disciplinary registers become increasingly specialized over time.

Lexical Diversity is one of the measures with significant variation along the developmental, generational, and global change dimensions. The only cohort with Lexical Diversity scores significantly higher than the other two is the >1920 cohort, especially in its contrast with the >1940 cohort ($WT(2) = 10.254, p = .001$).



Regarding interpersonal lexicogrammar, the only aspect with significant variation across cohorts is qualificative comment assessment, the type having to do with the evaluation of propositions in terms of expectation, source, or desirability (e.g. *surprisingly*, *evidently*, *presumably*, *unfortunately*). The only significant contrast is, again, that between the >1920 and >1940 cohorts.

Figure 6.9: Cohort differences in qualificative assessment

From the study of cohort differences across complexity and interpersonal lexicogrammar parameters, it is clear that the main generational contrast is to be found between cohorts born in the first and second decades of the twentieth century and those born in the third and fourth decade. The latter's writing resembles that of scholars born between the fifth and sixth decade, except for the Lexical Sophistication and Pronoun/Noun Ratio variables. It also becomes clear that change between cohorts is a temporal variation scale distinct from that of language development and global change, with specifically significant effects in three variables (Dependent Clause per T-Unit, Lexical Sophistication, and Qualificative Assessment).

The three cohorts in the TCL corpus may be characterized according to their specific traits. Scholars in the 1900-1920 period have the most distinctive prose, with high lexical diversity, lexical sophistication and use of qualificative assessment. Excerpt 6.2, from the introduction of a paper published in 1941, shows some of these features. With a lexical sophistication score of .45 and a lexical diversity score of .81, the excerpt is illustrative of the lexical profile characterizing this cohort. The high level of lexical sophistication appears not to be related to the frequent use of technical terms (as suggested by the follow-studies in Chapter IV), but to a wider range of lexical choices which could be considered formal (but

not specialized) vocabulary (e.g. *advocate, irrespective of, concentrate upon, intercourse, kinship*). The high lexical diversity score may be attributed the scarce use of repetition, which, as discussed in Chapter IV, appears to connect with a lack of focus on constructing taxonomies. One potentially relevant consideration in the case of TCL linguists from this cohort, most of whom operated within the US American structuralist period, is the emphasis on producing accurate descriptions of specific languages without constructing overarching theoretical edifices (unlike linguists on the European linguistics scene in the first half of the 20th century).

- (6.2) Professor Bally was undoubtedly justified in advocating the study of European stylistics as a discipline concerned with such features of style as are common to the whole community of European languages, irrespective of their origin and structure.' We may with profit concentrate upon those types of derivation which, by their use in linguistic systems tied together by cultural intercourse even more than by kinship, may well be looked upon as integral portions of a 'European word-formation'. One particularly curious type, represented in French by the two varieties *l'objectif* and *l'initiative*, is found not only in Romance, but also in borrowings absorbed by Germanic, Slavic, and even Finnish. As is generally the case with such widespread abstracts, it is traceable to Latin; but it has not yet been determined whether we owe this type to the classical or to the medieval stage of that language.

Qualificative assessment is another signature feature for the 1900-1920 cohort. Excerpts 6.3-6.5 (from the same paper in excerpt 6.2) contain examples of this evaluative resource, through which propositions are evaluated for their evidential support, predictability, desirability, or importance (Halliday & Matthiessen, 2014, p. 191). This assessment type is used in academic discourse to qualify external sources and author's own research, signaling possible gaps or courses of action (qualificative: desirability) (excerpt 6.3), projecting indeterminate voices (qualificative: presumption) (excerpt 6.4), and reacting to findings (qualificative: significance) (excerpt 6.5).

- 6.3 In contrast to this, Meyer-Liibke suggested that *-iva*, in Italian, be regarded as a regular suffix serving for the derivation of verbal abstracts, ' and pointed out that the neuter plural *-attvum*, known to have had a great vogue in late Latin, might be regarded as the probable starting point. **Unfortunately**, he failed to investigate the question more at

length in his subsequent writings, so that the entire problem will have to be considered anew.

- 6.4 At this advanced stage in the development of the suffix, it would perhaps be hazardous to insist on the necessity of supplying one of the **allegedly** lacking nouns *causa* ‘cause’, *ratio* ‘reason’, *vis* ‘force’, *voluntas* ‘will’, *virtus* ‘inward force’, *potentia* ‘power’, *ars* ‘art’, *scientia* ‘science’.
- 6.5 **It is remarkable** how steadily the change of -ivum and -iva from unsubstantial, colorless endings to elements with a highly peculiar signification progressed throughout the Middle Ages.

Scholars in the 1920-1940 cohort especially characterize themselves by a high score in Dependent Clause per T-Unit and Pronoun/Noun Ratio, and low Lexical Sophistication and use of asseverative assessment. Excerpt 6.6 presents a high score in Dependent Clause per T-Unit (DCT=1.2) and a low score in Lexical Sophistication (LS= 0.27). Dependent Clause per T-Unit scores indicate the degree of grammatical intricacy (the proportion of clauses divided by the total number of clauses and clause complexes) (Halliday, 1985b). Grammatical intricacy can be achieved through a variety of logicosemantic resources for , hypotactic and paratactic clause complexing,. In the excerpt, the downranked clauses and clause complexes (underlined) elaborate entities and participants, which is needed to contextualize the argument being advanced. Verbal projection introducing Chomsky’s voice into the text (bolded) add further intricacy to the passage.

- (6.6) ||| Chomsky (1972: 86) **states**, <<in criticizing an analysis of the word *remind* (Postal, 1970a), [which made some appeal to Raising],>> the following: ||| “I might mention that the permutation rule that gives (25) as well as subject-raising -into object position (this phrase not present in the original circulated version)- seem to me to be at best dubious rules.”

||| This formulation [(without the added clarification)] might well have been confusing to some, as [[it was to the present writer, [who, in some circulated but unpublished arguments, took it to be a general rejection of the existence of a rule Raising]]. ||| However, in an earlier personal communication as well as in the published version, the author has clarified his position, || **indicating** || that what he had in mind rather was only to

call into question the existence of a raising operation in the case of [[what I am here calling B-verbs.]] ||| That is, Chomsky does not question the existence of Raising for at least some A-verb constructions. || Rejection of Raising for B-verb constructions is also briefly alluded to in Chomsky (1971) || and sketched in greater detail in Chomsky (to appear). ||| (Postal, EC-TCL)

Excerpt 6.7, from the same paper as excerpt 6.6, is an even more extreme example of high grammatical intricacy. The passage corresponds to a simple identifying clause, where the Identified is the nominal group with the noun *consequence* as Head, and the Identifier is an ultra-long nominal group consisting of a transcategorized clause (underlined), within which the Head nominal group *problem* is postmodified by a prepositional phrase and by a downranked paratactic complex. Elaboration of entities is, again, the motif behind these highly intricate instances, in this case motivated by the need to discuss previous research as background information for the ongoing argument. It may thus be proposed that one of the distinctive features of this cohort is the more frequent elaboration of entities motivated by the necessity to acquaint readers with the features of entities and prior arguments. This interpretation makes sense when considering that the predominant role of the TCL scholars in this cohort was putting forward new theoretical frameworks for the study of language.

- (6.7) An obvious and crucial consequence of a rejection of raising operations in B-verb complements is, of course, that the problem of constructing a unitary account of Raising for both B-verbs and A-verbs, which Rosenbaum, Lakoff, Ross, and others tackled without much success, and which, it was claimed previously, McCawley's verb-initial hypothesis solves, simply does not arise.

TCL scholars in the 1940-1960 cohort occupy a middle ground position between the preceding cohorts, resembling the 1920-1940 in its lower Lexical Diversity, but differing from it in its higher Lexical Sophistication.

6.1.3. Conclusion

This chapter has explored the relationship between developmental drifts in complexity and interpersonal lexicogrammar variables and variation between cohorts and across times of

measurement. It adopted two complementary perspectives on the study of diachronic change in academic registers. The general change perspective obtains from considering variation across times of measurement, in the case of the TCL corpus corresponding to three decade-long periods (1960's, 1990's, and 2010's). Findings from this perspective coincide with some of the trends reported in historical linguistic studies following a similar approach to the modelling of diachronic language change, including densification, objectivization, and a slight decrease in lexical sophistication interpreted as evidence of democratization. The cohort variation perspective examined differences between TCL scholars grouped according to shared historical periods in their semiotic lifelines, illuminating differences in syntactic complexity (Dependent Clause/T-Unit), lexical complexity (Lexical Sophistication and Lexical Diversity), and evaluative lexicogrammar (qualificative assessment). The complementarity of the perspectives is evident in the different trends identified in each (except for lexical complexity measures, which are significant in both perspectives).

The relationship between developmental drifts and registerial change is complex because of the possible resonances and mismatches between change across different perspectives. The general principle that ontogenesis recapitulates phylogenesis should not be interpreted simplistically as implying correspondence between general language change and language change within individuals. Only two of the linguistic changes in the TCL corpus discussed thus far in this thesis are exclusively developmental (that is, not observed in the study of cohorts and times of measurement): the increase in Coordinate Phrase per T-Unit and the increase in specialized lexical sophistication (see Chapter IV for discussion). The only measure with diachronic variation exclusively pertaining to general change (variation across times of measurement) is lexical density. The measures varying exclusively between cohorts are Dependent Clause per T-Unit and qualificative comment assessment. Evaluation, particularly modal assessment, varies along both developmental and general change

perspectives (but not between cohorts). Finally, the most complex variation occurs for lexical diversity, which increases within the developmental timescale and decreases within the general change and between cohort timescales.

The studies in this chapter have contributed a multiperspectival account of the key diachronic dimensions contextualizing scholarly language development, showing that scholars' semiotic trajectories interact in complex ways with the semiotic histories of their disciplines. The studies have also illustrated complementary approaches to the study of academic register change, including the lesser explored cohort variation perspective. The interactions between scholarly language development and other forms of language change need to be studied in more detail, desirably with larger communities and more clearly defined cohorts.

CHAPTER VII: A LANGUAGE-BASED CASE STUDY

This chapter adopts a methodological perspective complementary to that of Chapters IV through VII. While previous chapters focused on contrasting early to late career writing data in search of general developmental drifts, this chapter explores the extended trajectory of a single scholar (M.A.K. Halliday) with a view to understanding the longitudinal pathways of the language parameters examined. The chapter illustrates a longitudinal approach to Research Questions 3 and 4 (“Throughout their scholarly trajectories, to what extent does linguists’ writing change regarding its complexity, intricacy, density, and sophistication?” and “Throughout their scholarly trajectories, to what extent does linguists’ writing change regarding the use of evaluative resources for assessing propositions and entities?”). The first part provides the rationale for the selection of Halliday as a case and contextualizes his trajectory based on autobiographical accounts. Subsequent sections report on two studies performed on the Halliday corpus with a focus on 1) his development of syntactic and lexical complexity, and 2) his development of evaluative lexicogrammar and pronominal self-reference. The concluding remarks summarize the most salient findings and suggest further lines of enquiry.

7.1. Why a case study?

Cohort sequential designs model language change along within-persons dimensions (general and cohort-specific developmental change) and between-persons dimensions (variation between cohorts and times of measurement) (Schaie & Caskie, 2009). I have used the notion of “drift” -a term borrowed from Sapir (1921)- throughout this thesis to denote a significant trend for language parameters to develop in a certain direction, suggestive of favored sets of strategic adaptations in scholars’ registerial repertoires. The notion differs from that of developmental sequence in that it avoids the implication of a universal and deterministic order of linguistic change in favor of probabilistic interpretations compatible with a view of language as a complex adaptive system (Larsen-Freeman, 2006; Ortega &

Byrnes, 2008). Despite its usefulness in modelling language in a complex non-deterministic manner, the cohort sequential design illustrated in previous chapters is constrained by the strategy of contrasting early and late career language data, which fails to encompass the unfolding of scholarly trajectories over a continuous extended timeline. Longitudinal case studies are thus a necessary complement towards a more comprehensive and contextualized exploration of extended semiotic trajectories.

This chapter presents a language-based longitudinal retrospective case study of one of the scholars in the TCL corpus (Michael Halliday) with the aim of expanding understanding of the developmental drifts in complexity and evaluative lexicogrammar illuminated by the cohort sequential design. As for every language user, Halliday's trajectory reflects a combination of typicality and uniqueness. He is typical as a linguist in the general sense of having experienced a period of academic apprenticeship and having instantiated a set of academic registers to expound on and explore language-related issues. His use of language, while not necessarily typical, does remain close to the median values for most of the complexity and evaluative lexicogrammar parameters explored in this thesis, except for Mean Clause Length, Clauses per T-Unit, and Appreciation (see Table 7.1). The comparison of his early and late career scores also matches the direction of most of the changes observed for the global TCL corpus. There are, at the same time, features of Halliday's trajectory which, combined, amount to a unique profile, including his involvement as a language specialist during War World II, the fact that much of his professional and research education occurred in a non-English speaking context (China), and, most importantly, his role as the pioneer of a theoretical paradigm.

Table 7.1: Early and late career median values for complexity and evaluation features in the TCL corpus and Halliday's sub-corpus

Variable	Twentieth Century Linguists Corpus		Halliday	
	Median		Median	
	Early Career	Late career	Early Career	Late Career
Mean T-Unit Length	23.89	24.79	27.28	21.06
Mean Clause Length	13.56	13.51	16.32	11.24
T-Units per Sentence	1.15	1.16	1.27	1.30
Clauses per T-Unit	1.79	1.83	0.44	0.51
Dependent Clauses per Clause	0.42	0.42	0.37	0.41
Lexical Density (Ure)	0.50	0.50	0.48	0.49
Lexical Diversity	0.76	0.77	0.73	0.77
Lexical Sophistication (Specialized)	0.023	0.024	0.009	0.014
Probability-type modalization	7.46	8.00	7.36	6.29
Comment Assessment	9.5	5.2	8.46	3.67
Appreciation	7.00	9.00	5.05	1.48

In studying Halliday's language trajectory, the aim is not to produce descriptive generalizations extensible to a hypothetically similar group (despite the typical features noted above). Case studies in contemporary language research seek to produce *theoretical* generalizations geared towards supporting, refining, nuancing, or challenging existing theories (Duff, 2010). The theory under examination in this case posits the existence of developmental drifts associated with specific complexity and evaluative lexicogrammar parameters, and the study of a scholars' academic language trajectory can refine it by showing possible pathways for these parameters. The extended pathways may, for example, turn out to have a non-linear progression (e.g. as a curve or wave-like pattern) or to vary across instances without showing a longitudinal trend, both possibilities remaining outside the radar in an exploratory early/late career contrast. While a single scholar's extended

trajectory is not enough to generalize about the shape of parameter pathways, it does provide an opportunity to test the fit of the model and explore its implications for specific individuals in a more contextualized manner.

Halliday's extended writing trajectory is well suited to a longitudinal language-based case study on various grounds. Through his six decade-long trajectory, he published regularly as a single author on a well delimited set of issues and showed a cumulative and gradual approach to theory construction. His writings are fully accessible in edited volumes which include, among others, passages from his doctoral thesis and seminal papers from the 1960's, indicating their original date of publication (an important consideration in ensuring an accurate chronological ordering of data) accompanied by informative editorial notes. There are also various biographical resources which serve as contextualizing documentary evidence, including an autobiography (Halliday, 1998), published interviews (Martin, 2013), and papers by his colleagues reflecting on specific aspects of his trajectory (Davies, 2014; Christie, 2018), not to mention my own contact with scholars who were close collaborators of his. These features offer opportunities for a comprehensive and contextualized account of Halliday's extended trajectory which can illuminate the issues addressed in this thesis.

7.2. M.A.K. Halliday

This biographical reconstruction is based on Halliday's autobiography (Halliday, 2002), published interviews (Martin, 2013) as well as on external biographical sources used to contextualize the events in his trajectory within a broader historical perspective. The aim is to use Halliday's reconstruction of his trajectory as an opportunity to reason about the relationship between scholars' semiotic lifelines and the historical contexts in which these unfold. This section also serves to contextualize key themes in his scholarly trajectory which, in his own regard, exerted influence on his way of theorizing language.

Halliday was born on April 13, 1925, in Leeds, Yorkshire, England, within a middle-class family with both parents employed as language specialists: his father, as a dialectologist and English teacher, and his mother, as a French teacher. He recalls being interested in language from an early age thanks to his parents' engagement with grammar, literature, and language education. At his grammar school in Yorkshire, he received a language-based education largely focused on the reading of English literature classics, which was so intensive that he remembers secretly taking pleasure in the reading of Chinese classics for the sake of variety. He also remembers being dissatisfied with teachers' interpretations of literature classics and seeking, from an early age, to look for answers in linguistics, a relatively young discipline then dominated by structuralism on both sides of the Atlantic. His early contact with linguistics as a schoolboy was frustrated by the highly technical and abstract quality of the texts available to him at that time. Halliday's childhood remembrances reveal early affordances which may have influenced his eventual semiotic pathway: growing up in a family of language specialists, receiving a language-intensive education, having access to classics and linguistics textbooks. Language was, in other words, a dominant feature of his vital landscape from an early age.

Halliday's adolescence and early adulthood unfolded during War World II (1939-1945), a period of tremendous social, political, and economic agitation in the United Kingdom, Europe, and most of the world. The UK was among the territories most hardly affected by the war, losing 454.000 citizens (70.000 of them civilians), and having much of its industry and infrastructure severely battered by the German bombing campaigns. A discourse of patriotism and civic union was prevalent in the country, and sectors of civil society, including academia, were called upon to contribute to the resistance efforts from their respective fields. One of the services in great demand was the training of army personnel in the languages of adversary armies (or those of the territories occupied or

threatened by them), mostly to carry out translation and interrogation tasks. Japan's invasion of British Empire territories in the Far East and South East Asia had prompted the need to train personnel in Asian languages, including Japanese and Chinese. After initial failure to meet the demand, the School of Oriental and African Studies (SOAS) -the agency designated for the training task- sent out calls to grammar schools around the United Kingdom for male students with aptitude for learning foreign languages to join the intensive courses being offered in London. These teenagers were later affectionately called 'The Dulwich Boys' and many of them would, in the years after the war, become outstanding academic figures (Oba, 1995).

Halliday volunteered for the call at the age of 17, and, after showing aptitude for identifying Chinese tones in the admission test, he took an 18-month intensive Chinese course followed by six-month military training, and was sent to British India to support counter-intelligence tasks until 1945. The perceived need for training in Asian languages continued after the Japanese surrender in 1945, mostly focused on post-war operations in the former Japanese-occupied territories, including China. From 1945 to 1947 (aged 20-22), Halliday was assigned, along with other first batch trainees, to teach Chinese intensive courses for army officers in London. During this intensive language learning and teaching experience, Halliday recalls becoming aware of the need for adequate grammatical descriptions of Chinese that would facilitate its teaching and learning. This period of his trajectory illustrates how major catastrophes like wars can affect individuals' language experience by prompting sudden changes in their social material environment, which they cannot control but need to adapt to in different ways. Halliday was affected by World War II in his early adulthood, prior to his academic apprenticeship, and the war acted as a catalyst for his subsequent scholarly interests in teaching and Chinese grammar.

The two years after the war were also an important formative period in his political identity, during which he became a committed member of the Communist Party of Great Britain. The Party reached a maximum of 60,000 members at its peak in 1947, but paled in size compared to its continental European counterparts, and had relatively limited political influence in the government and the general public (Laybourn, 2006). The Party's official program, *The British Road to Socialism*¹⁰, curated by Stalin himself, proposed a peaceful transition towards socialism based on the promotion of antimonopoly strategies among trade unions and the decolonization of British Empire territories. Such an agenda naturally clashed with the views of more conservative sectors of British society, and proposed more radical methods than those of the center-left Labour Party, which had recently emerged as a dominant political force. Halliday's commitment to a minority left party during this period reflects congeniality with the causes of power redistribution, decolonization and linguistic anti-imperialism, issues that would resurface in his writings decades later.

After his army service, and benefiting from a grant for ex-servicemen to continue higher education, Halliday moved to China to complete an undergraduate program offered jointly by Peking University and (externally) by the University of London, working as a part time English teacher at the university's English department. He then went on to accept a Ph.D. scholarship offered by the University of Cambridge under the condition that he would complete the initial part of the degree in China. His Ph.D. supervisors were Luo Changpei, a renowned Chinese scholar in historical phonology and Sino-Tibetan studies at Peking University, and Chinese linguist Wang Li, at Lingnan University in Canton. His undergraduate and initial graduate experience occurred against the backdrop of the Chinese Communist Revolution (1945-1949), during which the UK supported the Nationalist side until 1947, and the Communist side from 1947 to 1949 (after realizing their imminent

¹⁰ <https://www.marxists.org/history/international/comintern/sections/britain/brs/1951/51.htm#2>

victory). During the period, Halliday continued to read linguistic theories of Marxist orientation after becoming critical of the Marrism (the official Soviet linguistic theory at the time). He came in contact with J.R. Firth's publications on the relationship between persons and society, finding them congenial with his interpretation of Marxism, and had meant to be supervised by Firth upon his return to England. However, the School of Oriental and African Studies, presided by Firth, had a conservative political orientation and rejected his application for admission on the grounds of his allegiance to the British communists (an inconvenient political affiliation within the global witch-hunting of communists amidst the peak of McCarthyism). In hindsight, Halliday recalls this political witch-hunting as affecting the course of his trajectory (see the underlined), but not the contents of his language theory:

Have these experiences affected your approach to linguistics, especially linguistics as doing?

MAKH: No, I don't think so. I mean, yes, okay, I was witch-hunted out of a couple of jobs for political reasons. And the British Council refused to send me anywhere at all during that time, however much people asked. But I don't think that this has affected my approach to linguistics. Linguistics as doing is part of a political approach and I didn't suffer in the way that a lot of people suffered. Of course, I've no doubt that I would have gone in very different directions had this not happened. For example, if I had been taken on and kept on in the Chinese department at SOAS I might well have stayed principally in Chinese studies and worked on Chinese rather than moving into linguistics generally. And secondly, of course, the thing that I really wanted was the job on Chinese linguistics in Firth's department. It was for purely political reasons that I didn't get that. I wish that I had that interview on tape because it would be one of the most marvellous documents ever. It would be fantastic, absolutely fantastic. (Hasan, Kress & Martin, 2013, p. 29)

Halliday did eventually gain admission to the School of Oriental and African Studies and managed to be supervised by Firth, after the sudden death of his Cambridge supervisor, sinologist Gustav Haloun. His return from China brought about important setbacks in his original plan of pursuing research in Chinese phonology: there were no Modern Chinese specialists in Cambridge at the time, and he had to switch to the analysis of a 14th century Chinese text (*The Secret History of the Mongols*). *The Secret History* was a challenging

object of study because it was an antique text for which no contextualizing sources existed and whose Chinese dialect had disappeared. Halliday was forced, by the nature of his new thesis topic, to adopt a fully logocentric approach and to give preeminence to grammatical evidence within the text itself. He made an effort to apply the principles of Firth's approach by describing the text in a series of analytical levels and reasoning about the contextual implications of its textual choices (parts of his thesis are published in Halliday (1959)). Firth's approach was, however, not geared towards the study of grammar, and despite Halliday's remembering of his relationship with Firth as unfolding on friendly terms and Firth's eventual acceptance to endorse his thesis, it is clear that Halliday's work differed from what would have been considered mainstream Firthianism at the School at that time. It is noteworthy that Halliday managed to complete his project under Firth's supervision despite the latter's mentorship style, characterized by former students and colleagues as controlling and highly assertive, and his highly conservative political orientation. Plug (2008, p.19) gives a hint of Firth's style at the School during the years immediately after the war:

Firth was downright autocratic in his requirement that 'nothing should be offered for publication without being read and approved by him' (Palmer 2002: 232). He discouraged publication in journals other than the *Bulletin of the School of Oriental and African Studies*, and his position as Chairman of the SOAS Publications Committee gave him an effective veto of any written output that he did not deem in line with his own views. Palmer (2002: 232) recalls Firth's dismissal of one of his own efforts – 'There's a lot of junk here, Palmer' – which he eventually only published in 1960, after Firth's death. Similarly, Trim (2002: 277) indicates that Firth's dominance of the Board of Studies in linguistics and phonetics in the University of London meant that UCL staff almost ceased to submit theses for research degrees, since 'they did not believe that any work not following the prosodic approach would be acceptable'. In general, Firth blocked any collaboration – or even debate – between his own and UCL staff, even after Daniel Jones' retirement in 1949.

Halliday cites as reasons for his positive terms with Firth his own willingness to stand up for his viewpoints when dealing with him, and, on an anecdotal note, the circumstance of them both being from Yorkshire. His positive relationship with Firth did not, however,

translate into an opportunity for Halliday to be employed at the School after his Ph.D., unlike for Palmer, Mitchell, and other students of Firth's.

The period comprising his academic stay in China and his research supervised at the School of Oriental and African Studies constitutes his academic apprenticeship, a formative stage during which he was exposed to key academic influences (Wang Li's phonological theories -influenced by Jespersen's theories- and Firth's poly-systemism) and strengthened his ideological engagement with Marxism. These influences mediated Halliday's approach to the issues and problems addressed in his formative years and guided the realizations that would be reflective in his own theoretical paradigm in years following completion of his Ph.D. in 1954 (age 29).

The four years following his Ph.D. Halliday spent at Cambridge, as a Chinese teacher, and as a participant in two scholarly groups: the Linguistics Group of the British Communist Party and the Cambridge Language Research Unit. The particularities of Chinese as a language lacking in morphology and the pedagogical demands of being among the first teachers of Chinese as a foreign language in a non-military context could have influenced some of Halliday's early theoretical views. Regarding Chinese, Halliday notes that its lack of morphology had induced him, since his time in Canton, to use paradigmatic analysis as a way to break into Chinese grammar and to put less emphasis on syntax than would probably have been the case if he had focused on English or any highly inflected language. His role as a language teacher, in turn, could have pushed him towards more explicit models to explain grammar to novice learners than would have been the case if he had been teaching classics to a Chinese literate audience.

Halliday's participation in the Linguistics Group of the British Communist Party between 1954 and 1958 allowed him to explore the connections between Marxism and language theory in the company of likeminded scholars. The Group was intent on producing

a Marxist linguistic theory which would favor the internationalist decolonial agenda of the British Communist Party. The events of the 1956 Hungarian Uprising and Khrushchev's denouncement of Stalin in 1956 dealt a significant blow to the influence of communism in England and around the world. One of its effects was the disaffiliation of intellectual figures in favor of new political movements, including the New Left. Halliday does not recall disaffiliating, but "backing off" from his more active political involvement of earlier years, while maintaining his commitment to the construction of a Marxist linguistics:

To me it's very much been part of this backing-off movement. In other words, I started off when I got back to Cambridge being very politically active and trying to combine the role of being a graduate student in linguistics with being active in the local Communist Party, setting up a Britain-China Friendship Association and all that. But even then there were only 24 hours in the day, and the two came to clash. I had to decide which I was better at, and I thought: "Well, I don't know. Probably there are more people who can do the political spade-work". But there's a more important point than that. What worried me at the time was the search for a Marxist linguistics. (Hasan, Kress & Martin, 1956, p. 23)

I always wanted to see what I was going towards as, in the long run, a Marxist linguistics – towards working on language in the political context. But I felt that, in order to do that, you really had to back off and go far more deeply into the nature of language. (Hasan, Kress & Martin, 2013, p. 24)

Parallel to his Chinese teaching and political activities, Halliday participated in the Cambridge Language Research Unit, convened by British philosopher Margaret Masterman. Initially an informal discussion group, the Unit grew to become an important think tank on machine translation and natural language processing until its dissolution in 1986. Some of Halliday's earliest papers from this period (e.g. *On the problems of mechanical translation*) argue in favor of the thesaurus as an efficient form of dealing with the problem of multiple meanings across languages.

Halliday participated in the Unit until his relocation to Edinburgh in 1959. Linguistics was flourishing in the United Kingdom at the time, with Firth's General Linguistics being the choice paradigm for the creation of new language departments. Edinburgh, as remembered by

Halliday, was cohesive and inviting community in which different departments coexisted harmoniously despite their differences. Edinburgh marked Halliday's incursion into a yet unfamiliar role: that of teaching linguistics. The audience then were teachers from northern England, whom he recalls being receptive and full of enriching feedback. The demands of the new role as linguistics teacher and teacher trainer, coupled with his prior learnings as a Mandarin teacher, his interpretation of Firth, and his intellectual political activities, combined to form the critical mass in which his theoretical model began to take shape.

His 1961 paper "Categories of the theory of grammar" provides a seminal overview of what was to be called "Systemic Grammar" shortly afterwards. This and subsequent seminal papers appeared in the middle of the generative linguistics boom in the United States, which had spread to other latitudes, including England, by the mid 1960's. Generative grammar made a number of categorical claims regarding the nature of language and linguistics, coupled with incisive criticism of prior and concurrent theoretical approaches. It was severely dismissive of language research based on the study of language use, which it considered overly focused on performance at the expense of what, in its regard, mattered exclusively: native speakers' "competence". Halliday (in his 1986 interview) recalls it as follows:

Chomsky's work quickly became a new establishment, and in many ways a rather brutal establishment actually. At University College London one great problem was whether it was fair on students to give them anything except establishment transformation theory because they wouldn't get a job. Now it was not as bad in England as it was in the United States, where the whole thing was polarised much more. But I certainly found it difficult in the sense that there was a lot of excitement generated in the early sixties, in relation to applications of linguistics in the School of Applied Linguistics in Edinburgh, and one or two other centres. Then this tidal wave of Chomskian linguistics washed over the United States and then England and other places. It became a very rigid establishment using all the tactics that one expects: those of ridiculing the opposition, setting up a straw man in order to knock them down and so on. "Why didn't I sort of fall in with it?" Because I found it in every way quite

unacceptable. I thought that intellectually it was unacceptable. Hasan, Kress & Martin, 2013, p. 28)

Despite the challenges placed by the highly influential and aggressively self-promoting generative paradigm, Halliday's systemic grammar gathered an attentive readership in the linguistic circles of England and the world around. His 1968 appointment as Director of the UCL Communications Research Center and his success at starting the first undergraduate program in linguistics therein -despite the ongoing budget cuts- attest to Halliday's scholarly status during the period. In his directorial capacity, Halliday had the opportunity of influencing British educational policy through his overseeing of the *Linguistics and Education Programme*, which led to the production of curricula and materials bearing the mark of Halliday's early educational thinking (Cunningham, 1971; Christie, 2018). Despite these important milestones, Halliday quit University College London in 1970 feeling dissatisfied with the ongoing intellectual climate at the time, and -except for a short academic stay in Essex in 1973- he would not live in UK territory for the rest of his life.

The early 1970's brought new roles and challenges for Halliday. In the personal realm, his new role as a parent offered an opportunity for him to extend the systemic functional model in significant ways, through the study of the language development of his son, called by the pseudonym "Nigel". This study led to a series of publications throughout the 1970's in which key notions, such as "metafunction", were introduced. His merging of parental and researcher roles was facilitated by the circumstance of his being unemployed for one year and unable to immigrate to Canada due to issues with his work visa. Linguist Ruqaiya Hasan, his wife, describes these as "difficult, perhaps fortuitously difficult, times in more than one respect" (Hasan, Kress & Martin, 1986, p. 28). Throughout the decade, Halliday participated in various visiting scholar positions in the United States, Europe and Africa, including a yearly stay at the University of Essex. Halliday was offered a tenure track position at a US

American university during this period, but refused it because he and his wife did not like the USA as a place to live.

The 1970's was also the period when Halliday began focusing on the relationship between language and society, after sensing that the dominance of generativism had diminished the readership's interest in alternative grammatical theories. He did not stop theorizing grammar during the 1970's (or during any of the periods of his career), but his way into grammar was through the study of language development and the sociological aspects of language:

I tried throughout the 1960s to sort of, how should I say, integrate myself and my thinking into what was then the dominant establishment, (and it was very dominant – the Chomskian paradigm had just washed right over), and I tried to come to terms with this and even in my publications (like ‘Some notes of deep grammar’ – Halliday 1966) to make contact with it in some way or another, and that was a total failure. So by the end of the 60s, when I'd left University College, I just saw ‘Well nobody's interested in that anyway, so I'll go back to my other love, which was language in society’. So the 70s was I think entirely, as you rightly say here, working on language and social context, and so forth, and work on cohesion which had already started. But that again was, as it were, beyond the normal bounds of grammar. (Martin & Thibault, 2013, p. 14)

In 1976 (aged 51), Halliday and his family moved to Australia, where he founded the Department of Linguistics at the University of Sydney. One of the main projects in which he participated as a consultant during the late 1970's and early 1980's was the *Language Development Project*, commissioned by the Australian government with the aim of designing curricula and materials for the transition between primary and secondary school (Christie, 2018). Halliday's main task was proposing a theoretical model of language learning to guide curriculum and material development, the result of which was his famous triad (“*Learning language, learning through language, learning about language*”) (Halliday, 1977). In 1985, one year before his retirement, Halliday published the first edition of *Introduction to*

Functional Grammar, a reference source compiling the theory of grammar and the description of English built over the past decades and adding new grammatical notions (e.g. grammatical metaphor), with subsequent editions in 1994, 2004, and 2014 (the last two in co-authorship with Christian Matthiessen). Halliday continued to publish frequently throughout the 1990's and 2000's, and remained a committed participant to academic conferences until shortly before his passing in 2018 (aged 93).

Halliday's scholarly trajectory covers at least eight experiential domains, reflected in the volumes edited by Jonathan Webster and curated by Halliday himself: grammatical theory, text and discourse, early childhood language development, the language of science, computational and quantitative studies, English and Chinese language, language and education, and language and society. These domains he articulates through the systemic functional model of language, which he began constructing in the 1960's under the name of "scale-and-category theory" (1961) and transformed into systemic functional grammar from the late 1960's onwards. Halliday's theory construction process can be described as elaborative and extensive. It is elaborative in that it started with a general outline comprising the basic elements of his architecture of language and then proceeded to fill in details at the intersection of specific dimensions (e.g. stratification, metafunction, rank, instantiation) (Matthiessen, 2007). It is extensive regarding the accrual of contexts of application which emerged alongside the social roles he occupied throughout his trajectory (e.g. language teaching, machine translation, language development, language policy, social critique).

The studies in this chapter study the unfolding of complexity and evaluative lexicogrammar in Halliday's extended scholarly trajectory, from 1958 to 2008. I have focused on these two dimensions throughout this thesis in addressing the ideational and interpersonal aspects of scholarly language development. Syntactic and lexical complexity are indirect approximations to the ideational dimensions of intricacy, metaphoricity,

technicality and specialization; and can be interpreted in terms of “syndromes” of functional features based on text analysis of illustrative samples. Evaluative lexicogrammar has, in turn, been focused in probing developmental motifs in the evaluation of propositions and entities.

7.3. Complexity in Halliday’s writing trajectory

Chapter IV identified three developmental drifts in the contrast of TCL scholars’ early and late career papers: a drift towards higher use of coordination within the nominal group, and lexical complexity drifts towards higher lexical diversity and higher specialization with respect to the discipline. These drifts represent a generalized tendency for complexity parameters to vary in a specific direction (as opposed to varying in a random non-directional fashion). Because syntactic and lexical complexity parameters are an approximate indication of the balance between experiential and logical modes of representation, the inference granted from these drifts (and from the complexity parameters lacking significant career period variation), is that TCL linguists’ writing trajectories generally maintain an equal balance between density and grammatical intricacy over time, unlike, for example, physicists, who do move towards denser nominal groups (Montemayor-Borsinger, 2001). Interestingly, as shown in Chapter VI, a trend towards densification (i.e. a more experientialized construal of reality) becomes evident across times of measurement in TCL, suggesting that linguistics does become denser over time, but not necessarily linguists’ writing.

This case study addresses the issue of syntactic and lexical complexity development over extended linguistic trajectories, providing a more nuanced perspective on Research Question 3: “Throughout their scholarly trajectories, to what extent does linguists’ writing change regarding its complexity, intricacy, density and sophistication?”. In tracing Halliday’s linguistic development over a 50-year period, this study shows some of the extended patterns of complexity measures that can occur in a scholar’s writing trajectory and makes it possible to understand scholarly development as a process of adaptation in which some linguistic

resources may emerge as directional trends and others as fluctuations related to specific trajectory phases or text instances.

7.3.1. Procedure

The study is based on a corpus of 25 texts produced by Michael Halliday throughout his scholarly trajectory, the first one published in 1958 and the last one in 2008, for a total span of five decades. I selected the texts in two-year intervals to provide a more delicate perspective on the emergence and regularity of variation of the aspects under study. I removed long citations, references, and notes from his papers to ensure the exclusive study of material reflective of his writing. The mean length of the papers is 10.000 words (with a standard deviation of 3.000 words).

I used the web-based complexity analysis platform by Ai and Yang 2010 to obtain lexical and syntactic complexity measures for each of the texts. The analysis combined descriptive plotting of time series data (with *ggplot2* R package) with manual analysis of text instances corresponding to major trends or fluctuations observed. *Ggplot2* fits a smooth line and confidence intervals to time series plots using the Locally Estimated Scatterplot Smoothing (LOESS) method, a non-parametric smoothing technique that does not assume data point linearity, capturing curves, fluctuations and other non-linear patterns in a more accurate manner. The smoothing features make the plots more easily interpretable in terms of possible trends while flagging instances differing considerably from the rest (outliers).

I used manual text analysis, as in previous chapters, to understand the functional mechanisms underlying variation in the plots, paying special attention to instances occurring within plot regions showing upward or downward trends. In interpreting syntactic complexity variation, I focused on the complementarity between logical choices at the clause complex and clause rank, examining their relationship with unit length and grammatical intricacy at different points of Halliday's trajectory. Logical lexicogrammar includes the systems of

TAXIS and LOGICO-SEMANTIC RELATION, which interlock in the complexing of clauses, as shown in Table 7.2. I analyzed TAXIS and LOGICO-SEMANTIC RELATION choices in two complete papers by Halliday: “Class in relation to the axes of chain and choice in language” (1963) and “On grammar and grammatics” (1996)¹¹. The first round of analysis classified each of the orthographic sentences as clause simplexes or clause complexes. The second round focused on the type of TAXIS occurring within clause complexes (parataxis or hypotaxis). Finally, I analyzed the logico-semantic relation between the primary and secondary clauses in parataxis, and between the independent clause and the main dependent clause in hypotaxis.

Table 7.2: LOGICOSEMANTIC RELATION and TAXIS (Based on Halliday & Matthiessen, 2014, Ch. 7)

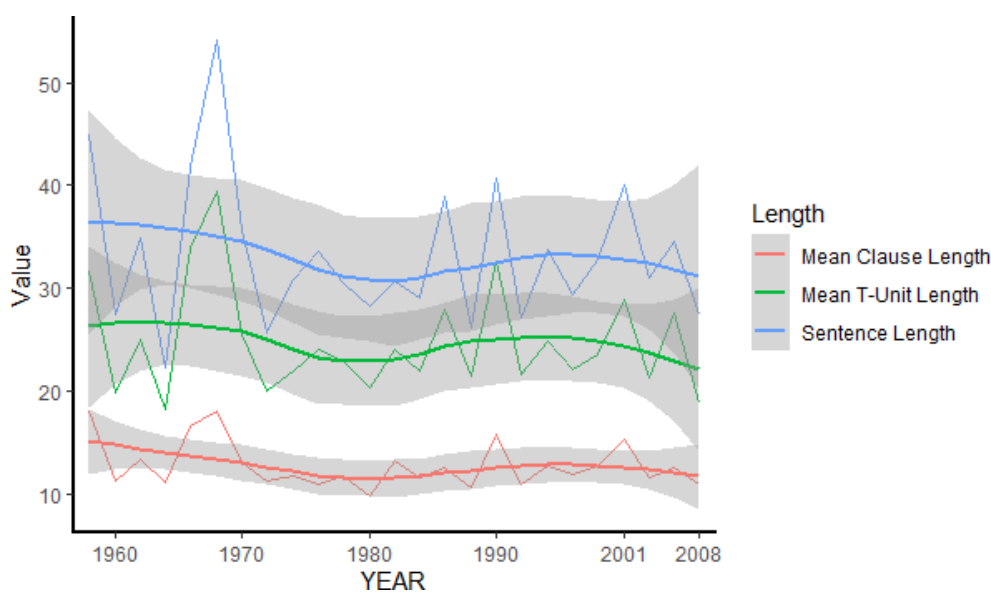
LOGICOSEMANTIC RELATION			Parataxis	Hypotaxis	
				Finite	Non-finite
Expansion	Elaboration	Exposition	She wasn't a show dog; I didn't buy her as a show dog.		
		Exemplification	We used to have races – we used to have relays.		[He was an] absolute loner of a man, pursuing some dream of exploration in the jungles.
		Clarification	They used to work over here; that's how they met.	'Here' said Nana, who ruled the nursery.	I worked for a local firm at that time, selling office equipment.
	Extension	Addition	He'd been a medieval history student in college and I was interested in medieval literature, too.	And yet Frank grows up, while Huck never grew up.	Besides being gifted with literary talent, Amir Khusrau was a musician, too.
		Variation	The vortex is not a uniform cylinder but has a shape that varies with altitude.	Camera pulls back to show Kane and Susan in much the same positions as before, except that they are older.	Instead of finding the perpetrators, they criminally charged the Earth First! activist, who was left crippled for life.
		Alternation	Can I go on the computer, or have something to eat.	If you haven't lost it, then it's in that cupboard.	We used to go away at the weekend, taking all our gear with us.
	Enhancement	Temporal	I served in World War II and then [= 'subsequently'] I went to Yale.	By the time I was to page sixty, I felt a certain click.	Follow the pathways around the landscaped gardens and over bridges before resting at the Tea House

¹¹ Matthiessen (P.C., August 20, 2020): “As an aside – but a relevant in Michael’s case: both these papers were prepared as written documents from the start, whereas many of his later papers started life as papers written to be read aloud, which makes a significant difference of course.”

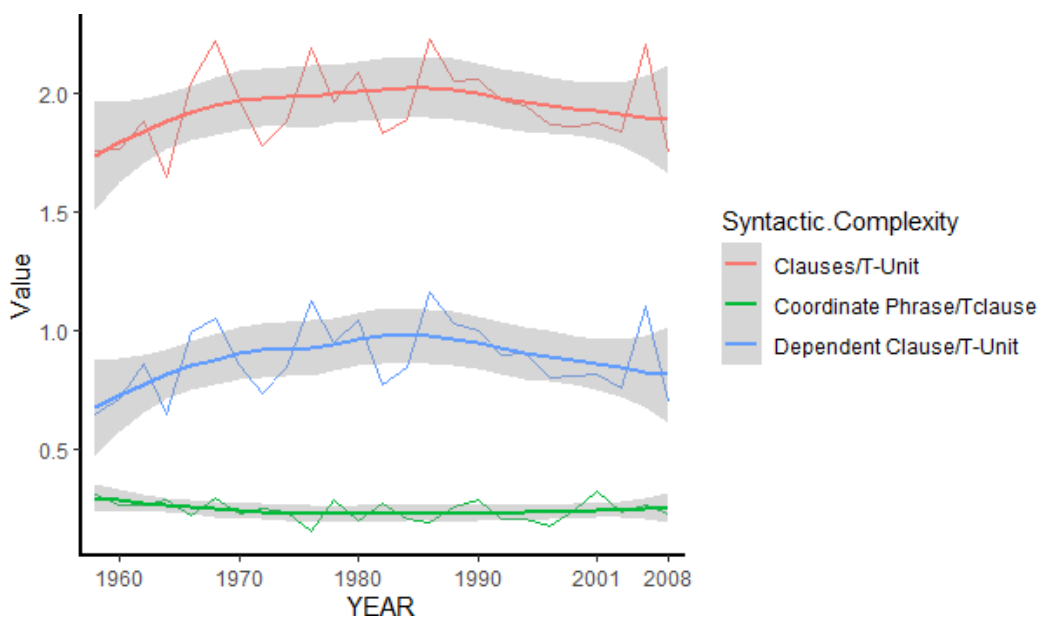
		Spatial	He fell onto a sea of emerald grass <u>and there</u> he died.	Arrows never fall <u>where he places himself.</u>	—
		Manner	Keep on subtracting the difference, <u>and in that way you will arrive at the correct figure.</u>	<u>As it happens.</u> Margo was an extremely rich woman.	Bacteria can also aid chemical precipitation of calcite <u>by making the water more alkaline.</u>
		Causal	In her books, Tove Jansson spoke initially to children, so the hero is himself quite young.	The problem isn't simply going to go away because people are laughing.	This view was not empirically based, having arisen from an a priori philosophy.
		Conditional	I have stress at work, and then I sail and fly.	If I had a different view, then perhaps I would write more novels.	I've found that I can't go more than three days without doing something physically invigorating.
Projection	Mental		'The gods must watch out for Kukul,' he thought to himself.	So you believe that the short story is better at dealing with real-life, human emotions.	—
	Verbal		'What is REAL?' the Rabbit asked the Skin Horse one day.	Coming back to Clinton and Blair – I would certainly say <u>that I regard them as criminals.</u>	—

7.3.2. Findings

Figure 7.1. shows the diachronic unfolding of length-based measures in Halliday's writing trajectory. The three measures (clause length, sentence length, and T-Unit length) coincide in their peaks and troughs, illustrating the collinearity of these indexes mentioned in Chapter IV. No single upward or downward pattern is apparent, but three major regions of high variation can be observed during the 1960's, the late 1980's, and the early 2000's. The 1960's values are particularly striking, showing a large drop immediately followed by a large spike.

Figure 7.1: Length-based measures in Halliday's writing trajectory

Unit length measures appear to vary mostly between instances, without any trend being evident from the smooth lines in the plot, a finding that supports the lack of a developmental drift observed for these measures in Chapter IV. Because unit length measures are approximate indications of grammatical intricacy (see Chapter IV), it makes sense to note that specific regions of Halliday's trajectory characterize themselves by a more intricate style with lengthier clauses and clause complexes. When considering the unfolding of syntactic complexity measures in Figure 7.2, it is possible to observe that Clauses per T-Unit and Dependent Clause per T-Unit follow a discontinuous upward trend until the 1980's (with spikes during the early 70's) and then decline through the 1990's and 2000's. The pathway for syntactic complexity measures thus differs from that for length-based measures, except for the late 1960's papers. More interestingly, despite the outlying instances, both syntactic complexity measures describe a curve pattern peaking during the 1980's and declining throughout the 1990's, which suggests a possible non-linear developmental pathway (see excerpt 7.1 further below).

Figure 7.2: Syntactic complexity measures in Halliday's writing trajectory

In both unit length and syntactic complexity measures, the largest spike occurs at the end of the 1960's, the data points corresponding to Halliday's *Notes on transitivity*, a tryptic of papers published in 1966, 1967 and 1968 in which he introduces seminal grammatical notions¹². The 1960's was one of Halliday's most intensive theory construction periods, during which he proposed the basic tenets of the systemic functional model (Matthiessen, 2007). In the *Notes* papers, the outstanding length of units stems from various linguistic choices, most prominently those associated with clause complexing and nominal group elaboration. Excerpt 7.1 illustrates these choices in text, with the analysis of its constituent clause complexes in terms of taxis, including parataxis (the chaining of clauses of equal status in serial 1 ^ 2 ^ 3 sequences) and hypotaxis (the binding of an independent nuclear clause with one or more dependent clauses in $\alpha ^ \beta ^ \gamma$ sequences) (Halliday & Matthiessen, 2014, Ch. 7).

¹²Matthiessen (P.C., August 20, 2020): "Michael had to condense the papers at the request of the editor of the journal, John Lyons."

(7.1)	Expounding: categorizing: grammatical theory	Logical structure
1)	While there is relative independence between them, [[as compared with the high degree of interdependence among the options within each set]], the two cannot be entirely isolated from one another in a description of the syntax of the clause.	$\times\beta \times\gamma \alpha$
2)	They have often been treated rather separately, perhaps because thematic structure has often been looked upon as a kind of secondary structure imposed by the speaker for the sake of stylistic variety; and this in turn may be for various reasons.	$1(\alpha \times\beta) \times 2$
3)	It is sometimes assumed, for example, that clauses which are agnate thematically are paraphrases of one another whereas clauses related in other ways are not ; and in some languages, including English, many thematic options are realized by <u>structural means</u> <u>[[somewhat different from those used to express the experiential meaning of the clause, for example, the use of phonological prominence of the sort referred to as tonicity to realize information focus]]</u> .	$1(\alpha \wedge \beta(1 + 2)) + 2$
4)	But the latter is a low-level, language-specific distinction; and the former assumption seems to depend on a consideration of the clause in isolation from any context, whereas it is in relation to the context that thematic variation is meaningful: it seems doubtful whether one could insist, for example, that <i>it was yesterday John painted the shed</i> and <i>the one who painted the shed yesterday was John</i> , taken in context, have the same meaning, while at the same time asserting that <i>John painted the shed yesterday</i> and <i>John was painting the shed yesterday</i> , or the modally agnate pair <i>John painted the shed yesterday</i> and <i>did John paint the shed yesterday?</i> have not.	$1(1 + 2(\alpha \wedge \beta)) \wedge = 2 < \alpha \wedge \beta(\alpha \wedge \beta)$

The clause complexes in the excerpt combine parataxis at the higher level of structural organization with hypotaxis for the linkage of clauses and the expansion of nominal groups. Clause complex 3, for example, is a lengthy instance combining two T-Units with additive parataxis (1 + 2), the first T-Unit consisting of a projection complex ($\alpha \wedge \beta$) which, in turn, projects an additive clause complex (1 + 2) ; and the second T-Unit consisting of a simple clause with a long nominal group (underlined), in which a non-finite elaborative clause is embedded. The length of clause complex 3 is mostly driven by the choice to link the

two T-Units paratactically (instead of separating them) and the choice to elaborate the nominal group *structural means* in the second T-Unit with an embedded clause. These choices arguably have a discursive (textual) motivation: linking the two T-units reinforces the likeness of their experiential content in regard to the rhetorical purpose of elaborating the *various reasons* mentioned in clause complex 2; and elaborating *structural means* with an embedded clause facilitates the discursive continuity of the concessive rhetorical strategy at play.

Clause complex 4, even longer than the previous one (excluding the example clauses inside), is an instance of paratactic exemplification, in which the secondary clause makes the primary clause more specific by providing examples. The combination of rhetorical strategies involving concession and argumentation with elaboration within nominal groups and clause complexes largely explains the outstanding difference in unit length for Halliday's late 1960's papers. Unit length fluctuating across instances without an observable trend in Halliday's extended trajectory is coherent with the lack of developmental significance observed for unit length parameters in Chapter V: mean unit length is largely driven by contextual needs at the instance level of instantiation, although sets of instances for specific periods may reflect period-specific increases.

It is illustrative to consider the relationship between unit length, syntactic complexity, and logical lexicogrammar in *Class in relation to the axes of chain and choice in language* (1963) and *On grammar and grammatics* (1996). The texts differ in unit extension and syntactic complexity values: mean T-Unit length is 31.5 words in the 1963 paper and 24.3 in the 1996 paper, and the mean number of Clauses per T-Unit is 1.62 for the former and 1.76 for the latter. Table 7.3 shows a normalized frequency comparison of TAXIS and LOGICOSEMANTIC RELATION choices in the two texts. Aspects such as the use of

enhancement and projection nexuses, and the frequency of simplexes, remain relatively stable, while elaboration and hypotaxis are slightly less frequent.

Table 7.3: Ideational meaning in introductions in Halliday (1963) and Halliday (1996) (Normalized to 100 clauses)

	Halliday (1963)	Halliday (1996)
Simplexes	9.67	13.40
Parataxis	29.03	48.45
Hypotaxis	33.87	24.73
Elaboration	33.87	25.77
Extension	6.45	13.40
Enhancement	14.51	11.34
Projection nexuses	4.83	4.12

The only major difference concerns the use of parataxis. The 1996 text uses this tactic choice more consistently, with entire phases involving clusters of paratactic nexuses such as those in 7.2, 7.3 and 7.4. The logico-semantic relations are realized congruently by structural conjunctions, or linkers, such as *and*, *or* and *so*. Parataxis in the 1963 text occurs mostly as a secondary mode of clause complex organization, associated to the meaning of counter-expectation or mixed within more intricate logico-semantic complexes involving projection or further expansion (7.5).

- (7.2) It is easy to see where this kind of slippage takes place: astronomers observe stars, and an expression such as astronomical observations could equally well be glossed as ‘observations of stars’, or as ‘observations made during the course of doing astronomy’.
- (7.3) So now psychology is the study of psychology; and an expression such as Australian psychology is unambiguously ambiguous.
- (7.4) The study of language is called linguistics; grammar is part of language; so, within that general domain, the study of grammar may be called grammatics and we can do this as linguists, we can take language for granted, as sociologists take society for granted.

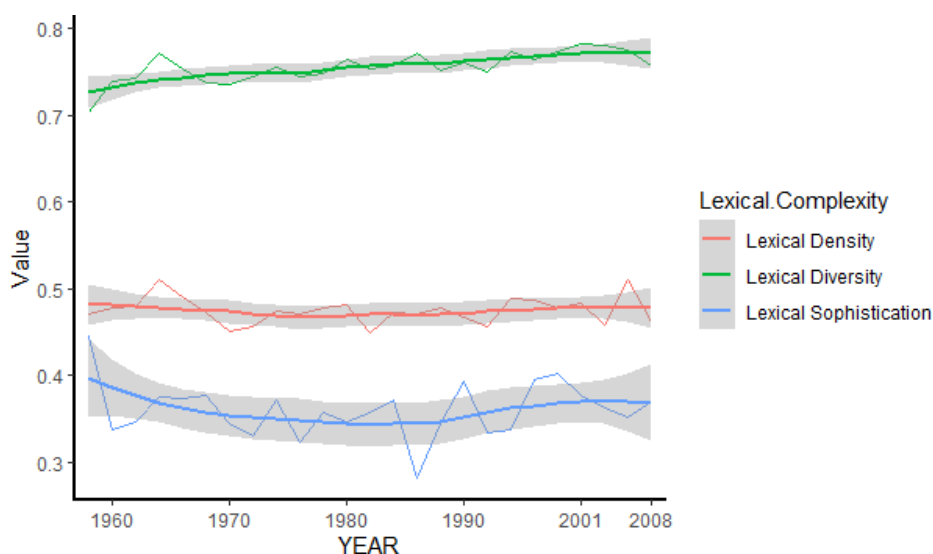
- (7.5) There are, however, clear instances where syntactically defined sets do not coincide with morphologically defined sets; and it would probably be generally agreed that, whatever the status accorded to the latter, the former cannot be ignored.

This preference for parataxis and congruent realization of logico-semantic relations points to what could be considered a more spoken-like style in the 1996 paper¹³. The contrast could partly be motivated by differences in the field of activity instantiated by the texts. The 1963 paper is primarily driven by the purpose of putting forward proposals for linguistic categorization and its use of hypotaxis reflects, as in prior examples, the need to acquaint readers with theoretical entities newly introduced. The 1996 paper mostly focuses on recapitulating prior theoretical positions in developing new arguments, thus being less compelled to contextualize or exemplify the entities therein. Differences in unit length and syntactic complexity are symptoms of the cyclicity of the scientific knowledge construction process, reflected in instancial differences in the grammatical intricacy of texts, but not in a continuous upward or downward trend.

The findings for lexical complexity in Figure 7.3 add further nuance to the picture. Lexical diversity reflects a tenuous but continuous increasing pathway, indicating the longitudinal accumulation of new lexical items, whereas lexical density and lexical sophistication observe minor instancial variations without a consistent trend:

¹³ Matthiessen (P.C., August 20, 2020): “There was certainly a deliberate change over the years. By 1996, Michael would very likely have written the chapter so that it could be read aloud – assigning appropriate information structure.”

Figure 7.3: Lexical complexity measures in Halliday's writing trajectory



As explored in the follow-up studies in Chapter IV, variation in lexical complexity is too subtle to be pinned down to a specific lexical item category but it can be associated, in a general sense, with the accumulation of experiential meanings throughout scholarly trajectories. Halliday's lexical diversity pathway coincides with the general drift identified in Chapter IV, and it is interesting to explore how the subtle progression towards more lexically diversified prose reflects in texts from different regions of his trajectory. Analysis of *Class in relation to the axes of chain and choice in language* (1963) and *On grammar and grammatics* (1996) points possible underlying factors.

The *Class* paper characterizes itself by a focus on a delimited set of theoretical entities, the most frequent ones being *class(es)* (n= 105), *structure* (n= 64), *nominal group* (n= 55) and *clause* (21). Its dominant field of experience is clearly grammatical theory. The text employs frequent repetition, with 75.63% of its content made of terms repeated five or more times, and only 9.65% tokens used only once. Most of the repetition, however, corresponds to general use lexis and only 19.00% of repeated terms feature as technical terms. *On Grammar and Grammaticals* (1996) is also a highly dense theoretical paper focused

on the field of grammatical theory. With a lexical diversity score of 0.78, it is slightly more lexically diverse than the *Class* paper, which has a score of 0.72. The percentage of terms repeated five or more times in this paper is slightly higher, at 79.05%, and its percentage of single use terms is 8.63%, slightly lower than that of the *Class* paper. Its percentage of single use content terms is, however, slightly higher, at 8.21%. This simple quantitative analysis points to two possible areas of differentiation that might explain the subtle lexical diversity advantage of the 1996 paper: its lower amount of highly repeated terms and its higher proportion of single use content terms (*architecture, artificial, ascriptive, authenticity, casual*).

Although both texts show a high amount of repetition, the 1963 stands out for the larger amount of highly repeated terms proportional to its size and a relatively smaller number of single use terms. With 105 and 64 hits in the text, *class* and *structure* stand out as the most repeated content items in the text and, therefore, the entities with the most elaborate construal. Analysis of these instances in the text shows that they are predominantly expanded by elaboration, that is, by linguistic choices which specify their type or clarify their meaning. The most common elaboration occurs in nominal groups with the target entity as Head and a Classifier denoting the specific class, i.e.: *class: syntactic class, one-member class, primary class; structure: group structure, clause structure, place-ordered structure, depth-ordered structure*. The elaboration of target entities also occurs in nominal groups with post-Deictic as Head, in which case the class membership of the entity is refined, i.e.: *class: the category of class, the term class, the notion of class*. The elaboration of target entities also occurs at the clause rank, in clauses denoting their expansion in terms of taxonomic delicacy (7.6, 7.7) or definition (7.8, 7.9). Definitions are the only instances in which the target entities occur in nominal groups functioning as Subject.

- (7.6) When we take the class further in delicacy, however, and recognize secondary classes, some of these more delicate classes are chain classes and others are choice classes.
- (7.7) But the patterns they display are typical in their complexity: **a given class** breaks down by simple subdivision into a system of more delicate classes, but the same original class will also subdivide in a number of different ways, so that many dimensions of classification intersect with one another.
- (7.8) Here **class** would be the name given to a set of items which are alike in their own structure: that is, in the way that they themselves are made up of items of lower rank.
- (7.9) **A structure** is an ordered arrangement of elements in chain relation, such as the English clause structure predicator + complement (for example *fetch the ink*).

The high amount of repetition in the *Class* paper engenders lexical diversity by the introduction of classes and subtypes of theoretical entities, but at the same it constrains it by its focus on the construal of a few target entities. Ideational metaphor is not a prominent strategy in either text, but its usage shows some interesting differences. In the 1963 text, the ideational metaphors fulfil the more traditionally recognized function of “distilling” meaning as abstraction and carrying forward a line of reasoning by backgrounding previous information (e.g. Wignell, Martin & Eggins, 1989). In 7.10, it is possible to observe that, once the metaphor “potentiality of occurrence” is introduced, it is subsequently defined in a downranked elaboration nexus (this metaphor does not derive from previous discourse; it is imported into the text in what appears to be an attempt at making it a technical term). In 7.11, the metaphor “use” is employed in two successive messages in thematic position and expanded in the third turn by a metaphor of extension-disjunction (*alternative*), indicating the progression of a cumulative argument.

- (7.10) By this I mean that the concept is introduced into the description of a language in order to bring together those sets of items that have the same **potentiality of occurrence**; in other words, sets of items which are alike in the way they pattern in the structure of items of higher rank.

(7.11) Likewise we might have word–classes defined by group structure, or clause–classes by sentence structure. This use of the term “class”, to name a category defined in some way by its relationship to a higher structure, is by no means universal in linguistics; [...] The alternative to this **use** of the term “class” is to consider morphological classification.

The ideational metaphors identified in the 1996 text also package meanings of previous discourse and carry lines of argument forward, but they have an added evaluative connotation. In the logogenetic unfolding of the argument, metaphors are used to appraise the contents of previous discourse and to elaborate the arguments supporting the textual nucleus. This evaluative use of ideational metaphor is not found in the 1963 text, despite both texts being expositions. The evaluation can be realized by an Epithet (7.12) or by a metaphorical noun (7.13):

(7.12) (E28) Likewise linguistic theory is ‘theory of language’, but it is just as plausibly ‘theory in the field of linguistics’. To a certain extent this is a **pathological peculiarity** of the English language (...)

(7.13) (E29) So now psychology is the study of psychology; and an expression such as Australian psychology is unambiguously ambiguous. Such **confusion** is not normally found for example in Chinese (...)

The picture emerging from Halliday’s trajectory in one whereby unit length parameters vary instantially, syntactic complexity varies non-linearly, and lexical diversity reflects a cumulative pathway. The relative stability of lexical density suggests that the accumulation of meanings throughout Halliday’s trajectory does not entail higher nominalization or metaphoricity over time¹⁴. Three variation types can be identified in the unfolding of complexity measures in Halliday’s writing: non-directional variation without

¹⁴Matthiessen (Personal Communication, August 20, 2020): “When we discussed this, Michael told me he’d made a conscious effort in his own writing to control the degree of (ideational) grammatical metaphor.”

fluctuations (pronoun density, repetition), non-directional variation with fluctuations (length-based measures, lexical density, lexical sophistication), and directional (upward or downward) variation (lexical diversity, addition, pronoun density). Interestingly, the directional trends in Halliday's trajectory coincide with some of the developmental drifts identified in Chapter IV. The upward increase in lexical diversity and additive conjunctions observed in Figure 7.3 coincides with the increasing drifts for these aspects. The complexity measures failing to show a statistically significant drift in Chapter IV appear in Halliday's trajectory as non-directional trends with or without fluctuations, suggesting that these measures may have either show stability or fluctuate for specific text instances. For example, the major spikes in T-Unit length during the late 60's in Figure 7.1 stem from a specially high level of grammatical intricacy in Halliday's earliest theoretical papers, functionally motivated by the need to elaborate on theoretical entities, but this strategy does not amount to a steady developmental trend.

7.4. Evaluative lexicogrammar in Halliday's writing trajectory

This study addresses Research Question 4 ("Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities?") through the analysis of evaluative lexicogrammar resources in M.A.K. Halliday's extended writing trajectory. This perspective complements the approach in Chapter V, which focused on the identification of developmental drifts in evaluative lexicogrammar use within and across scholar cohorts in the Twentieth Century Linguists' corpus. The identified developmental drifts include an overall reduction in evaluation in late career writing, especially significant for comment assessment and negative appreciation. TCL linguists drifted, in other words, towards an apparently less evaluative style later in their career, or, in Martin and White's (2005) terms, a more "monoglossic"

voice. This finding I interpreted as reflecting the “interpersonal first” principle (Halliday, 1993) at an ontogenetic scale, underscoring the strategic importance of evaluation in taking on new roles and constructing their associated identities.

When considering extended trajectories by individual scholars, the picture becomes more complex due to the variability of linguistic features across text instances, as observed in Section 7.2 with complexity values. The issue to be explored in this study is whether extended scholarly trajectories can reflect these drifts (or any form of directional change). The interpersonal lexicogrammatical resources investigated are almost the same as those in Chapter V, including probability-type modalization, modulation, and different types of comment assessment. In addition, this study explores Halliday’s use of self-reference through first person singular and plural pronouns (*I/we*), with the aim of tracing the roles the author enacts and construes throughout his trajectory.

7.4.1. Procedure

This main part of the study is based on the automatic frequency counts of lexicogrammatical resources for probability-type modalization, modulation and comment assessment, and pronominal self-reference in 40 papers by Halliday published between 1958 and 2002. The target linguistic features, presented in Table 7.4, are well suited to software-assisted frequency counts due to their higher degree of grammaticalization, than more open-ended lexicalized systems, such as ATTITUDE, which is excluded from the present analysis. I used AntConc 3.5.7 to search for each linguistic feature using the concordance function and then extracted each concordance set as a .txt file to manually verify each instance. Manual verification was important in ensuring that each of the concordanced instances corresponded to their presumed grammatical class. For example, of the 2647 instances of “*I*” in the concordances, only 938 classified as pronominal self-reference, while the rest appeared in unrelated uses (e.g. in example clauses, as Roman numeral, or as capitalized *I*’s in titles). It

also served to correctly classify instances of modal verbs which can function as probability-type modalization or as modulation. I normalized the frequency counts for each text to 1.000 words and plotted the resulting time series in the `ggplot2` R package. To facilitate the interpretation of time series data, I employed the `stat_smooth` parameter in `ggplot2`, which fits a smooth line model with confidence intervals based on the Locally Estimated Scatterplot Smoothing method (LOESS) (see Section 7.3.1).

To explore the changes in Halliday's trajectory in text, I analyzed two complete articles published by Halliday in his early and late career, selected because of their shared features as expounding texts with a focus on grammatical theory: "Class in relation to the axes of chain and choice in language" (1963) and "On grammar and grammatics" (1996) (these are the same texts analyzed in 7.3 above). The analysis proceeded manually, on a clause-by-clause basis, considering the interpersonal grammatical resources and analytical procedure discussed in Chapter V. For each clause, I considered the speech function being realized either congruently or metaphorically (statement, question, command, offer), the use of congruent and metaphorical evaluative resources of probability-type modalization and comment assessment.

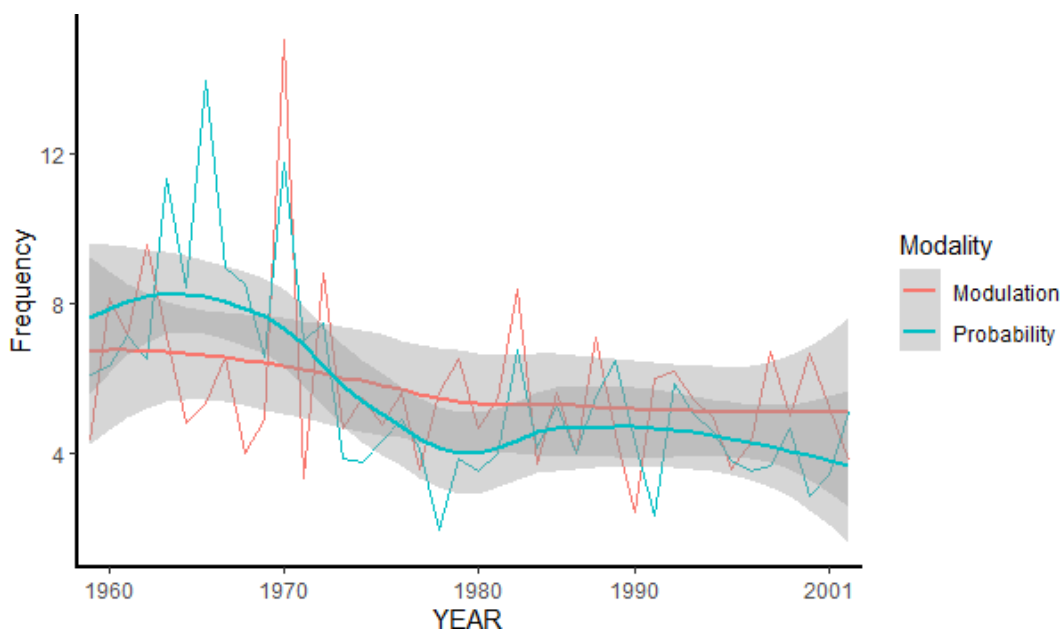
Table 7.4: Evaluative resources explored in Halliday corpus (based on Halliday & Matthiessen, 2014, Ch. 4, 10)

Assessment type	Domain of manifestation							
	Clause						Nominal group	
	Clause + Clause			Clause			Post-Deictic	Epithet
	Verbal clause	Mental clause	Rel. clause	Modal Adjunct	Finite	Pred.		
Modality: Modulation	<i>I ask you to/ I tell you to</i>	<i>I want you to</i>	<i>it is possible/ necessary/ desirable (for) to</i>		<i>can, could, should, must</i>	<i>have to, need to, be supposed/ required/ allowed/ willing/ keen/ eager to</i>		<i>necessary, obligatory, imperative,</i>
Modality: Modalization: Probability		<i>I think, I believe, I assume</i>	<i>It is likely/ possible/ probable/ certain that</i>	<i>perhaps, probably, certainly, possibly,</i>	<i>can, could, may, would, must</i>	<i>be likely/ certain to,</i>	<i>possible, probable, certain, likely, unlikely, improbable</i>	
Propositional On whole: Asseverative		<i>I + not + doubt</i>	<i>it is natural/ obvious/clear/ inevitable indubitable that</i>	<i>naturally, inevitably, of course, doubtless, indubitably, clearly, plainly</i>			<i>obvious, clear. plain</i>	<i>natural, inevitable, indubitable</i>
Propositional On whole: Qualificative	<i>they say, It's said, I argue, it is argued</i>	<i>I (not) expect,</i>	<i>it is predictable/ arguable/ surprising/ wonderful/ funny/ unfortunate that I'm confident that</i>	<i>predictably, surprisingly, presumably, allegedly, supposedly, arguably, sadly, funnily, importantly</i>			<i>alleged so-called presumed</i>	<i>surprising, predictable, wonderful, fascinating, important, sad, unfortunate</i>
Speech-functional Unqualified	<i>I admit, I assure, I tell you</i>			<i>truly, honestly, seriously, admittedly, to be sure, actually, really, in fact, as a matter of fact</i>				
Speech-functional Qualified	<i>I tell you + in general terms, I tell you + in terms of the law</i>			<i>generally, broadly, roughly, by and large, on the whole, frankly, personally, for my part, as far as I am concerned</i>				

7.4.2. Findings

The time series graph in Figure 7.4 shows Halliday's use of modulation and probability-type modalization throughout his trajectory. The smooth lines indicate a decrease for both evaluative resources, reflected for modulation as a continuous descending line, and for probability-modalization as a descending curve with an upper pulse in the late 1960's. The data show no cyclicity or periodicity. A major upper outlier occurs for the 1970 datapoint for modulation, and in the 1966 and 1970 datapoints for probability type-modalization.

Figure 7.4: Modality in Halliday's trajectory (normalized= 1.000 words)



The texts with the highest frequency of probability-type modalization are *Notes on deep grammar* (1966), *Functional diversity in language* (1970), and *Class in relation to the axes of chain and choice in language* (1963). *Some notes on big grammar*, a seminal theoretical paper, employs medium value probability-type modalization predominantly in relational clauses concerned with the assignment of attributes and classes. The meaning appears not to be uncertainty in the traditional verifactive sense, but rather, in Martin and

White's (2005) terms, the entertaining of dialogic possibilities in the backdrop of co-existing linguistic theories. For example, in excerpt 7.14, the instances of probability-type modalization (bolded) serve to recognize alternative classifications of syntagmatic structures (*may take the form, perhaps m^h, would appear as mixed types*) and alternative interpretations (*may be thought of, might be given X interpretation*). In the latter case, the instances are borderline between propositions and softened proposals: *might be given conventional interpretations* could be reworded as *we could interpret them conventionally*. Excerpt 7.15, showing instances of medium-value modalization used in identifying clauses defining newly introduced technical terms, illustrates the relationship between probability-type modalization and the introduction of technical terms in Halliday's earlier writings.

- (7.14) The ordering that is ascribed to structure **may be thought of** in dependency terms, or in constituency terms as an underlying sequence which does not (necessarily) correspond to syntagmic sequence, or as mere co-occurrence or absence of ordering. In all cases it is of a different nature from syntagmic sequence, in that the components are functions, not sets of items. If (with Lamb) we use to represent configuration, this being interpreted as “unordered with respect to syntagmic sequence, whether or not any other form of ordering is considered to be present”, then a structural representation **may take** the form m:h, or interchangeably h:m (modifier–head); this contrasts with a syntagmic representation of the form adjⁿ (adjective followed by noun). Representation such as m^h and adj:n **would then appear** as mixed types, where deep (structural) labels are attached to surface (syntagmic) relations, or vice versa. These **might be given** conventional interpretations, **perhaps** for example m^h as “modifier–head structure with realization by sequence alone” (i.e. where modifier and head are realized by the same class), adj:n as “modifier–head structure with realization by class alone” (i.e. where the classes **may occur** in either sequence); but these **would be** merely a shorthand for combining two types of representation.
- (7.15) The alternative to this use of the term “class” is to consider morphological classification. Here “class” **would be** the name given to a set of items which are alike in their own structure: that is, in the way that they themselves are made up of items of lower rank. A word–class **would then be** a set of words having a certain similarity in their own formation out of morphemes.

These excerpts may be contrasted with excerpt 7.16, from the 2001 text *Is the grammar neutral?*, where instances of probability-type modalization are rare, mainly because

this paper is not centrally concerned with proposing a taxonomy. It is interesting to note how the excerpt contains definitions and classifications of technical terms (*information, language, higher-order semiotic*) which are not modalized as the ones in the other excerpts are. Instead, the author relies on polar statements (e.g. *language is* as opposed to *language would be*) and more assertive wordings (*let us refer, we can distinguish*) to create a prosody of established or accepted knowledge.

- (7.16) But we can distinguish here two classes of information. One class of information is that typified by the genes: coded instructions whose presence marks the biological off from the physical within the material domain. The other class of information is that which takes the form of consciousness, as this is brought about within the brain. Let us refer to this latter class of information as "meaning", and to systems-&-processes of this kind as "semiotic". Language is a semiotic system; moreover, following Edelman (1992), who refers to human (post-infancy) consciousness as "higher-order consciousness", we can call it a higher-order semiotic. A higher-order semiotic is one which has a system of coded information (a lexicogrammar) at its core. This enables it to transform matter into information. The lexicogrammar is the powerhouse of language: the source of its semiotic energy.

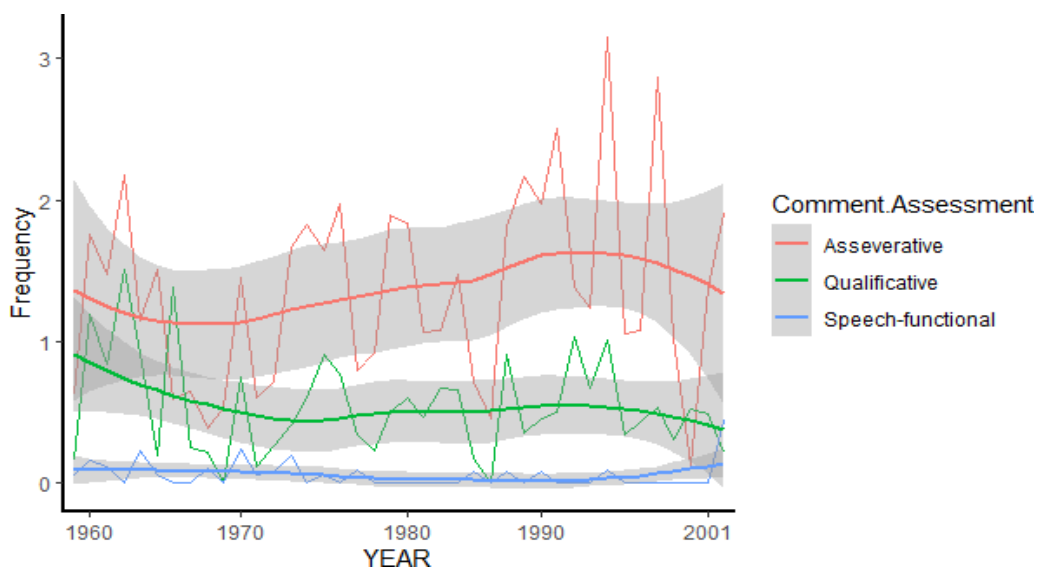
Probability-type modalization, at least in Halliday's case, associates with the formulation of theoretical proposals and the technicalization of terms, both activities being foregrounded earlier in his career. The fact that probability-type modalization shows no significant developmental or cohort-specific effects in the Twentieth Century Linguists' corpus suggests that the decline in this lexicogrammatical resource is a characteristic trait of Halliday's trajectory, but not of TCL scholars' community. The same holds true for modulation (the evaluation of proposal in terms of degrees of obligation or potentiality/ability), which shows a milder decline with far more irregular pulses and major outliers for 1970 (the *Functional diversity* paper) and 1962 (*Linguistics and machine translation*). Modulation in *Functional diversity* paper is mostly of the ability type, referring to constraints in grammatical structure (thus internal in orientation) and not to the grading of proposals. The use of modulation in *Linguistics and machine translation* is more interesting because it includes a variety of proposals modulated by possibility, necessity and strong

obligation (excerpt 7.17), motivated by the purpose of the paper to persuade readers of the value of linguistic theory in machine translation. Apart from these two papers, which figure as major outliers, modulation in Halliday's trajectory fluctuates irregularly across instances without a clear chronological pattern.

- (7.17) Grammatical equivalence between two languages **can be** displayed most adequately, therefore, by means of quantitative studies of the grammar of each. Such equivalence **must furthermore be related** to the rank scale: the scale of grammatical units, of which the word is one. These units are the stretches into which language text is cut when grammatical statements are being made about it. Again they are not universals: they **must be recognized** afresh for each language. When we compare two languages **we cannot link** the languages as a whole; we select for comparison items from within them — and not only items, of course, but abstract categories (classes, structures and so on) of which the items are exponents. These items, and the categories set up in abstraction from them, **must be related** to the grammatical units of which they are members.

Figure 7.5 shows the time series for asseverative, qualificative and speech-functional comment assessment in Halliday's writing trajectory. The smoother lines indicate a non-linear curve for asseverative assessment (with major outliers throughout the 1990's), a descending line for qualificative assessment, and a stable line for speech-functional assessment.

Figure 7.5: Comment Assessment in Halliday's trajectory (normalized= 1.000 words)



The smooth line for asseverative assessment above is interesting because it shows a non-linear path for an evaluative resource failing to show significant developmental, cohort or time of measurement effects in the previous chapters, indicating a scholar-specific trait. The texts employing this resource most prominently are *The contexts of English* (1994) and *On the grammar of scientific English* (1997). Asseverative assessment, as noted in Chapter V, is the comment assessment type expressing speakers' judgment of the proposition as obvious, natural, or clear. In *The contexts of English*, asseverative assessment is widely used in expressing judgments of propositions as deriving from shared understanding (what Martin and White (2005) call "concur") (excerpts 7.18 and 7.19). This resource positions reader as agreeing with the assumptions presented, functioning as a strategy to involve them in the unfolding argument (e.g. Thompson, 2001).

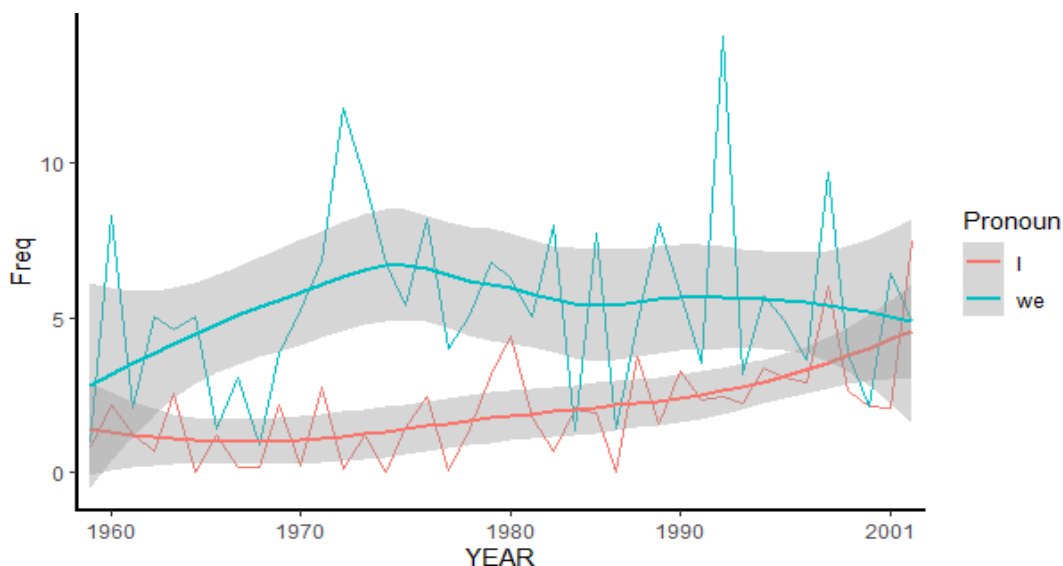
(7.18) In a language such as modern English, which does a great deal of work of a very varied kind, a best guess of the number of words currently disposable, if we include all the technical vocabularies, might be somewhere in the seven-figure range: more than a million, and less than ten million. But **of course** no individual speaker uses them all. Any one person, using English regularly in a typical adult register range, might call actively on, say, between one per cent and five per cent of the total; they would **no doubt** understand many more, especially in a living con-text, or at least have some sense of what they were about. But that still leaves a vast number that would mean nothing to them at all.

(7.19) There are some quite significant differences between scientific English and scientific Chinese; but there is also a great deal in common, and the learner already familiar with the discourse of a scientific discipline in his own language can make use of this experience in trying to master that in another. **No doubt** the same general pattern of relationship (though different in its specifics, **of course**) would hold among scientific varieties whatever the language.

Figure 7.6 shows the unfolding of pronominal self-reference throughout Halliday's trajectory. Plural first-person self-reference (*we*) describes an upward smooth line until the 1970's, followed by a decline during the next decades, with a mild diminishing pattern characterized by major variation across instances throughout the 1980's and 1990's. Singular

first-person self-reference (*I*), in contrast, shows an upward trend through the entire time series, with irregular pulses throughout.

Figure 7.6: Pronominal self-reference in Halliday's trajectory (normalized= 1.000 words)



The papers with the most frequent use of plural self-reference (*we, us, our*) are *Systemic Grammar and the concept of a science of language* (1992), *Towards a sociological semantics* (1972), and *On the grammar of scientific English* (1997). Halliday uses *we* in at least two senses: to refer to himself as part of the linguistics -or systemic functional linguistics- speech fellowship (excerpt 7.20), or in referring to language users in general (excerpt 7.21). Both usages tend to occur in textual phases where he positions himself as an insider or knower with respect to a potentially unacquainted reader.

- (7.20) Categories that are used in the analysis of language are general concepts which help **us** to explain linguistic phenomena. They are not "reified": that is, they are not endowed with a spurious reality of their own. For example: **we** do not start with a ready-made concept like Theme. **We** start with a particular problem, such as "why does a speaker of English choose to put one thing rather than another in first position in the clause?" To explain this, **we** have to set up a long chain of explanation; this involves certain abstract categories, through which **we** relate this question to a large number of other phenomena in the language. "Theme" is the name that we give to one particular link in this chain of explanations, embodying a generalization about the structure of the message.

(7.21) Let me try to make this point a little clearer. The categories and relations **we** use to talk about things - the names **we** use, their systematic relationships to each other, the configurations in which they occur — define for us what **we** think of as 'reality'. Reality is what **our** language says it is. But these categories and relations were not given to **us** ready-made. The world as **we** perceive it is not clearly bounded and classified. **We** have to impose the categories ourselves, grouping together sets of different and often quite disparate phenomena that for purposes of human survival can be treated as alike.

Singular self-reference (*I, my, we*) is clearly most favored in Halliday's writings during the 1990's, although it is less frequent than plural self-reference at almost all datapoints. In his later writings (e.g. *The spoken language corpus: a foundation for grammatical theory* (2002)), singular self-reference is generally used to inscribe his voice in expressing opinions and disagreements, often within explicit subjective modalization (*I think*) (Excerpt 7.22), and to refer to his previous work and interests (7.23). Earlier writing use singular self-reference mostly in the organization of discourse, as shown in excerpt 7.24 from *General linguistics and its application to language teaching* (1960).

(7.22) As I have remarked elsewhere (2002), there is considerable recourse to grammatical theory in Hunston and Francis' book. I am not suggesting that they deny this — they are not at all anti-theoretical; but it is important, I think, to remove any such implication from the notion of "corpus-driven" — which is itself a notably theoretical concept. I don't think Tognini-Bonelli believes this either, though there is perhaps a slight flavour in one of her formulations (p. 184)

(7.23) My own interest, as a linguist and more specifically as a grammarian, has been closely related to these questions, but in a sense also complementary to them. I have been interested in the evolution of scientific forms of discourse, and their relation to everyday language especially spoken language, and especially the spoken language of small children; as well as their relation to other forms of written adult language, especially to the standard language of the modern nation state (of which in some sense scientific language is simply a particular case). But I have concentrated more on the 'micro' aspects, and specifically on the grammar of the scientific clause; because that, to my mind, is where the essential work is done - where the meaning is made.

(7.24) In what follows I shall concentrate mainly on the role of linguistics. In other words I shall be dealing with the linguistics side of that part of general linguistic theory that enables us to describe effectively how a language works.

One of the questions emerging from the study of self-mention in Halliday's writing is whether the paths observed in his trajectory reflect a general developmental drift, a cohort-specific drift, a general change in the academic registers of linguistics, or an author-specific pathway. Although self-mention was not studied in Chapter VI, Hyland and Jiang's (2016) does study this phenomenon in a cross-sectional corpus, showing that singular self-mention has been overtaking plural self-mention in applied linguistics papers since the 1960's, unlike in the hard sciences, where plural self-mention has grown considerably. Halliday's pathways for plural and singular self-mention would thus reflect the general trend for self-mention in the discipline. Hyland and Jiang's explanation of plural self-mention in terms of the predominance of multiple authorship in recent decades does not apply in Halliday's case because all the papers in the Halliday corpus are single-authored. Plural self-mention in his case relates to positioning of himself and the reader as disciplinary community insiders sharing knowledge and experience, which occurs with varying degrees of intensity across text instances. In the case of singular self-mention, there is no obvious reason for the steadily upward trend observed: explanations based on increasing seniority or authorial positioning lose ground when considering Halliday's status as a disciplinary authority from an early stage of his career. One of the possible reasons would be his more frequent discussion of prior work, a context in which his use of *I* is especially favored in the later decades¹⁵.

The study of interpersonal features in Halliday's extended trajectory has thrown additional light into the nature of language change in the assessment of propositions within scholarly trajectories. One of its main theoretical implications is that individual trajectories can reflect the general developmental drifts of the community (or the cohort) and, at the same

¹⁵Matthiessen (P.C., August 20, 2020): "And most likely a higher proportion of papers originally given as invited plenary/ keynotes/ talks, where he was expected to draw on his own experience over the decades."

time, they can indicate scholar-specific pathways for certain linguistic features. The marked changes in probability-type modalization and asseverative assessment -both features lacking significant variation for the TCL corpus- do reflect important interpersonal motifs in Halliday's trajectory. This dissonance is not surprising when it is understood that developmental drifts are generalized diachronic variation profiles for a community, and not deterministic sequences (e.g. Larsen-Freeman, 2006). Another implication from this case study is the importance of instantial variation in considering developmental change: some of the interpersonal features under study vary considerably across papers (with or without a perceivable longitudinal trend). The study of interpersonal meanings unfolding in specific text instances can thus result illuminative of the longitudinal trends observed.

The second part of this findings report focuses on the unfolding of interpersonal features in two papers: *Class in relation to the axes of chain and choice in language* (1963) and *On grammar and grammatics* (1996) (See 7.3.2). The 1963 text is composed of at least two main sections. The first one, corresponding to the introduction, consists of a hortatory exposition, that is, a text exposing reasons why a course of action should be followed (in this case, a proposal to consider "class" a syntactic category). The remainder of the text comprises a macro-report with a general taxonomic orientation. *On Grammar and Grammaticals* consists mainly of descriptive and compositional reports. The introductory section is an analytical exposition with a problem-solution pattern running through, which serves to make the case that grammar as an object of study needs to be distinguished from grammar as a theory, and the rest of the text presents the "solution" to this problem.

There are major differences in their deployment of interpersonal meaning, as shown in Table 7.5. Sharp contrasts can be identified in the number of proposals put forward, the frequency of modalizations and modulations, and the orientation of the modality choices. The

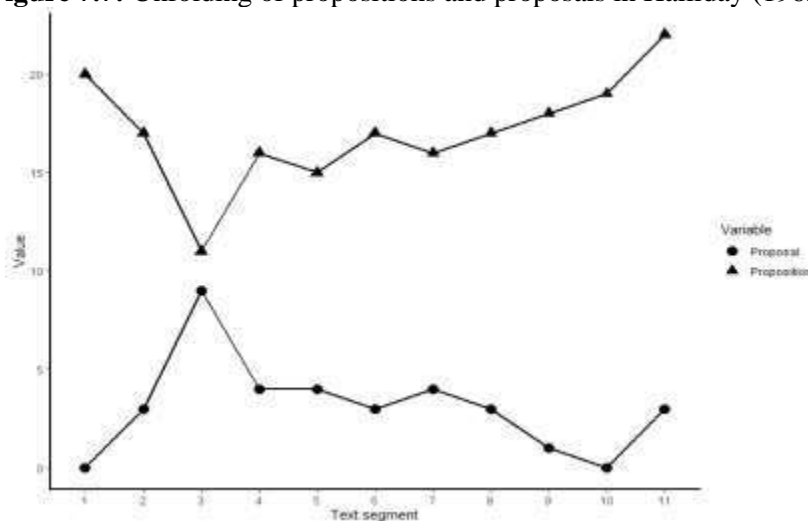
general contrast can be described as fitting with Wignell's (1998) notion of "a shift away from what people *should* do to what people *do* do" (p. 308).

Table 7.5: Interpersonal meaning in Halliday (1963) and Halliday (1996) (Normalized to 1000 clauses)

		Halliday (1963)	Halliday (1996)
SPEECH FUNCTION	Propositions	754.80	964.13
	Proposals	137.16	34.78
	Polarity (Positive/Negative)	517.69	743.47
	Modulation	146.01	80.43
ASSESSMENT	Explicit objective	35.39	0
	Probability	0	14.13
	Explicit subjective	159.3	77,17
	Implicit	48.67	16.30
	Usuality	8.84	21.73
	Comment		

Figure 7.7 shows the logogenetic distribution of propositions and proposals in the 1963 text.

Figure 7.7: Unfolding of propositions and proposals in Halliday (1963)¹⁶



Most proposals occur within the introduction, which is not surprising considering that hortatory expositions (the text type instantiated in this section) orient themselves to the regulation of behavior. The proposals make the case for distinguishing denominations for morphological and syntactic sets and for providing accounts of syntactic likeness, and are realized by high value modulations (*has to, cannot be, must be*) and by explicit objective modulations (*it is desirable that they should*) (7.25). In each case, the implicit addressee is the

¹⁶Each segment in the graph represents a stretch of 20 clauses in the text.

fellow linguist, and the force of the modulations enacts a role of authority or strong ethical commitment.

- (7.25) (E1) There are, however, clear instances where syntactically defined sets do not coincide with morphologically defined sets; and it would probably be generally agreed that, whatever the status accorded to the latter, the former **cannot be ignored**. Syntactic likeness **must be accounted for**. Moreover, even where the two sets do coincide, the criteria on which they have been established, and therefore their theoretical status, is different; and **it is desirable that they should not be** called by the same name.

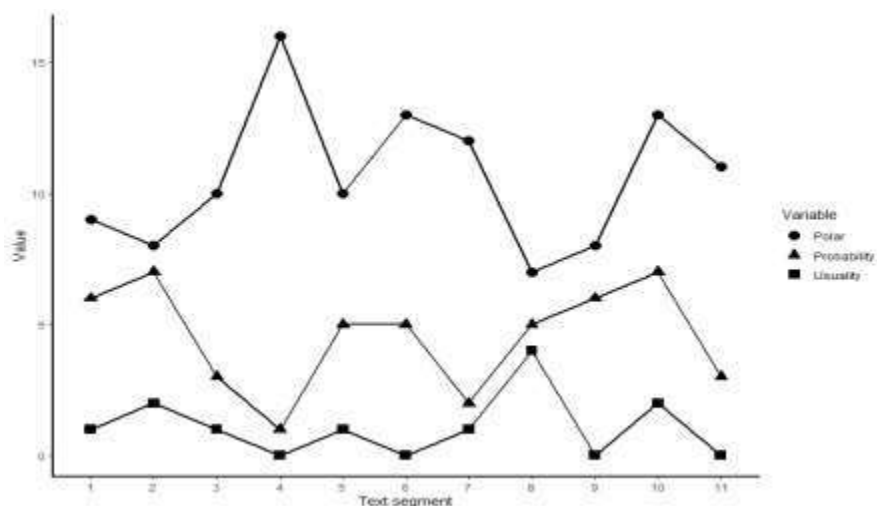
In the rest of the paper, mostly consisting of a taxonomic report, the proposals are less strong and are generally realized by median to low value modulation. Their functions include proposing names for theoretical categories (7.26), indicating possible courses of action (7.27), and assessing the worth or feasibility of an approach (7.28). Some instances, however, include high value modulations resembling the ones in the hortatory exposition (7.29). Despite its factual nature, the taxonomic macro-report continues the prosody of modulation initiated in the hortatory exposition, with proposals enacting high authority.

- (7.26) (E2) This gives three secondary chain classes, which **may be called** “predeictic” (for example all), “deictic” (for example my) and “postdeictic” (for example other).
- (7.27) (E3) In such cases we **may have to be** prepared to treat the particular feature of sequence as being non-significant.
- (7.28) (E4) It is doubtful whether one **should set** a theoretical limit to the degree of depth in recursion.
- (7.29) (E5) This, however, is manifestly not true: there is a difference in meaning, and although it does not seem so important as that between John saw Mary and Mary saw John, it certainly cannot be ignored.

The assessment for propositions is 53.91% polar (positive or negative), 26.26% probability type, 13.36% attitude type, 5.52% usuality type, and 1.38% of the comment type. The logogenetic distribution of three most frequent assessment types is presented in Figure 7.8. It is possible to notice fluctuations in the unfolding of assessment types in the text, especially with polarity and probability. Polarity remains the dominant motif throughout the

text, although between segments 1 to 3 and segments 8 to 10, probability assessment is higher, suggesting phases of higher indeterminacy. Between 8 and 10 (in the taxonomic report), the probability modalizations relate to the discussion of recursive structures (their possible ordering, their probable classification, etc.) (7.30, 7.31, 7.32).

Figure 7.8: Unfolding of assessment types in Halliday (1996)



(7.30) Likewise we might have word-classes defined by group structure, or clause-classes by sentence structure.

(7.31) (E9) Syntactic classification, <<sometimes referred to as “functional classification” in what is perhaps a rather misleading opposition of “form” and “function”>>, is a central feature of linguistic methods.

(7.32) (E10) Here “class” would be the name given to a set of items. A word-class would then be a set of words having a certain similarity in their own formation out of morphemes.

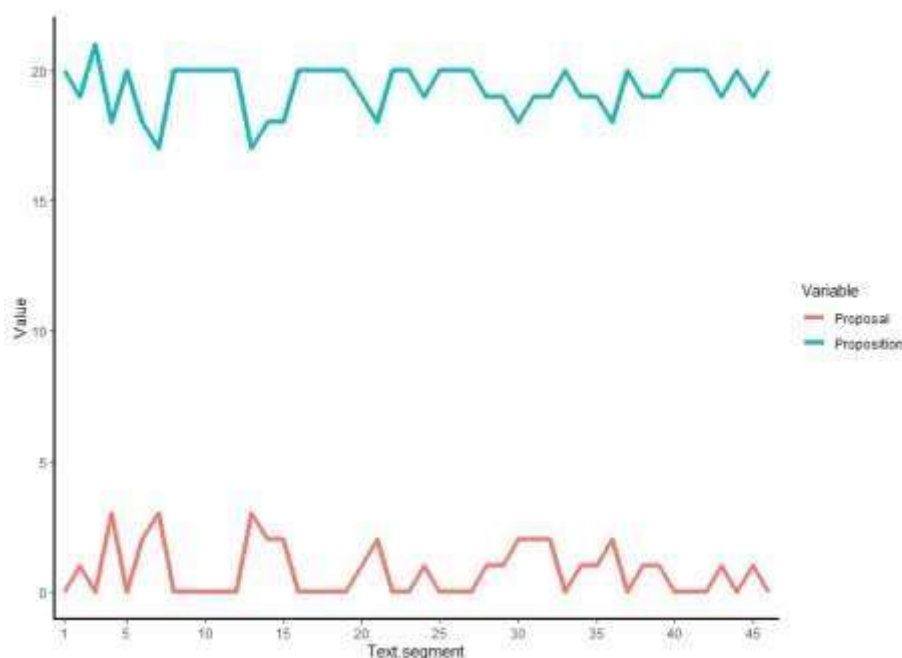
Modalization: probability is the most frequent type of modal assessment. 72.34% of probability assessments are congruent (realized by Finite or Adjunct), whereas 27,66% are incongruent (interpersonal metaphors of modalization). The congruent modalizations realized by a Finite element (usually with *may* as the modal operator) relate to indeterminacies in the assignment of categories and to the attenuation of propositions with an attitudinal value (7.33). Interpersonal grammatical metaphors are all of the explicit objective type, co-

occurring with modal Finite operators and Adjuncts in evaluative prosodies. They are oriented to enacting consensus (7.34) or to assessing the validity of propositions (7.35, 7.36).

- (7.33) [...] but it **would probably be** granted that some such category is necessary to linguistic description whatever name we choose to adopt for it.
- (7.34) [...] and **it would probably be generally agreed that**, whatever the status accorded to the latter, the former cannot be ignored.
- (7.35) **It is also true**, in my opinion, **that** the class thus defined, the syntactic set, is crucial to the whole of linguistic theory.
- (7.36) **It is perhaps doubtful whether** there are any instances in language where a difference in sequence makes no difference whatever to the meaning.

Halliday (1996), *On grammar and grammatics*, mostly contains propositions from beginning to end, with no phase of the text having a significant increase of proposals. This text shows the prototypical profile of expounding registers, where prose detached from interpersonal intrusion for the most part. Some proposals in the foreground material processes (7.37), but most of them foreground relational processes indicating the reader to accept certain categorization or class name (7.38, 7.39). Modulations foregrounding mental processes (7.40) or verbal processes (7.41) could be interpreted as interpersonal metaphors emphasizing the projected proposition.

Figure 7.9: Unfolding of propositions and proposals in Halliday (1996)

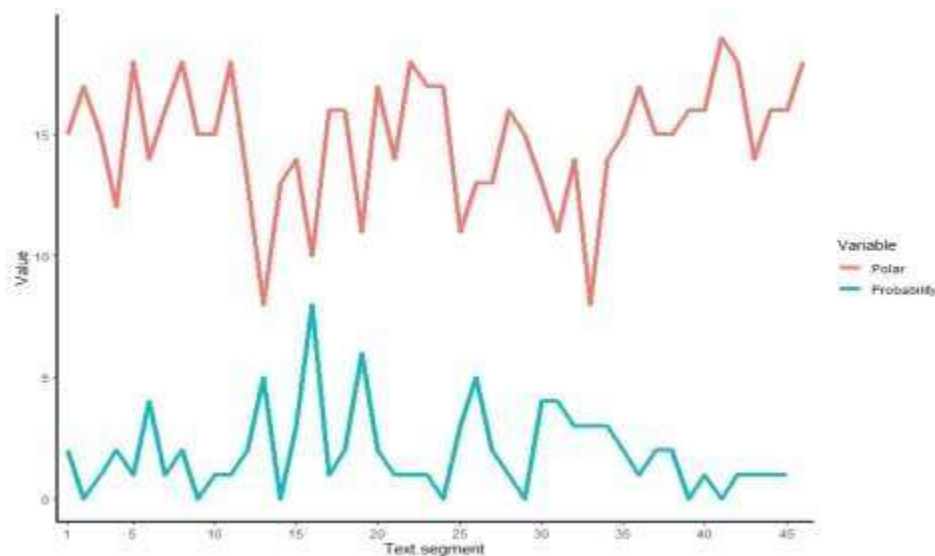


- (7.37) **We can study** ethnographically the patterns of this evaluation, and their place in the social process.
- (7.38) Formal logic and even mathematics **can be seen** as the result of tidying up the indeterminacies of natural language grammars.
- (7.39) In other words, the grammar adopts what **we may call** a “trinocular” perspective.
- (7.40) **We can note** how the grammar manages the complexity of human experience.
- (7.41) And here again **we have to say** that there seems no indication that languages are collapsing under the weight.

The evaluation of propositions also reflects a mostly interpersonally detached style. 83.80% of propositions in the text are have positive or negative polarity and only 16.2% have some form of modal assessment, the most frequent type being modalization probability (67.93%), followed by usuality (19.08%) and comment assessment (10.68). Although less frequent, comment assessment of the asseverative type (*naturally, obviously*) also occurs marginally throughout without peaking in any textual phase. The few interpersonal metaphors

are mostly of the explicit subjective type, realized by mental projections (examples 7.42 and 7.43) and a minority of them are of the explicit objective type, realized with the Predicator (*are likely*) (7.44). In both cases, Halliday fronts the clause with an interactant Subject, inscribing a more overt intersubjective stance in the propositions advanced.

Figure 7.10: Unfolding of polar and probability assessment in Halliday (1996)



(7.42) **I suspect** that the same holds true for the grammatics as a theory of grammar: but we cannot test it for being right or wrong.

(7.43) **I think** it is also a valid goal to explore the relevance of grammatics to semiotic systems other than language, and even to systems of other types.

(7.44) **We are likely to become** aware of this when we meet with a crop of unfamiliar words, like those associated with the recent move into nanotechnology (engineering the very small).

The contrast in the speech-functional and modal assessment choices made in the two texts reflects a possible semiotic drift in the writing of Michael Halliday towards what could be considered more interpersonally neutral prose. The use of evaluative resources in the text coincides with the shape of the extended pathways in Figure 7.4, and with the overall drift towards less evaluative writing in the TCL corpus discussed in Chapter V. Late career writing

becoming less evaluative over time thus appears to be a robust finding across the studies performed in this case. Halliday's case suggests that part of the decrease may relate to the lesser need of introducing new theoretical entities as trajectories evolve, for it is mainly in this context where different forms of modality are most frequent in his texts. In general, it makes sense to think of scholars as meaners engaged in a continuous exchange of meanings with a readership, the exchange evolving in the strength and assertiveness of the propositions and proposals advanced.

7.5. Conclusion

This chapter has explored an extended scholarly trajectory with the aim of understanding possible longitudinal pathways of complexity and evaluative lexicogrammar features. It is clear from the two studies above that the examined features differ in the shape of their extended pathways. Unit length features (Mean T-Unit length, Mean Clause Length) fluctuate across instances without showing an identifiable trend, their variation being primarily driven by the textual unfolding of meanings in specific text phases. These features do not create developmental motifs in scholars' trajectories in the same way that they do in school or university literacy, where unit size increase is an indicator of attaining advancedness (Ortega, 2003). Regarding syntactic complexity, the extended pathway for dependency measures (Clauses per T-Unit, Dependent Clause per T-Unit) reflects a non-linear curve-like pattern indicating that, in Halliday's trajectory, grammatical intricacy increased up to a point when it started decreasing towards its early career levels. Text analysis shows that one of the mechanisms driving these measures is the need to provide elaboration for theoretical entities, which would be more foregrounded at the beginning of theory construction. Lexical Diversity and singular pronominal self-reference show an upward trend, reflective of cumulative motifs throughout Halliday's trajectory related to the

construal of theoretical entities (in the case of Lexical Diversity) and to his positioning as expert and discussion of prior experience (in the case of pronominal self-reference).

Evaluative lexicogrammar exhibits a diminishing pattern especially relevant for probability-type modalization, which Halliday uses mostly in hedging proposals for theoretical categories, and not so much in the expression of uncertainty. The extended pathways in Halliday's trajectory coincide with the developmental drifts in Chapters IV and V, except for probability-type modalization, which shows no significant change for Chapter V but appears to have developmental relevance in Halliday's case.

The case study of Halliday's trajectory illustrates the role of these dispositions in defining the content and orientation of scholarly trajectories. Early childhood engagement with language within the family context and interest in Chinese culture guided some of his later life decisions concerning what and where to study, decisions which, in turn, reinforced these early dispositions and created further opportunities for their continuity. Halliday's construal of himself as someone concerned with deriving practical effects of linguistic theory in society and his association of this trait with his identity as a Marxist further illustrates the ways in which dispositions built over the course of life histories shape the content and orientation of scholarly trajectories. However, it is important not to establish direct causal associations between individuals' life histories and the realization of meanings in academic registers throughout their lives. The contexts in which personal experiences are construed and exchanged are inherently different from the expounding and exploring contexts in which scientific theories are constructed and debated, although in some cases the former can surface in the latter (and vice versa). Developmental linguistic variation largely involves subtle and subconscious changes driven and enabled by intrinsically functional mechanisms.

CHAPTER VIII: CONCLUSION

This thesis has investigated language development throughout linguistics scholars' trajectories, recognizing their status as meaners with expanding semiotic potentials, focusing on the complementary dimensions of complexity and evaluative lexicogrammar. After situating scholarly language development within the successive transitions of the ontogenetic timescale, the thesis advances the premise that scholars' linguistic repertoires expand as they instantiate disciplinary registers to construct theories and enact scholarly identities, and that this expansion is reflected in developmental drifts and cohort-specific specific changes. I investigated this premise through a dual approach combining the modelling of language change in the contrast of early and late career texts across generations of twentieth century linguists and the longitudinal exploration of variation pathways in a single scholars' writing trajectory. This chapter recapitulates the main findings for each of the research questions formulated; highlights their theoretical, methodological, and practical contributions; and reflects on the limitations of the study and possible avenues for further research.

8.1. Summary of major findings

In this thesis, I set out to provide an answer to the following questions:

- (1) What is the nature of scholarly language development within a conception of language as a social semiotic?
- (2) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding syntactic and lexical complexity parameters?
- (3) Throughout their scholarly trajectories, to what extent does linguists' writing change regarding the use of evaluative resources for assessing propositions and entities?
- (5) What is the relationship between language change within linguistics scholars' trajectories and the general evolution of academic registers?

This section summarizes the main conclusions and findings for each of the questions.

8.1.1. The nature of scholarly language development

In the theoretical discussions in Chapter II as well as in the interpretation of findings in the rest of the chapters, I stressed the claim that scholarly language development can be most adequately understood as the expansion of registerial repertoires for the theorization of the object of study and the enactment of scholarly identities. Expansion is a cover term for a variety of processes taking place in scholars' ontogenetic timescale, including the elaboration, clarification, and exemplification of theoretical entities and propositions; the addition and interrelation of experiential domains; and the negotiation of scholarly identities driven by evolving roles in the disciplinary community. The assumption underlying this claim is that continued instantiation of academic registers throughout scholars' trajectories entails adaptations which are reflected in general developmental drifts within speech fellowships: individuals' acts of meaning within registers occur within a history of instantiations exhibiting continuity and change. The antithesis of this premise, that scholars' acts of meaning are each self-contained instantiations lacking any form of historical continuity, belies a social semiotic conception of development, although it is arguably implicit in much of the prevailing synchronic literature.

Through the instantiation of academic registers, scholars' individuate strategies for making meaning and realizing meanings as wordings in text, expanding the delicacy of their experiential repertoires and recalibrating their interpersonal relationship with readers in synchrony with their developing identities and changing roles. Once Phase III of language development (mother tongue) is fully in place, individuals expand their registerial repertoires by adapting to the doing and sharing registers of the family and community contexts, the multiple registers of schooling, the pedagogical and disciplinary registers of undergraduate education, and the academic apprenticeship registers of graduate education (Halliday, 1975/2003, 1984,

2008; Christie & Derewianka, 2008; Christie, 2010; Martin & Rose, 2008; Matthiessen, 2009). Scholarly development continues the expansion, chiefly involving lexicogrammatical variation within registers as the linguistic resources associated with specific uses undergo reconfigurations across repeated instantiations. Register is a central consideration in making sense of this process of expansion, since subtle developmental variations occur at the intersection of Field, Tenor and Mode configurations. Field guides the semantic strategies for construing institutional experience as meaning systems and for organizing social practices as text. Tenor orients semantic strategies for enacting institutional roles, values and power relations. Mode indicates semantic strategies for presenting Field and Tenor as information in text, including the experiential and interpersonal aspects foregrounded.

For individual scholars, scholarly trajectories entail the interplay between their construction of social material reality and the semiotic dispositions formed throughout their lives. Individuals do not relate to an objective external reality with predetermined effects and consequences. They construct the social material environment and their own place within it as part of their developing consciousness and act on their construction of it by embracing, accommodating, negotiating or resisting their social material circumstances in a complex contingent manner and in interaction with objects and social agents (both individuals and institutions). Human beings' inborn drive to make sense of their environment and relate intersubjectively (c.f. Halliday, 1978) is furthered in interaction with human others and their material situational environment, initially in the context of family, and subsequently in the contexts of school, academic literacy, the workplace, citizenship, academia, and others. Their positioning within these institutional contexts is given by the roles and degree of power allotted to them by virtue of their ethnicity, gender, occupation, income, nationality, political affiliation, age, religion, bodily and mental fitness, etc. Semiotic systems, chiefly language, allow the internalization of these positionings as identities associated with specific roles or

personae, the aggregate of which forms the individual as a subject with more or less consistent dispositions to interact with the environment in particular ways (Firth, 1950).

8.1.2. Syntactic and lexical complexity throughout scholarly trajectories

Early career and late career writing remain largely similar as per the statistical analysis of most complexity parameters, which reflects the metastability of registers within individuals' semiotic trajectories. The complexity measures showing significant, yet subtle, diachronic differences are Coordinate Phrase per Clause (CPC), Coordinate Phrase per T-Unit (CPT), Lexical Diversity (MSTTR) and Specialized Lexical Sophistication (SPS). The first two measures correspond to a developmental drift in TCL scholars' academic writing whereby late career writing involves a significant (yet subtle) increase in coordinate phrases. Analysis reveals that functional mechanism underlying this trend is paratactic extension of the coordinating type, a logico-semantic motif involving two or more elements with equal status within a clause complex or a nominal group complex (Halliday & Matthiessen, 2014, p. 559). Further analysis suggests additional features of this developmental drift, most importantly that late career writing shows preference for paratactic extension within nominal groups, which resonates with the hypothesis that advanced language development focuses on nominal groups and not on clause complexing (Norris & Ortega, 2009; Biber *et al.*, 2011). These subtle differences may stem from the accumulation of ideational meanings within scholars' repertoires, being a symptom of higher saturation of experiential meanings in their repertoires and of a more marked disposition to consider the interrelations between experiential entities.

Lexical Diversity appears to be an indicator of the nature of the cohesive strategies employed in text and, by indirect extension, of the nature of the semiotic activity at play (see the follow-up study in section 4.2.2.). This measure shows a negative correlation with Repeated Content Lemmas in a synchronic, but not diachronic, perspective. The diachronic

pattern of Specialized Lexical Sophistication, in turn, involves key term types without a significant pattern to emerge regarding grammatical categories or their technicality status. Descriptive evidence suggests that non-technical terms -those lacking direct connection with a specialized taxonomy- account for much of the observed diachronic drift in this variable. The developmental drift indicated by lexical complexity variation in the TCL corpus thus seems to be towards increasing individuation in scholars' engagement with data and with the readership, rather than towards increasing specialization.

8.1.2. Evaluative lexicogrammar throughout scholarly trajectories

The key interpersonal features of academic registers show no significant differences across career periods, including the overall distribution of speech-functional moves and evaluation mostly focusing on modalization. The findings reflect the general profile of academic registers as functional varieties backgrounding the explicit expression of evaluative stances and generally foregrounding the writer's role as a distant expert (c.f. Biber & Finegan, 1989). Three developmental drifts in TCL scholars' use of evaluative lexicogrammar include a general decrease of evaluative statements across the three studied cohorts, a general decrease in the use of comment assessment, and a cohort-specific decrease in the use of negative evaluation. TCL scholars' early career writing thus tends to include more frequent evaluation of propositions and entities while late career writing could be considered, in Martin and White's (2005) terms, more monoglossic. Comment assessment and appreciation polarity are the evaluative resources showing the most significant differences across periods, which indicates that the early career significance of evaluative statements stems from these more delicate subsystems. The comment assessment type showing most the most significant career period effects is speech-functional assessment. This assessment type associates with textual phases characterized by an internal rhetorical orientation, that is, phases oriented towards increasing readers' belief of a proposition of

willingness to adopt a proposal (Mann, Matthiessen & Thompson, 1992). Negative polarity being significantly more frequent in early career writing reflects novice scholars' intent to create a niche for themselves by pointing to existing gaps or faults in the literature.

8.1.3. Scholarly writing development and registerial change

Using a cohort sequential design (Schaie & Caskie, 2005), I studied two complementary perspectives on the modelling of registerial change: change across times of measurement (general change) and change between cohorts. The general change perspective considered three times of measurement (the 1960's, 1990's, and 2010's), showed findings coinciding with trends reported in cross-sectional linguistic studies, including densification, objectivization, and a slight decrease in lexical sophistication. The cohort variation perspective examined differences between TCL scholars grouped according to shared historical periods in their semiotic lifelines, illuminating differences in syntactic complexity (Dependent Clause/T-Unit), lexical complexity (Lexical Sophistication and Lexical Diversity), and evaluative lexicogrammar (qualificative assessment). The complementarity of the perspectives is evident in the different trends identified in each (except for lexical complexity measures, which are significant in both perspectives). Only two of the linguistic changes in the TCL corpus discussed thus far in this thesis are exclusively developmental (that is, not observed in the study of cohorts and times of measurement): the increase in Coordinate Phrase per T-Unit and the increase in specialized lexical sophistication (see Chapter IV for discussion). The only measure with diachronic variation exclusively pertaining general change (variation across times of measurement) is Lexical Density. The measures varying exclusively between cohorts are Dependent Clause per T-Unit and qualificative comment assessment. Evaluation, particularly modal assessment, varies along both developmental and general change perspectives (but not between cohorts). Finally, the most complex variation occurs for lexical diversity, which increases within the

developmental timescale and decreases within the general change and between cohorts' timescales.

8.2. Implications

8.2.1. Theoretical implications

The most important theoretical contribution concerns the foregrounding of the developmental dimension of scholarly writing, a largely unaddressed issue in academic language research. It has traditionally been assumed that scholars have reached a final stage in their developmental trajectories after which no language change occurs other than within specific self-contained text instances. Scholarly development has mainly been addressed through introspective accounts based on biographical reconstructions or autobiographical recall (c.f. Casanave & Vandrick, 2003), which provide rich ethnographic insights but generally set aside language change (an understandable omission given the subtle and unconscious nature of developmental linguistic variation). Apart from the insights from a few prior studies (Montemayor-Borsinger, 2001, 2002, 2008; Dressen-Hamouda, 2008), little is known about how scholars' linguistic repertoires adapt through their trajectories. The abundant body of synchronic literature on academic registers has reinforced the view of scholars' writing as conforming to a set of canonical features throughout their lives.

This thesis offers a multiperspectival view on scholarly language development, shedding light into its nature and possible developmental drifts in the field of linguistics. It challenges static conceptions of scholarly language trajectories, but avoids the simplifying generalization that all aspects experience change, showing patterns of stability and change across different parameters and timescales. This thesis thus contributes to recent calls for the study of language development within a lifelong perspective by tackling developmental variation beyond instructed learning contexts (Ortega & Byrnes, 2008; Bazerman *et al.*, 2017). It also proposes a probabilistic approach to language development in which the focus lies on the relationship between individual pathways and general drifts, significant trends for

language to change in a specific direction within a community, thus favoring a view of language development as a complex adaptive endeavor (Larsen-Freeman, 2006). The dual focus on complexity and evaluative lexicogrammar stresses the fact that scholarly development, as other developmental transitions, is metafunctionally diversified. Scholars' development entails, on one hand, the expansion of ideational repertoires for the construal of entities and the relations between them; and, on the other hand, the deployment of interpersonal repertoires for the enactment of scholarly identities. A third area not addressed in this thesis is the textual metafunction, governing the assignment of informational prominence to ideational and interpersonal meanings, but it could be incorporated once the developmental significance of the metafunctional diversification principle (Halliday, 1973) is recognized.

Another area in which this thesis makes significant theoretical contributions is the exploration of the linguistic mechanisms underlying complexity measures. Syntactic complexity measures have long been choice parameters for the investigation of developmental language variation and, nowadays, with the availability of resources for their automatic computation (Ai & Lu, 2010; Lu & Ai, 2015), their applicability has expanded. Part of their appeal also lies in their ability to provide objective and replicable indicators of linguistic variation allowing extrapolations from the multiple contexts in which they have been applied. However, the relationship between complexity measures and language theory constructs still requires a more precise definition in terms of underlying functional and contextual mechanisms within what Norris and Ortega (2009) call an "organic" approach to complexity research. This thesis echoes the call for the functional interpretation of complexity measures by studying those showing significant drifts in terms through the lens of Systemic Functional Linguistics. One of the links proposed was the interpretation of syntactic and lexical complexity measures as indirect indications of the balance between experiential

and logical modes of representation. Interestingly, none of the syntactic complexity measures studied showed significant developmental variation, and only Lexical Density and Dependent Clause/T-Unit turned out to differ significantly between cohorts and times of measurement, suggesting that the balance between logical and experiential representation remains constant within trajectories. Variation in Coordinate Phrase per Clause, the only syntactic complexity measure with significant developmental effects, reflects the logical motif of paratactic extension within nominal groups, suggestive of a more interrelated construal of entities in late career writing. Lexical Diversity and Lexical Specialization, both parameters with significant developmental and cohort effects, are interpretable in terms of syndromes of ideational features. Lexical Diversity tends to be higher in texts with an argumentative orientation not primarily concerned with the construction of taxonomies; while Lexical Specialization involves both technical and non-technical terms.

8.2.2. Methodological implications

The study of developmental language variation in uninstructed contexts poses challenges calling for methodological innovation. Scholarly trajectories do not follow a curriculum with predefined goals, levels, and evaluative criteria, which makes it necessary to exercise valid criteria in selecting the areas to be examined and timeframes for their analysis. The intrinsic variability of individual scholarly pathways invalidates any conception of development based on the generalized reaching of a standard of correctness, competence or any such construct. Similarly, the assumption that language change within scholars' trajectories can be decontextualized from general registerial change cannot be as conveniently held as is often the case with instructed language development, where linguistic variation is typically modelled ahistorically. Scholarly development thus calls, by its very nature, for a methodological approach which adapts to the open-endedness and historical situatedness of linguistic change.

One innovation in response to the above challenges was the construction of a cohort sequential corpus based on language user profiles (Schaie & Caskie, 2005). While developmental and historical linguistic variation have typically been studied separately and with recourse to cross-sectional corpora organized around global registerial profiles or texts (Ortega & Byrnes, 2008; Leech *et al.*, 2009), this thesis models both variation types in an integrated manner, taking language user sub-corpora as quantitative analysis units. Modelling a community of language users allows for more grounded inferences about linguistic variation and change than modelling an indistinct set of texts, however large it may be, since it offers a better fit to the fact that language is a system maintained within speech fellowships. It also facilitates reasoning about the role of individual differences as drivers of change, since it is always possible to step up the delicacy of analysis to consider specific users with interesting usage profiles (e.g. outliers).

The cohort sequential design applied in this thesis allows modelling within-persons effects (general and cohort specific) together with between persons effects (across cohorts and times of measurement). The picture emerging from this modelling technique is more complex and theoretically satisfying than that emerging from diachronic contrasts of cross-sectional corpora. It shows that generalized developmental drifts occur in parallel with cohort-specific drifts, in the context of variation across cohorts and global registerial variation, a model matching the theoretical formulation that ontogenesis (language change within the individual) both drives and is framed by phylogenesis (the evolution of language within social groups) (Halliday & Matthiessen, 1999). It thus illuminates the fact that individual and community language change, though inextricably linked, can differ from one another given generational differences in exposure to and uptake of linguistic innovations. Cross-sectional designs, in contrast, collate these diverse effects into a single interpretation of language change as a unidirectional phenomenon. The use of non-parametric mixed effects

modelling with the *nparLD* R package (Noguchi *et al.*, 2015) offers a replicable open-access resource for similar or related research designs, and might be used as a robust complement to the more traditional descriptive frequency counts.

Just as modelling general drifts in developmental language variation is an important task, mapping language variation along individuals' extended trajectories is essential for understanding possible pathways for specific variation parameters. It is through attention to extended trajectories that it becomes possible to recognize that even those linguistic variables lacking a general developmental drift do, in fact, change in non-directional or non-linear fashion. Such is the case of unit length measures, which experience no significant diachronic change along developmental or cohort timescales, but show major variation for specific instances or career periods driven by specific discursive needs amenable to discourse analytic exploration. It is also through the study of extended trajectories that awareness can be gained of individual-specific patterns, those not reflecting for the broader community but featuring prominently for specific meaners. Uniqueness is best understood in the context of commonality, and it needs to be studied as an indication of the adaptive value of the linguistic resources involved.

Finally, it is worth reflecting on the complementarity between quantitative and text-analytical techniques illustrated by this thesis. The structure of each chapter followed the principle of progressive analytical delicacy, whereby initial exploration with a broad scope narrows down to more focused studies investigating significant findings. This principle is especially suitable in cases where little empirical background is available to make informed choices of focus from the beginning of the research project, as is the case with the largely unaddressed issue of scholarly language development. Quantitative techniques are useful in alerting the researcher of attention-worthy patterns deserving further study, thus offering more systematic ways of narrowing down the analytical focus. However, once interesting

patterns are singled out, quantitative techniques are limited in their ability to account for their occurrence. It is here where discourse analytical techniques based on theories designed to cope with text complexity, such as Systemic Functional Linguistics, can step in to aid interpretation and explanation. While strictly speaking this thesis is not text analytical, it does use functionally-motivated analysis strategically as a method for elucidation of variation patterns. I believe these forms of complementarity between quantitative and text-analytical techniques bear more promise for the integrative study of language variation in large (or very large) datasets than purely quantitative or purely text-analytical research.

8.3. Limitations of the study

The limitations of this thesis study mainly pertain to the sampling of language data within individuals and across cohorts. First, it is worth reflecting on the extent to which the data considered in this study provides the ground for comprehending scholarly language development beyond the group of individuals sampled. While disciplinary delimitation may be considered a strength enabling deeper and better contextualized exploration, a multidisciplinary corpus would clearly amount to a more comprehensive understanding of scholars' development across disciplinary contexts. Indeed, developing a scholar can entail different expectations and linguistic development paths for a physicist, a sociologist, an art critic, or a linguist. Delimitation to a few generations of twentieth century-born scholars similarly entails strengths and weaknesses: it facilitates reasoning about the trends and influences which may bear upon scholar's language use in specific historical periods, but it constrains the ability to generalize about scholars in different historical periods. One example of this constraint in linguistics is the tendency for recent generations of linguists to publish multi-author papers (Hyland, 2020), which this study would, by its design, fail to account

for¹⁷. A way of reconciling these limitations is to view the studies in this thesis as an opportunity to derive informed theoretical generalizations (Duff, 2010) about the nature of scholarly writing development, and not as an attempt to produce descriptive statistical generalizations.

Related to the issue of data constraints is the focus on contrasting early and late career data illustrated in Chapters IV and V. Although comparing language data across two time points is a standard methodological strategy in longitudinal language research, more complex and comprehensive accounts of scholarly language development would be possible with datasets involving more frequent data points, ideally covering entire trajectories (e.g. the case studies on Michael Halliday’s development of complexity and evaluative lexicogrammar presented in Chapter VII). Two constraints prevented a more extensive sampling of extended trajectories in this thesis. One concerns cost: building a corpus of an entire scholarly trajectory is a time-consuming endeavor (for reference, building a 2 million token Halliday corpus took around four months). Had this more comprehensive strategy been selected, it would have entailed a substantial reduction in the number of scholars in the TCL corpus. The other constraint was access to publications, especially those by scholars in earlier generations: consistently sampling entire scholarly trajectories would have been hindered by the difficulty of obtaining publications from earlier hardcover or print sources. Given these constraints, a less ambitious but more feasible goal was reducing data collection to two time points, labelled as early and late career and operationalized as writings produced during the third decade of life (early) and from the fifth decade onwards (late). This exploratory strategy was suitable for identifying general developmental drifts and differences across cohorts, but

¹⁷Matthiessen (Personal Communication, August 20, 2020): In such cases (e.g. in the multi-authored papers in areas such as engineering – where authors may be mentioned even if they did not contribute to the actual writing on the paper- “it would probably be helpful to adopt a kind of apprentice-model involving a notion of cross-generational teams. One possible way forward would be to explore **authorial voice**, allowing for the possibility of chorus-like voices”.

future research might focus on the study of developmental pathways in extended trajectories, as illustrated in Chapter VII.

8.4. Recommendations for further research

The study of scholarly language development (and, more broadly, the study of adult language development outside instructional contexts) is a largely unexplored area of research, as stressed in Chapters I and II. As lifelong views on language development gain momentum, more studies from a variety of theoretical and methodological perspectives would contribute to articulating a cogent theory of language change across contexts, including academic contexts, throughout the lifespan. Ideally, side by side with ethnographically oriented introspective studies, language-based studies should be conducted which seek to identify developmental drifts and pathways within communities and specific individuals, using a mixture of quantitative and text-analytical techniques. The insights from such studies would be greatly enhanced by the consideration of different disciplines, cohorts, and languages; and by the implementation of statistical techniques capturing the effects of different intervening factors and the interrelations between linguistic variables.

Parallel to the study of scholarly language development and uninstructed language change, it is important to enrich understanding of the indicators employed in the study of developmental language variation, particularly those in the complexity tradition. Studies investigating the lexicogrammatical, semantic and contextual correlates of syntactic and lexical complexity measures can make them more informative and interpretable in terms of syndromes of interrelated linguistic features indicative of underlying semiotic motifs. The follow-up studies in Chapter IV and the case study on Halliday's complexity development in Chapter VII offer possible methodological models, but future studies may explore the correlations between complexity measures and a larger set of registerially varied texts.

9. Appendixes

Appendix 3.1.: Scholars in the Twentieth Century Linguist Corpus

NAME	BIRTH	PHD/MA GRADUATION	ALMA MATER	WORKING LOCATION
Abbot, Barbara	1943	1976	UC-Berkeley	USA
Aikhenvald, Alexandra	1957	1957	Moscow State University	Australia
Allan, Keith	1943	1978	University of Edinburgh	Australia
Biber, Douglas	1952	1984	U. of Southern California	USA
Bonfante, Genaro	1904	1924	U. of Rome	Italy
Bybee, Joan	1945	1973	UC-Los Angeles	USA
Chafe, Wallace	1927	1958	Yale University	USA
Cheshire, Jenny	1946	1979	University of Reading	UK
Chierchia, Genaro	1953	1984	U. Massachusetts- Amherst	USA-Italy
Chomsky, Noam	1928	1955	Harvard U.	USA
Cook, Vivian	1940	1971		UK
Corbett, Greville	1947	1976	U. Birmingham	UK
Davies, Eirian	1946	1976	U. of London	UK
Dik, Simon**	1940	1968	U. Amsterdam	Netherlands
Dubois, John	1951	1981	UC-Berkeley	USA
Dyen, Ysidore	1913	1939	U. of Pennsylvania	USA
Eliason, Norman	1908	1931	U. John Hopkins	USA
Emeneau, Murray	1904	1931	U. Yale	USA
Fillmore, Charles	1929	1961	U. Michigan	USA
Foley, William	1949	1976	UC-Berkeley	Australia
Fowkes, Robert	1913	1947	Columbia U.	USA
Fowler, Roger	1938	1968	U. College London	UK
Fries, Peter	1937	1964	U. of Pennsylvania	USA
Garvin, Paul	1920	1947	Indiana U.	USA
Geeraerts	1955	1981	U. of Leuven	Belgium
Givon, Talmy	1936	1969	Hebrew U. of Jerusalem	USA
Goldberg, Adele	1963	1992	U.C. Berkeley	USA
Granville, Anna	1905	1934	U. John Hopkins	USA
Haas, Mary	1910	1935	Yale University	USA
Halle, Morris	1923	1955	Harvard U.	USA
Halliday, Michael	1925	1955	Cambridge U.	UK, Australia
Haspelmath, Martin	1963	1993	Freie Universität-Berlin	Germany
Hawkins, John	1947	1975	Cambridge U.	UK-US
Hengeveld, Kees	1962	1992	U. Amsterdam	Netherlands
Hodge, Bob	1940	1972	Cambridge U.	UK-Australia
Hoenigswald, Henry	1915	1936	U. of Florence	USA
Hopper, Paul	1939	1967	U. Texas- Austin	USA
Hudson, Richard	1939	1964	U. London	UK
Hymes, Dell	1927	1955	Indiana U.	USA

Jackendoff, Ray	1945	1969	MIT	USA
Joos, Martin	1907	1938	U. Madison	USA
Kachru, Braj	1932	1962	U. Edinburgh	USA
Kay, Paul	1934	1963	Harvard U.	USA
Labov, William	1927	1964	Columbia U.	USA
Lakoff, George	1941	1966	Indiana U.	USA
Lamb, Sidney	1929	1958	UC-Berkeley	USA
Leech Geoffrey	1936	1968	U. College London	UK
Lehmann, Winfred	1916	1941	U. Madison	UK
Lieberman Mark	1934	1966	MIT	US
Longacre, Robert	1922	1955	U. of Pennsylvania	US
Malkiel, Yakov	1914	1938	Friedrich-Wilhelms U.	US
Martin, James	1950	1977	U. Essex	Australia
Matthiessen , Christian	1956	1989	UCLA	Australia-Hong Kong
Menges, Karl	1908	1932	U. Berlin	USA
Mulder, Jean	1954	1988	UCLA	USA
Palmer, Frank	1922	1950	U. Oxford	UK
Pike, Kenneth	1912	1942	U. Michigan	USA
Postal, Paul	1936	1963	Yale U.	UK
Quirk, Randolph	1920	1951	U. College London	UK
Read, Allen Walker	1906	1931	U. Oxford	UK
Rizzi, Luigi	1952	1981	U. Paris VIII	Italy
Sampson, Geoffrey	1944	1965	Cambridge U.	UK
Sebeok, Thomas	1920	1945	Princeton U.	US
Sinclair, John	1933	1958	U. Edinburgh	UK
Stubbs, Michael	1947	1975	U. Edinburgh	UK
Swadesh, Morris	1909	1933	Yale U.	US
Swales, John	1938	1966	Leeds U.	UK-US
Thompson, Geoff	1947	1974	Leeds U.	UK
Trager, George	1906	1932	Columbia	US
Van Valin, Robert	1952	1977	UC-Berkeley	US
Verschueren, Jef	1952	1980	UC-Berkeley	Belgium
Wechsler, Stephen	1962	1991	Stanford U.	US
Wierzbicka, Anna	1938	1964	Polish Academy of Sciences	Australia

Appendix 3.2: Twentieth Century Linguists Corpus composition

Scholar	Early career		Late career	
	<i>n</i> papers	<i>n</i> tokens	<i>n</i> papers	<i>n</i> tokens
Abbot	3	14996	3	10344
Aikhenvald	2	13731	3	34910
Allan	2	13571	2	16103
Biber	3	23849	2	17330
Bonfante	1	819	1	1793
Bybee	2	18630	3	29600
Chafe	2	9607	2	9031
Cheshire	2	9232	2	13443
Chierchia	3	19163	2	12402
Chomsky	3	22277	5	43633
Cook	2	9063	2	9906
Corbett	2	10918	1	5413
Davies	2	9139	2	10982
Dik	2	9397	1	3829
Dubois	2	16819	3	21775
Dyen	1	5761	2	14119
Eliason	1	4035	1	2971
Emeneau	2	8009	3	16941
Fillmore	1	6609	2	17761
Foley	3	26469	2	10227
Fowkes	1	3706	2	6256
Fowler	1	5150	2	10570
Fries	1	6601	2	14682
Garvin	1	4190	1	5984
Geeraerts	4	30626	2	13801
Givon	1	3453	1	4030
Goldberg	2	12938	3	16940
Granville	2	9697	1	5359
Haas	1	6824	1	5255
Halle	2	8250	2	12380
Halliday	8	107530	7	136208
Haspelmath	2	12842	3	29077
Hawkins	3	32023	1	8043
Hengeveld	2	14171	2	12727
Hodge	1	1975	3	18562
Hoenigswald	1	4364	1	7892
Hopper	2	8363	1	6121
Hudson	1	12277	1	9790
Hymes	3	23452	3	26009
Jackendoff	1	8302	1	9523
Joos	1	3326	1	6810
Kachru	2	13363	2	11513

Scholar	Early career		Late career	
	<i>n</i> papers	<i>n</i> tokens	<i>n</i> papers	<i>n</i> tokens
Kay	1	7597	1	9362
Labov	3	25621	2	12169
Lakoff	3	22621	3	24907
Lamb	4	26694	5	37735
Leech	2	11153	1	5794
Lehmann	2	11382	1	7995
Lieberman	1	4406	1	7880
Longacre	3	19141	3	17882
Malkiel	2	11898	2	12785
Martin	3	18499	2	17126
Matthiessen	2	22831	3	32281
Menges	1	6807	2	11234
Mulder	1	6176	1	7705
Palmer	1	7402	2	10419
Pike	2	8440	2	11968
Postal	1	5860	1	7735
Quirk	2	10580	2	12106
Read	1	5270	1	2629
Rizzi	3	20414	2	12018
Sampson	1	7337	1	5312
Sebeok	1	2913	3	9188
Sinclair	1	5660	2	16991
Spitzer	1	7294	1	8409
Stubbs	3	20002	2	14239
Swadesh	2	8426	1	9239
Swales	1	5423	1	6755
Thompson	1	6612	1	8313
Trager	2	6450	1	7021
Van Valin	2	11661	1	3666
Verschueren	3	24719	2	10490
Wechsler	1	4772	2	10002
Whitney	1	4034	1	4882
Wierzbicka	1	6545	1	8205
TOTAL	143	960.157	144	1.064.487

Appendix 4.1.1: Early career complexity scores

NAME	MLS1	MLTU1	MLC1	TU/S1	C/T1	DC/T1	DC/C1	CP/T1	CP/C1	LD1	HLD1	LS1	SPLS1
Abbot	24.39	21.68	10.91	1.12	0.6	0.97	0.48	0.43	0.22	0.48	5.41	0.35	-0.11
Aikhenvald	23.35	22.15	15.09	1.05	0.31	0.46	0.31	0.72	0.49	0.52	8.17	0.49	1.02
Allan	31.97	23.91	12.31	1.33	0.58	0.89	0.45	0.45	0.23	0.47	5.98	0.39	0.68
Biber	27.03	21.45	15.32	1.25	0.38	0.41	0.29	0.61	0.44	0.52	8.3	0.38	1.09
Bonfante	32.5	22.83	14.32	1.42	0.35	0.54	0.33	0.29	0.18	0.51	7.38	0.38	1.77
Bybee	28.76	24.48	11.88	1.17	0.65	1.02	0.49	0.68	0.33	0.53	6.49	0.41	0.75
Chafe	23.23	21.38	11.01	1.07	0.56	0.88	0.44	0.47	0.24	0.5	5.71	0.41	-0.92
Cheshire	31.01	25.32	12.52	1.22	0.64	0.98	0.48	0.53	0.26	0.49	6.23	0.39	0.31
Chierchia	21.96	20.82	11.77	1.05	0.5	0.75	0.42	0.32	0.18	0.48	6.01	0.44	-0.4
Chomsky	32.67	28.33	14.14	1.15	0.59	1.02	0.47	0.49	0.24	0.49	6.89	0.36	-2.15
Cook	26.03	20.41	11.34	1.27	0.49	0.74	0.41	0.37	0.2	0.5	5.91	0.31	-1.12
Corbett	25.6	21.22	11.18	1.2	0.58	0.87	0.45	0.29	0.15	0.51	5.84	0.34	1.22
Davies	35.76	29.22	13.1	1.22	0.65	1.14	0.51	0.36	0.16	0.45	5.82	0.35	-1.14
Dik	28.48	26.79	13.33	1.06	0.62	0.93	0.46	0.44	0.22	0.48	6.57	0.38	-1.45
Dubois	28.35	25.62	14.27	1.11	0.56	0.77	0.42	0.49	0.27	0.51	7.27	0.39	0.59
Dyen	24.5	22.28	12.15	1.06	0.5	0.78	0.41	0.31	0.16	0.5	5.91	0.48	0.76
Eliason	31.53	29.61	14.32	1.07	0.57	1	0.47	1.02	0.5	0.49	6.88	0.41	0.45
Emeneau	26.14	22.61	12.81	1.16	0.44	0.71	0.4	0.46	0.26	0.47	6.01	0.46	0.04
Fillmore	37.8	31.07	15.43	1.2	0.64	0.97	0.47	0.33	0.16	0.48	7.18	0.4	-1.05
Foley	22.49	18.49	13.55	1.21	0.33	0.36	0.26	0.49	0.36	0.54	7.5	0.43	-0.51
Fowkes	22.59	19.64	11.61	1.12	0.37	0.54	0.32	0.42	0.24	0.5	5.81	0.49	1.35
Fowler	29.1	23.89	13.92	1.21	0.44	0.67	0.39	0.6	0.35	0.49	6.94	0.41	-1.17
Fries	29.5	26.07	13.27	1.13	0.56	0.92	0.46	0.25	0.13	0.51	6.76	0.42	-1.13
Garvin	24.49	23.26	14.56	1.04	0.38	0.53	0.33	0.3	0.19	0.52	7.63	0.47	1.42
Geeraerts	30.41	24.45	13.18	1.24	0.57	0.82	0.44	0.38	0.2	0.5	6.93	0.38	-0.14
Givon	30	27.87	14.15	1.06	0.54	0.87	0.44	0.34	0.19	0.49	7.25	0.46	-0.07
Goldberg	22.02	20.14	10.78	1.07	0.49	0.81	0.42	0.29	0.15	0.51	5.59	0.39	0.4
Granville	47.31	31.91	14.22	1.49	0.63	1.01	0.45	0.23	0.1	0.45	6.55	0.38	-0.22
Haas	23.43	21.58	11.8	1.08	0.52	0.75	0.41	0.44	0.24	0.51	6.05	0.45	0.54
Halle	24.24	21.24	11.89	1.14	0.48	0.76	0.42	0.4	0.22	0.49	5.98	0.44	0.07
Halliday	34.71	27.28	16.32	1.27	0.44	0.63	0.37	0.68	0.41	0.48	8.02	0.39	-2.66
Haspelmath	22.89	19.98	12.1	1.14	0.43	0.61	0.37	0.33	0.2	0.51	6.6	0.47	0.66
Hawkins	32.26	26.21	13.49	1.23	0.58	0.9	0.46	0.64	0.33	0.52	7.24	0.39	0.28
Hengeveld	27.64	24.57	14.19	1.12	0.53	0.74	0.42	0.49	0.28	0.48	7.01	0.38	0.45
Hodge	17.05	15.85	9.75	1.07	0.32	0.5	0.31	0.36	0.22	0.47	5.06	0.52	1.86
Hoenigswald	23.45	22.89	12.74	1.02	0.46	0.69	0.38	0.4	0.22	0.5	6.38	0.48	0.77
Hopper	32.35	27.97	14.35	1.16	0.56	0.85	0.43	0.63	0.32	0.52	7.4	0.47	0.35
Hudson	47.84	37.98	16	1.25	0.68	1.27	0.52	0.45	0.19	0.45	7.3	0.34	-1.81
Hymes	32.11	28.47	18.12	1.13	0.38	0.54	0.34	0.85	0.54	0.51	9.28	0.44	-1.52
Jackendoff	27.68	24.32	12.7	1.13	0.57	0.85	0.44	0.46	0.24	0.52	6.8	0.41	-1.34
Joos	34.89	25.31	15.12	1.37	0.49	0.62	0.36	0.25	0.15	0.49	7.32	0.41	0.43
Kachru	29.06	26.74	15.59	1.09	0.47	0.68	0.39	0.56	0.33	0.5	8.09	0.42	-0.89
Kay	24.86	21.46	12.72	1.15	0.48	0.67	0.4	0.33	0.2	0.48	6.53	0.4	-0.47

NAME	MLS1	MLTU1	MLC1	TU/S1	C/T1	DC/T1	DC/C1	CP/T1	CP/C1	LD1	HLD1	LS1	SPLS1
Labov	27.96	22.18	13.18	1.26	0.49	0.64	0.38	0.42	0.24	0.51	6.76	0.38	-1.55
Lakoff	23.68	21.34	10.56	1.1	0.61	1.02	0.49	0.42	0.21	0.45	5.16	0.37	-1.23
Lamb	32.62	29.15	13.84	1.12	0.61	1.03	0.48	0.46	0.22	0.51	6.91	0.49	-0.96
Leech	28.48	23.93	13.57	1.19	0.51	0.7	0.39	0.52	0.29	0.48	6.7	0.43	-0.51
Lehmann	19.67	18.48	11.1	1.07	0.42	0.6	0.36	0.28	0.16	0.52	5.77	0.59	0.32
Lieberman	23.54	22.85	12.02	1.03	0.57	0.93	0.48	0.47	0.25	0.52	6.39	0.37	2.09
Longacre	27.07	25.01	13.83	1.08	0.46	0.71	0.39	0.62	0.34	0.51	7.49	0.51	1.99
Malkiel	35.14	32.77	21.59	1.04	0.4	0.49	0.31	0.38	0.24	0.51	9.56	0.63	-0.75
Martin	27.69	23.1	14.96	1.2	0.43	0.51	0.32	0.52	0.34	0.53	8.16	0.41	0.13
Matthiessen	34.51	25.41	14.48	1.36	0.49	0.66	0.37	0.59	0.33	0.48	7.08	0.39	0.61
Menges	23.2	23.41	14.81	0.98	0.33	0.5	0.31	0.4	0.25	0.51	7.79	0.55	0.31
Mulder	28.48	24.58	13.72	1.15	0.51	0.73	0.4	0.43	0.23	0.43	6.3	0.45	1.41
Palmer	32.17	24.68	14.77	1.3	0.49	0.63	0.37	0.59	0.35	0.45	7.12	0.43	0.59
Pike	22.56	23.36	15.2	0.96	0.4	0.58	0.35	0.46	0.3	0.48	7.48	0.38	0.67
Postal	44.86	41.3	16.33	1.08	0.72	1.41	0.55	0.3	0.11	0.49	8.09	0.38	-0.1
Quirk	53.82	40.09	18.26	1.35	0.56	1.04	0.47	0.69	0.31	0.51	8.87	0.42	-1.07
Read	26.15	21.55	12.59	1.21	0.47	0.56	0.33	0.35	0.2	0.5	6.46	0.43	0.26
Rizzi	33.47	28.23	13.68	1.18	0.57	0.94	0.44	0.45	0.22	0.49	6.97	0.41	0.2
Sampson	41.53	32.42	11.8	1.29	0.77	1.58	0.57	0.42	0.15	0.48	5.68	0.39	0
Sebeok	28.31	22.03	13.92	1.28	0.41	0.51	0.32	0.4	0.25	0.51	7.51	0.35	0.87
Sinclair	25.86	21.45	12.56	1.21	0.48	0.68	0.39	0.58	0.34	0.5	6.35	0.37	-0.71
Spitzer	50.92	44.39	22.42	1.17	0.55	0.85	0.43	0.29	0.15	0.49	9.97	0.59	0.05
Stubbs	22.13	19.34	11.02	1.14	0.49	0.74	0.41	0.48	0.27	0.5	5.7	0.36	-0.83
Swadesh	26.67	23.21	14.62	1.14	0.43	0.54	0.34	0.7	0.44	0.53	7.88	0.52	0.04
Swales	37.26	31.21	15.11	1.19	0.68	1.08	0.51	0.76	0.36	0.53	7.88	0.37	0.29
Thompson	24.32	21.72	10.93	1.11	0.59	0.94	0.46	0.22	0.11	0.46	5.2	0.38	-0.11
Trager	28.63	21.55	13	1.32	0.4	0.56	0.33	0.4	0.24	0.48	5.98	0.47	-0.22
Van Valin	28.79	20.63	12.52	1.39	0.48	0.61	0.36	0.46	0.28	0.49	6.24	0.44	1.16
Verschueren	31.28	28.19	15.54	1.11	0.5	0.78	0.43	0.49	0.27	0.5	8.08	0.42	-0.86
Wechsler	23.61	18.92	10.8	1.24	0.54	0.75	0.43	0.34	0.19	0.5	5.78	0.42	1.14
Whitney	22.31	20.88	13.67	1.06	0.39	0.5	0.32	0.43	0.28	0.5	6.69	0.54	0.73
Wierzbicka	30.36	25.67	11.25	1.18	0.61	1.12	0.48	0.29	0.13	0.44	5.28	0.35	0.38

Appendix 4.1.2: Late career complexity scores

	MLS2	MLTU2	MLC2	TU/S2	C/T2	DC/T2	DC/C2	CP/T2	CP/C2	LD2	HLD2	LS2	SPLS2
Abbot	27.47	24.39	11.45	1.12	2.12	1.06	0.49	0.44	0.2	0.46	61.1	0.39	0.56
Aikhenvald	25.98	23.61	14.67	1.1	1.59	0.54	0.33	0.62	0.39	0.5	41.33	0.45	0.37
Allan	34.76	28.11	16.01	1.23	1.75	0.7	0.39	0.53	0.3	0.53	65.39	0.54	-0.03
Biber	27.84	24.76	14.8	1.13	1.67	0.63	0.37	0.58	0.34	0.54	47.86	0.37	0.43
Bonfante	24.4	23.53	12.75	1.03	1.84	0.73	0.4	0.52	0.28	0.5	46.59	0.58	1.75
Bybee	26.92	24.83	12.49	1.08	1.99	0.94	0.47	0.65	0.33	0.51	40.83	0.42	-0.53
Chafe	27.21	22.56	10.98	1.2	2.05	1.02	0.49	0.52	0.25	0.5	51.83	0.37	-0.97
Cheshire	28.93	24.07	12.34	1.2	1.95	0.9	0.45	0.58	0.3	0.51	49.44	0.37	0
Chierchia	27.65	22.22	12.16	1.24	1.82	0.77	0.42	0.38	0.21	0.5	70.94	0.44	1.19
Chomsky	55.13	45.87	21.46	1.21	2.06	1.03	0.49	0.53	0.25	0.54	102.8	0.45	-2.02
Cook	32.91	26.33	13.46	1.25	2	0.93	0.45	0.48	0.24	0.52	67.64	0.35	0.57
Corbett	23.03	19.1	10.4	1.2	1.83	0.79	0.42	0.4	0.22	0.5	56.74	0.39	1.19
Davies	34.86	30.57	16.13	1.14	1.89	0.84	0.44	0.64	0.34	0.47	53.7	0.32	0.96
Dik	33.51	28.1	15.23	1.18	1.85	0.79	0.42	0.5	0.27	0.48	66.43	0.4	0.3
Dubois	31.71	28.84	14.78	1.09	1.96	0.94	0.47	0.45	0.23	0.53	70.43	0.46	0.05
Dyen	30.31	27.09	12.92	1.11	2.09	1.06	0.5	0.37	0.17	0.48	81.64	0.4	-1.01
Eliason	39.85	33.33	14.22	1.19	2.34	1.3	0.55	0.59	0.25	0.48	67.38	0.46	1.2
Emeneau	22.7	20.72	12.79	1.09	1.61	0.63	0.38	0.33	0.2	0.49	67.36	0.46	-1.28
Fillmore	36.41	30.16	15.12	1.2	2	0.96	0.48	0.48	0.24	0.51	74.65	0.41	-0.74
Foley	42.03	28.39	16.65	1.49	1.7	0.62	0.36	0.63	0.37	0.52	66.19	0.47	0.05
Fowkes	22.07	21	13.61	1.01	1.51	0.51	0.31	0.47	0.3	0.51	46.52	0.53	-0.07
Fowler	33.87	26.75	15.49	1.27	1.74	0.65	0.36	0.72	0.41	0.5	46.85	0.43	-0.52
Fries	23.59	21.62	11.59	1.09	1.87	0.82	0.43	0.4	0.21	0.49	58.65	0.36	-0.26
Garvin	27.61	25.2	13.16	1.09	1.91	0.86	0.45	0.41	0.21	0.5	66.99	0.35	0.12
Geeraerts	31.07	25.35	14.99	1.22	1.69	0.67	0.39	0.51	0.3	0.52	60.69	0.42	-0.26
Givon	22.71	21.72	15.51	1.04	1.39	0.41	0.29	0.54	0.38	0.55	41.73	0.48	0.65
Goldberg	24.07	21.16	10.77	1.13	1.96	0.93	0.47	0.44	0.22	0.51	53.59	0.39	-0.31
Granville	44.88	31.51	14.23	1.42	2.22	1.11	0.49	0.24	0.1	0.45	183.97	0.45	-0.23
Haas	24.5	22.55	12.31	1.08	1.83	0.77	0.42	0.57	0.31	0.51	42.52	0.41	0.1
Halle	27.84	25.07	12.6	1.1	1.99	0.99	0.48	0.31	0.16	0.49	87.56	0.41	0.42
Halliday	27.48	21.06	11.24	1.3	1.87	0.77	0.41	0.35	0.19	0.49	76.59	0.39	-2.55
Haspelmath	29.3	23.11	12.39	1.26	1.86	0.82	0.43	0.47	0.25	0.52	61.6	0.43	-0.75
Hawkins	33.74	29.26	15.53	1.16	1.88	0.86	0.45	0.74	0.39	0.51	45.15	0.46	0.21
Hengeveld	28.16	23.5	13.61	1.2	1.72	0.72	0.42	0.47	0.27	0.48	58.94	0.42	0
Hodge	19.31	18.84	11.54	1	1.62	0.51	0.31	0.3	0.18	0.47	63.51	0.46	-1.73
Hoenigswald	26.66	21.8	11.53	1.22	1.89	0.83	0.43	0.49	0.26	0.49	54.11	0.43	-1.52
Hopper	26.7	22.9	12.48	1.16	1.84	0.77	0.42	0.41	0.23	0.51	63.72	0.43	0.48
Hudson	29.75	20.85	11.09	1.42	1.88	0.88	0.46	0.41	0.22	0.49	71.68	0.34	-0.37
Hymes	21.55	19.03	12.11	1.11	1.55	0.53	0.33	0.52	0.33	0.49	41.15	0.37	-1.84
Jackendoff	25.68	21.87	12.25	1.17	1.78	0.75	0.42	0.46	0.25	0.5	55.8	0.41	-1.2
Joos	31.85	24.13	13.25	1.32	1.81	0.73	0.39	0.45	0.24	0.49	70.72	0.43	-0.92
Kachru	22.64	20.37	12.89	1.11	1.57	0.52	0.33	0.7	0.44	0.51	32.16	0.43	-0.28
Kay	28.18	26.4	14.52	1.06	1.85	0.78	0.41	0.53	0.29	0.51	52.64	0.45	1.68

MLS2	MLTU2	MLC2	TU/S2	C/T2	DC/T2	DC/C2	CP/T2	CP/C2	LD2	HLD2	LS2	SPLS2	MLS2
Labov	28.04	25.74	14.24	1.09	1.81	0.79	0.43	0.51	0.28	0.52	54.19	0.37	0.1
Lakoff	19.58	17.5	10.73	1.11	1.62	0.61	0.37	0.4	0.24	0.52	48.96	0.39	0.01
Lamb	31.37	26.08	14.29	1.2	1.84	0.78	0.41	0.52	0.29	0.49	59.43	0.37	-2.48
Leech	31.25	26.48	14.65	1.18	1.8	0.77	0.43	0.66	0.36	0.49	46.8	0.37	0.55
Lehmann	19.79	20.7	12.75	0.95	1.63	0.52	0.32	0.28	0.17	0.57	69.81	0.62	0.54
Lieberman	29.64	27.34	14.79	1.08	1.84	0.83	0.44	0.89	0.48	0.56	33.14	0.45	1.32
Longacre	28.3	24.79	13.6	1.14	1.83	0.8	0.43	0.46	0.24	0.47	61.28	0.41	0.72
Malkiel	45.26	40.74	26	1.09	1.55	0.5	0.31	0.6	0.38	0.52	75.19	0.54	-0.92
Martin	32.89	29.54	17.48	1.11	1.71	0.7	0.4	0.93	0.55	0.52	35	0.46	-0.43
Matthiessen	42.14	34.09	21.78	1.24	1.57	0.54	0.34	0.65	0.42	0.5	64.19	0.39	0.41
Menges	40.01	38.89	23.02	1.02	1.68	0.61	0.36	0.84	0.49	0.54	47.5	0.54	-0.72
Mulder	20.82	18.64	11.12	1.11	1.67	0.6	0.36	0.37	0.22	0.45	56.24	0.46	1.45
Palmer	35.04	26.38	14.27	1.33	1.85	0.78	0.41	0.82	0.44	0.46	42.24	0.32	1
Pike	22.72	22.47	12.68	1.01	1.76	0.69	0.39	0.65	0.36	0.47	34.63	0.33	-0.67
Postal	24.22	22.48	11.15	1.07	2.01	1	0.49	0.31	0.15	0.49	76.29	0.41	1.13
Quirk	36.49	29.28	13.75	1.24	2.11	1.05	0.48	0.58	0.28	0.48	61.95	0.4	-0.56
Read	26.03	20.43	10.97	1.27	1.88	0.79	0.4	0.25	0.14	0.5	101.98	0.38	2.05
Rizzi	39.76	32.16	18.02	1.24	1.79	0.68	0.37	0.45	0.25	0.52	87.93	0.45	0.8
Sampson	39.84	33.92	14.99	1.18	2.26	1.24	0.55	0.34	0.15	0.52	116.09	0.38	1.34
Sebeok	54.56	48.91	23.45	1.13	2.05	1.02	0.49	0.63	0.3	0.5	86.03	0.48	-0.41
Sinclair	33.61	22.81	11.8	1.48	1.94	0.89	0.45	0.47	0.24	0.49	71.23	0.36	-0.92
Spitzer	53.11	41.83	18.79	1.28	2.22	1.09	0.49	0.47	0.21	0.49	111.85	0.5	-0.65
Stubbs	26.8	21.8	13.56	1.23	1.61	0.58	0.36	0.72	0.45	0.54	37.07	0.42	-0.67
Swadesh	26.75	23.91	14.54	1.12	1.64	0.63	0.38	0.57	0.35	0.52	46.33	0.43	-1.07
Swales	40.61	31.29	17.41	1.29	1.79	0.76	0.42	0.52	0.28	0.53	77.93	0.48	0.9
Thompson	37.23	29.37	13.39	1.26	2.19	1.1	0.5	0.36	0.16	0.48	101.87	0.4	0.7
Trager	24.8	21.21	13.39	1.17	1.58	0.52	0.33	0.53	0.33	0.49	46.48	0.55	-0.67
Van Valin	24.29	19.17	12.08	1.26	1.59	0.56	0.35	0.39	0.24	0.48	61.95	0.44	2.05
Verschueren	32.82	28.7	16.09	1.14	1.77	0.75	0.42	0.53	0.29	0.51	61.88	0.41	-0.05
Wechsler	30.98	25.35	14.06	1.22	1.8	0.73	0.4	0.43	0.24	0.5	71.51	0.42	-0.24
Whitney	25.1	24.13	13.24	1.03	1.81	0.78	0.42	0.51	0.28	0.49	49.1	0.5	0.2
Wierzbicka	49.3	43.24	21.37	1.14	2.01	0.95	0.47	0.96	0.48	0.53	50.87	0.42	-0.18

Appendix 4.2: Coordinating preposition counts in TCL corpus (normalized 1000)

NAME	AND-EC	BUT-EC	OR-EC	AND_LC	BUT-LC	OR-LC
Abbot	20.33876	4.001067	7.868765	20.10828	4.253674	6.090487
Aikhenvald	32.48125	0.36414	6.554512	31.56689	1.51819	11.02836
Allan	23.65338	3.536954	6.189669	27.7588	3.912314	6.644725
Biber	31.74137	2.138454	3.52216	23.48529	2.250433	5.366417
Bonfante	21.97802	8.547009	9.76801	32.90574	6.692694	4.461796
Bybee	26.78476	3.703704	5.743425	23.85135	4.054054	8.074324
Chafe	21.65088	3.539086	6.557718	27.46097	6.754512	6.090134
Cheshire	24.69671	2.058059	3.249567	26.77974	3.273079	4.388901
Chierchia	15.39425	2.974482	3.861608	21.04499	4.837929	5.482987
Chomsky	22.80379	3.097365	6.104951	24.08727	5.248321	7.150551
Cook	21.0747	2.317114	2.868807	17.26227	3.331314	6.864527
Corbett	16.57813	4.030042	4.213226	20.69093	4.433771	4.618511
Davies	18.27333	4.048583	5.471058	23.12876	5.28137	3.642324
Dik	18.41013	6.172183	5.959349	23.766	2.089318	2.611648
Dubois	17.30186	4.875438	8.14555	20.80367	4.408726	3.628014
Dyen	20.48256	3.298039	4.860267	17.91912	4.249593	4.674552
Eliason	33.45725	4.460967	15.36555	24.57085	7.404914	6.395153
Emeneau	26.34536	3.870646	5.993258	26.03152	4.072959	7.024379
Fillmore	13.46649	3.026176	3.631412	23.53471	3.490794	6.587467
Foley	28.78839	4.495825	4.042465	29.23634	7.52909	7.431309
Fowkes	15.6503	3.777658	3.237992	27.49361	4.955243	5.914322
Fowler	30.29126	2.718447	5.242718	34.15326	4.068117	4.635762
Fries	13.48281	3.029844	3.635813	22.13595	2.043318	3.677973
Garvin	17.89976	0.954654	5.966587	17.04545	1.002674	5.180481
Geeraerts	18.25247	4.603931	4.701887	23.54902	4.709804	3.333092
Givon	13.90096	2.027223	7.240081	25.55831	6.947891	6.947891
Goldberg	13.0623	2.550626	4.09646	22.72727	3.837072	6.965762
Granville	13.71558	7.218727	6.39373	17.54059	6.344467	2.239224
Haas	22.12778	3.516999	6.447831	27.02188	4.186489	9.895338
Halle	29.69697	2.909091	5.575758	8.885299	2.261712	3.634895
Halliday	24.0584	5.235748	7.197991	25.0279	5.726536	5.308058
Haspelmath	18.68868	5.528734	3.737736	30.02373	7.772466	5.433848
Hawkins	27.7613	3.403804	6.495331	35.06154	2.735298	6.216586
Hengeveld	19.2647	0.987933	3.881166	19.95757	2.27862	3.692936
Hodge	21.77215	6.075949	4.050633	20.20256	2.963043	4.14826
Hoenigswald	21.99817	2.520623	8.249313	22.80791	6.969083	6.208819
Hopper	24.03444	4.543824	5.26127	20.09476	5.227904	4.247672
Hudson	18.32695	3.746844	8.715484	24.31052	6.435138	6.230848
Hymes	35.562	4.050827	6.396043	31.4122	5.190511	6.113268
Jackendoff	22.7656	2.529511	3.252228	24.57209	4.620393	5.145437
Joos	15.6344	8.117859	6.313891	23.6417	5.286344	7.63583
Kachru	25.51822	2.170171	6.959515	40.47598	2.692608	5.037783

Kay	18.42833	3.290773	5.133605	25.63555	1.922666	3.418073
Labov	23.26217	4.410445	5.464268	23.33799	3.204865	3.122689
Lakoff	19.45095	3.62495	3.890191	25.93648	3.211948	4.777773
Lamb	20.94104	6.331011	5.993856	22.1545	4.081092	4.955612
Leech	22.77414	3.765803	7.531606	32.61995	3.969624	3.797031
Lehmann	20.03163	2.635741	3.426463	14.13383	2.876798	4.878049
Lieberman	21.10758	0.68089	3.858375	28.5533	0.761421	5.456853
Longacre	25.49501	4.336242	9.821848	25.27681	3.243485	5.088916
Malkiel	21.34813	2.521432	3.782148	25.65506	2.972233	6.883066
Martin	25.62301	1.351424	4.757014	35.20962	1.57655	5.722294
Matthiessen	26.80566	5.694013	6.570014	24.96825	3.376599	6.970044
Menges	20.86088	2.791244	4.994858	24.03418	4.717821	6.854193
Mulder	22.18264	3.562176	11.65803	18.04023	8.046723	8.825438
Palmer	29.8568	10.80789	5.674142	35.79998	6.814474	6.526538
Pike	18.95735	3.080569	7.464455	21.97527	4.846257	18.54947
Postal	10.23891	1.877133	4.095563	17.06529	5.559147	1.680672
Quirk	28.63894	5.293006	8.31758	26.76359	5.286635	7.43433
Read	20.11385	6.451613	4.364326	17.49715	4.1841	2.662609
Rizzi	14.45087	4.457725	4.604683	21.30138	3.494758	4.576469
Sampson	19.62655	7.223661	5.588115	15.06024	5.082831	2.070783
Sebeok	28.49296	3.432887	3.432887	21.9852	3.918154	6.421419
Sinclair	29.15194	4.770318	5.300353	28.07369	5.473486	5.238067
Spitzer	15.76638	4.250069	2.056485	22.9516	4.994649	3.091925
Stubbs	30.94691	5.849415	6.549345	38.62631	6.601587	5.96952
Swadesh	28.60195	5.221932	10.56254	23.70386	5.087131	7.035393
Swales	29.31956	2.765997	6.453992	25.16654	3.700962	7.401925
Thompson	11.34301	5.142166	3.932244	17.80344	3.007338	6.977024
Trager	26.51163	6.511628	8.217054	31.477	4.415325	12.81869
Van Valin	28.98551	3.344482	4.630821	24.54992	1.636661	3.818876
Verschueren	19.53963	2.953194	5.744569	22.59295	3.813155	7.244995
Wechsler	19.27913	7.124895	7.334451	21.19576	7.59848	8.09838
Whitney	24.5414	5.453644	9.915716	25.19459	4.916018	10.2417
Wierzbicka	17.87624	5.958747	3.514133	34.00366	4.753199	4.265692

Appendix 4.3: Lexical cohesion measures in TCL corpus

NAME	LSAEC	LSALC	MEAN_LSA	PNR-EC	PNR-LC	MEAN-PNR	RCL-EC	RCL-LC	MEAN-RCL	MEAN_LEXDIV
Abbot	0.16	0.2	0.18	0.19	0.18	0.19	0.47	0.43	0.45	0.77
Aikhenvald	0.11	0.12	0.11	0.06	0.07	0.07	0.52	0.52	0.52	0.76
Allan	0.15	0.12	0.14	0.13	0.11	0.12	0.45	0.45	0.45	0.77
Biber	0.21	0.19	0.2	0.08	0.09	0.08	0.54	0.55	0.55	0.75
Bonfante	0.3	0.17	0.24	0.15	0.1	0.13	0.29	0.36	0.33	0.78
Bybee	0.14	0.16	0.15	0.15	0.13	0.14	0.52	0.52	0.52	0.75
Chafe	0.26	0.16	0.21	0.13	0.19	0.16	0.44	0.43	0.43	0.77
Cheshire	0.3	0.13	0.22	0.21	0.16	0.19	0.44	0.48	0.46	0.77
Chierchia	0.17	0.13	0.15	0.15	0.14	0.14	0.49	0.49	0.49	0.77
Chomsky	0.16	0.14	0.15	0.21	0.16	0.19	0.48	0.51	0.49	0.76
Cook	0.3	0.33	0.31	0.19	0.13	0.16	0.46	0.52	0.49	0.76
Corbett	0.14	0.14	0.14	0.12	0.12	0.12	0.5	0.44	0.47	0.76
Davies	0.32	0.22	0.27	0.3	0.2	0.25	0.44	0.47	0.46	0.75
Dik	0.33	0.17	0.25	0.16	0.13	0.14	0.45	0.44	0.45	0.76
Dubois	0.16	0.13	0.14	0.1	0.11	0.11	0.5	0.51	0.5	0.78
Dyen	0.2	0.17	0.19	0.09	0.15	0.12	0.45	0.46	0.46	0.74
Eliason	0.13	0.1	0.11	0.2	0.22	0.21	0.38	0.37	0.38	0.77
Emeneau	0.17	0.25	0.21	0.17	0.1	0.13	0.41	0.46	0.44	0.75
Fillmore	0.1	0.15	0.07	0.1	0.13	0.06	0.1	0.48	0.24	0.74
Foley	0.13	0.15	0.14	0.12	0.13	0.12	0.5	0.5	0.5	0.77
Fowkes	0.12	0.1	0.11	0.1	0.11	0.11	0.36	0.39	0.37	0.79
Fowler	0.27	0.13	0.2	0.14	0.16	0.15	0.37	0.43	0.4	0.78
Fries	0.16	0.17	0.16	0.11	0.14	0.12	0.47	0.47	0.47	0.71
Garvin	0.18	0.39	0.29	0.05	0.1	0.08	0.45	0.46	0.45	0.7
Geeraerts	0.16	0.18	0.17	0.16	0.12	0.14	0.48	0.49	0.49	0.75
Givon	0.14	0.31	0.23	0.1	0.08	0.09	0.42	0.47	0.45	0.77
Goldberg	0.3	0.28	0.29	0.17	0.14	0.16	0.49	0.5	0.5	0.75
Granville	0.33	0.25	0.29	0.27	0.25	0.26	0.4	0.36	0.38	0.75
Haas	0.29	0.26	0.27	0.11	0.13	0.12	0.46	0.44	0.45	0.74
Halle	0.28	0.33	0.31	0.11	0.15	0.13	0.48	0.45	0.47	0.74
Halliday	0.34	0.26	0.3	0.15	0.19	0.17	0.49	0.49	0.49	0.75
Haspelmath	0.17	0.18	0.17	0.11	0.15	0.13	0.49	0.51	0.5	0.76
Hawkins	0.17	0.13	0.15	0.12	0.1	0.11	0.52	0.5	0.51	0.77
Hengeveld	0.2	0.19	0.2	0.11	0.12	0.11	0.49	0.49	0.49	0.73
Hodge	0.17	0.2	0.19	0.11	0.12	0.11	0.35	0.47	0.41	0.75
Hoeningswald	0.22	0.2	0.21	0.12	0.21	0.17	0.41	0.39	0.4	0.78
Hopper	0.23	0.23	0.23	0.1	0.17	0.13	0.44	0.42	0.43	0.78
Hudson	0.33	0.18	0.25	0.18	0.14	0.16	0.44	0.46	0.45	0.75
Hymes	0.28	0.13	0.2	0.08	0.14	0.11	0.47	0.47	0.47	0.76
Jackendoff	0.36	0.27	0.32	0.14	0.15	0.14	0.48	0.44	0.46	0.76
Joos	0.27	0.23	0.25	0.11	0.21	0.16	0.42	0.37	0.39	0.78
Kachru	0.18	0.16	0.17	0.1	0.11	0.1	0.46	0.45	0.46	0.75
Kay	0.18	0.14	0.16	0.11	0.09	0.1	0.46	0.49	0.47	0.73
Labov	0.28	0.27	0.28	0.12	0.1	0.11	0.47	0.47	0.47	0.77

Lakoff	0.31	0.3	0.31	0.22	0.1	0.16	0.47	0.52	0.49	0.72
Lamb	0.15	0.14	0.15	0.19	0.17	0.18	0.47	0.48	0.48	0.78
Leech	0.14	0.22	0.18	0.12	0.13	0.13	0.4	0.41	0.41	0.77
Lehmann	0.13	0.09	0.11	0.09	0.06	0.07	0.47	0.44	0.46	0.77
Lieberman	0.17	0.14	0.15	0.1	0.09	0.09	0.47	0.52	0.5	0.75
Longacre	0.31	0.24	0.28	0.09	0.11	0.1	0.48	0.46	0.47	0.74
Malkiel	0.11	0.11	0.11	0.08	0.07	0.08	0.4	0.4	0.4	0.78
Martin	0.14	0.14	0.14	0.11	0.07	0.09	0.5	0.51	0.51	0.78
Matthiessen	0.17	0.17	0.17	0.15	0.08	0.12	0.49	0.54	0.51	0.74
Menges	0.18	0.21	0.19	0.08	0.07	0.08	0.42	0.44	0.43	0.77
Mulder	0.16	0.11	0.14	0.14	0.14	0.14	0.42	0.41	0.42	0.68
Palmer	0.19	0.16	0.17	0.15	0.19	0.17	0.46	0.47	0.46	0.7
Pike	0.13	0.25	0.19	0.1	0.15	0.12	0.47	0.45	0.46	0.74
Postal	0.16	0.14	0.15	0.17	0.18	0.17	0.47	0.48	0.47	0.77
Quirk	0.28	0.13	0.21	0.16	0.21	0.18	0.42	0.41	0.42	0.78
Read	0.12	0.14	0.13	0.18	0.15	0.16	0.36	0.29	0.33	0.79
Rizzi	0.15	0.13	0.14	0.12	0.07	0.1	0.5	0.51	0.51	0.76
Sampson	0.17	0.15	0.16	0.18	0.12	0.15	0.42	0.45	0.44	0.78
Sebeok	0.25	0.21	0.23	0.14	0.15	0.14	0.39	0.37	0.38	0.79
Sinclair	0.12	0.22	0.17	0.18	0.15	0.17	0.4	0.47	0.43	0.77
Spitzer	0.19	0.29	0.24	0.11	0.18	0.14	0.36	0.36	0.36	0.79
Stubbs	0.14	0.15	0.14	0.13	0.09	0.11	0.49	0.5	0.5	0.78
Swadesh	0.22	0.22	0.22	0.08	0.09	0.08	0.51	0.46	0.48	0.79
Swales	0.24	0.13	0.18	0.17	0.12	0.14	0.4	0.46	0.43	0.8
Thompson	0.22	0.21	0.22	0.17	0.18	0.18	0.43	0.46	0.44	0.76
Trager	0.24	0.23	0.24	0.11	0.11	0.11	0.43	0.44	0.44	0.75
Van Valin	0.17	0.15	0.16	0.12	0.09	0.1	0.47	0.47	0.47	0.74
Verschueren	0.16	0.17	0.17	0.12	0.09	0.1	0.48	0.47	0.47	0.78
Wechsler	0.15	0.17	0.16	0.12	0.11	0.11	0.46	0.49	0.47	0.73
Whitney	0.15	0.21	0.18	0.1	0.15	0.12	0.38	0.4	0.39	0.79
Wierzbicka	0.16	0.21	0.19	0.35	0.14	0.24	0.4	0.46	0.43	0.76

Appendix 4.4: Technical and non-technical terms in the TCL corpus¹⁸

PERIOD	AUTHOR	TERM1	TYPE	log	CRAMV	TECHNICALITY
LC	Read	you	Pronoun	273.9	0.0813	Non-technical
LC	Read	know	Verb	265.53	0.0809	Non-technical
LC	Cook	dependency	Noun	734.34	0.0783	Technical
EC	Kay	taxa	Noun	482.42	0.0733	Technical
EC	Davies	comment	Noun	586.45	0.0727	Technical
LC	Cook	I	Pronoun	741.24	0.071	Non-technical
EC	Kay	contrast	Nominalization	512.03	0.0669	Technical
LC	Kay	tag	Noun	479.19	0.0653	Non-technical
EC	Read	semantics	Noun	190.22	0.0653	Technical
EC	Davies	adjuncts	Noun	405.7	0.0633	Technical
EC	Kay	taxon	Noun	317.63	0.0595	Technical
EC	Davies	test	Noun	347.91	0.0534	Technical
LC	Kay	polarity	Noun	342.74	0.0534	Technical
LC	Kay	host	Noun	336.05	0.0532	Non-technical
EC	Kay	taxonomic	Adjective	275.08	0.0518	Technical
LC	Dik	nlu	Noun	140.48	0.0494	Technical
LC	Davies	TRUE	Adjective	418.68	0.049	Non-technical
EC	Labov	contraction	Nominalization	464.5	0.0479	Technical
EC	Cook	children	Noun	266.84	0.0472	Technical
LC	Davies	subjunctive	Noun	275.11	0.0462	Technical
LC	Kay	naming	Verb	262.28	0.046	Non-technical
LC	Davies	epistemic	Adjective	311.04	0.0448	Technical
EC	Cook	acquisition	Nominalization	241.82	0.0447	Technical
EC	Cook	adults	Noun	217.54	0.0443	Technical
EC	Labov	deletion	Nominalization	401.38	0.0436	Technical
LC	Cook	users	Noun	286.82	0.0436	Technical
EC	Davies	adjunct	Noun	211.44	0.0431	Technical
EC	Dik	productive	Adjective	207.93	0.0427	Technical
EC	Kay	oak	Noun	169.32	0.0424	Non-technical
LC	Davies	believed	Verb	257.2	0.0422	Non-technical
EC	Kay	appendix	Noun	160.46	0.0417	Technical
LC	Cook	structure	Noun	418.1	0.0417	Technical

¹⁸ This sample contains 100 observations. The original dataset contains 1650 observations.

EC	Kay	taxonomy	Noun	168.1	0.0413	Technical
LC	Kay	tags	Noun	203.78	0.041	Technical
LC	Kay	berinmo	Noun	185.74	0.0409	Non-technical
EC	Hudson	ic	Noun	220.03	0.04	Technical
LC	Davies	FALSE	Adjective	227.21	0.0395	Non-technical
LC	Davies	probability	Noun	238.28	0.0394	Technical
LC	Kay	color	Noun	190.99	0.0387	Non-technical
LC	Labov	change	Nominalization	297.9	0.0387	Technical
LC	Read	what	Pronoun	103.01	0.038	Non-technical
EC	Dik	generative	Adjective	216.26	0.038	Technical
LC	Labov	misunderstandings	Nominalization	194.05	0.0377	Technical
LC	Kay	hue	Noun	157.58	0.0377	Technical
EC	Cook	child	Noun	192.56	0.0373	Technical
LC	Read	students	Noun	52.82	0.0372	Non-technical
LC	Dik	underlying	Adjective	141.77	0.037	Non-technical
LC	Hudson	cost	Noun	172.59	0.0368	Non-technical
EC	Labov	island	Noun	266.31	0.0362	Non-technical
EC	Davies	origin	Noun	152.66	0.0353	Technical
LC	Davies	belief	Nominalization	212.56	0.0347	Technical
EC	Read	he	Pronoun	91.39	0.0345	Non-technical
EC	Cook	model	Noun	187.48	0.0343	Technical
LC	Labov	chicago	Noun	154.19	0.0342	Non-technical
LC	Cook	poverty	Noun	148.43	0.0342	Technical
LC	Chierchia	subj	Noun	134.99	0.0342	Technical
LC	Kay	nrp	Noun	129.43	0.0342	Technical
LC	Chierchia	alternatives	Noun	144.28	0.0341	Non-technical
LC	Davies	subset	Noun	160.73	0.0341	Technical
LC	Hudson	money	Noun	162.98	0.034	Non-technical
LC	Kay	null	Adjective	137.67	0.034	Technical
EC	Cook	competence	Noun	158.05	0.0339	Technical
LC	Labov	philadelphia	Noun	152.86	0.0338	Non-technical
EC	Read	science	Noun	55.01	0.0337	Technical
LC	Cook	grammaticality	Noun	138	0.0337	Technical
EC	Labov	vineyard	Noun	226.19	0.0335	Technical
LC	Davies	propositions	Noun	167.43	0.0334	Technical
LC	Chierchia	gricean	Noun	131.17	0.0334	Technical

EC	Kay	terminal	Noun	127.96	0.0332	Technical
LC	Kay	sci	Noun	128.76	0.0331	Technical
EC	Read	korzybski	Noun	48.11	0.033	Technical
LC	Davies	modal	Noun	173.47	0.0329	Technical
EC	Davies	resultant	Adjective	112.25	0.0325	Non-technical
LC	Hudson	seal	Noun	124.59	0.0325	Non-technical
LC	Hudson	isa	Verb	121.68	0.0325	Non-technical
EC	Davies	clause	Noun	239	0.0323	Technical
LC	Read	taboo	Noun	38.76	0.032	Non-technical
LC	Cook	violations	Nominalization	125.88	0.0319	Technical
LC	Labov	volume	Noun	153.35	0.0318	Non-technical
LC	Cook	stimulus	Noun	138.23	0.0317	Technical
LC	Cook	arabic	Noun	123.53	0.0313	Non-technical
LC	Cook	groups	Noun	184.07	0.0312	Non-technical
EC	Davies	honestly	Adjunct	95.98	0.0308	Non-technical
EC	Read	word	Noun	69.74	0.0308	Technical
EC	Cook	duck	Noun	95.44	0.0305	Non-technical
EC	Read	semasiology	Noun	40.71	0.0304	Technical
LC	Cook	movement	Noun	171.74	0.0303	Technical
EC	Labov	variable	Noun	200.69	0.0302	Technical
LC	Kay	green	Adjective	109.69	0.0301	Non-technical
LC	Chierchia	quantity	Noun	108.35	0.03	Technical
EC	Labov	centralization	Nominalization	178.9	0.0298	Technical
EC	Dik	phonemic	Noun	131.69	0.0298	Technical
EC	Kay	mapping	Nominalization	84.57	0.0294	Technical
LC	Kay	centroids	Noun	95.66	0.0294	Technical
LC	Kay	sempol	Noun	95.66	0.0294	Technical
LC	Cook	questions	Noun	180.7	0.0292	Non-technical
EC	Kay	set	Noun	175.29	0.0291	Technical
EC	Chierchia	propositional	Adjective	153.9	0.0291	Technical
LC	Cook	type	Noun	187.82	0.029	Non-technical

Appendix 5.1¹⁹: Round 1 analysis of evaluative lexicogrammar

Career Period	Scholar	Clause	Evaluation	Speech function
P2	DIK	The phonological part describes the minima of form (phonemic features, phonemes, relevant stresses and tones, all of these taken in a linguistic, not in a physical sense) occurring in the language.	Neutral	Statement
P2	DIK	The grammatical part describes the ways in which the semantic aspects, as well as other, purely grammatical aspects and functions, are 'manifested' in forms, and how these forms combine into larger wholes.	Neutral	Statement
P2	DIK	Within the grammar, the word plays a vital role, justifying the distinction of a morphological and a syntactic sub- part.	Evaluative	Statement
P2	DIK	Syntax deals, in principle, with the ways in which words are combined into larger constructions,	Neutral	Statement
P2	DIK	while morphology is concerned with the internal grammatical structure of words.	Neutral	Statement
P2	DIK	This division should not be taken as a water-tight 'compartmentalization', to borrow Pike's felicitous term 2);	Evaluative	Command
P2	DIK	nor should it be understood as implying that in any language there is an absolutely clear-cut boundary between the two subparts:	Evaluative	Command
P2	DIK	morphology and syntax are interacting and interdependent subsystems within the total grammatical system.	Neutral	Statement
P2	DIK	The internal grammatical structure of words falls into three different types,	Neutral	Statement
P2	DIK	which have traditionally been labeled composition, derivation,, and inflection.	Neutral	Statement
P2	DIK	Composition and derivation stand off against inflection in that they concern the stem rather than the whole word:	Neutral	Statement
P3	DIK	derivation and inflection stand off against composition in that they involve the combination of roots or stems with affixes,	Neutral	Statement
P2	DIK	whereas composition involves the combination of roots with roots or of stems with stems.	Neutral	Statement
P2	DIK	Again, as is well-known, the clear distinction of derivation, and inflection in any one particular language has many problems of its own.	Evaluative	Statement
P2	DIK	Still, we do not think that these problems are such as to render the distinction in itself superfluous or counterfactual.	Evaluative	Statement
P2	DIK	Both roots and affixes are morphemes.	Neutral	Statement

¹⁹ This appendix shows an 80-clause sample of the analysis. The original dataset contains 12.454 observations.

P2	DIK	Morphemes can be regarded as equivalence classes of morphs, i.e. of elements having a significant similarity of form and of semantic or grammatical aspect,	Neutral	Statement
P3	DIK	and whose possible formal differences are either in free variation or phonemically conditioned by their environment.	Neutral	Statement
P2	DIK	Morphemes are the smallest elements having either a semantic or a grammatical aspect.	Neutral	Statement
P2	DIK	They are manifested in morphs,	Neutral	Statement
P2	DIK	while morphs consist of formal minima.	Neutral	Statement
P2	DIK	Our conception of the morpheme is different from the one which has become generally accepted in American linguistics (post-Bloomfieldian and post-post-Bloomfieldian) in that we retain the direct relation between morphemes and morphs and therefore, indirectly, with formal manifestations, while in the American acceptance of the term the criterion of similar function or meaning has driven the criterion of similar form into the background.	Evaluative	Statement
P2	DIK	One example may clarify the difference.	Evaluative	Statement
P2	DIK	In American linguistics, the plural-formation of the English noun is generally described as involving one 'morpheme' {Plural}.	Neutral	Statement
P2	DIK	In this way, certain significant differences within the class of plural-formations are obscured.	Evaluative	Statement
P2	DIK	We would say, rather, that Plural is a semantic aspect which is carried by different morphemes.	Evaluative	Statement
P2	DIK	First of all, we should distinguish the morpheme which enters into productive formations from those which characterize unproductive formations.	Evaluative	Command
P2	DIK	The former is the morpheme {-z, -s, -iz}, comprising the morphs /z/, /s/, and /iz/, as in <i>cents</i> , <i>books</i> , <i>glasses</i> .	Neutral	Statement
P2	DIK	The latter are a group of morphemes of quite restricted distribution, including {-an} (as in <i>oxen</i>), {-ran} (as in <i>children</i>), {-s} (as in <i>dice</i>), etc.	Neutral	Statement
P2	DIK	In actual fact, the plural-formation of English nouns is much more complicated than this,	Evaluative	Statement
P2	DIK	since significant differences of the plural-stems versus the singular words are also involved,	Evaluative	Statement
P2	DIK	but the few remarks made here may suffice to indicate the fundamental difference between our view of the morpheme and the prevailing American one.	Evaluative	Statement
P2	DIK	In the body of this article, some of the considerations underlying this difference will become apparent.	Neutral	Statement

P2	DIK	Morphology is concerned, first, with the inventory of morphs found in a particular language and their subsumption under morphemes; second, with the hierarchical structure of morphemes within words; and third, with the morphological systems constituted by the word, the basis of their internal morphological build-up.	Neutral	Statement
P2	DIK	It is the second field which we mean by the term 'morphological structure'.	Neutral	Statement
P2	DIK	We believe that transformational generative grammar as developed so far has not given the specific problems of morphological structure as we understand it here the place which they deserve within the total theory of language.	Evaluative	Statement
P2	DIK	This is reflected by the fact that until quite recently distinct morphological level or component was set up by the side of the syntactic, the phonological, and the semantic components of a generative grammar 3),	Evaluative	Statement
P2	DIK	questions pertaining to morphological structure being divided between syntax (in as far as syntactically relevant morphological values or functions are concerned) and phonology, or (in earlier versions) morphophonemics (for all facts concerning the actual formal manifestation of these values or functions).	Neutral	Statement
P2	DIK	As we shall see below, this division tends to obscure the problems at stake,	Evaluative	Statement
P2	DIK	and certainly does not solve them.	Evaluative	Statement
P2	DIK	We see two main reasons for this comparative neglect of morphology, one practical and the other theoretical.	Evaluative	Statement
P2	DIK	The practical source lies in the fact that in contradistinction to the prevailing practice in American (in particular, Bloomfieldian) linguistics up to about 1950 ,	Neutral	Statement
P2	DIK	which was mainly concerned with the 'lower' levels of linguistic structure, transformational generative grammar from the very start concentrated on the 'higher', syntactic level, partly incorporating the description of morphology, and partly leaving it for later treatment.	Neutral	Statement
P2	DIK	"the theoretical source is the priority given to grammatical rules over linguistic units in the Chomskian approach.	Neutral	Statement
P2	DIK	Again, this constitutes a radical and, in part, quite justified departure from the orientation of earlier linguistic theories.	Evaluative	Statement
P2	DIK	Indeed, a somewhat paradoxical characteristic of many representatives of modern 'structural' linguistics is that they have so little occupied themselves with structures.	Evaluative	Statement

P2	DIK	In the existing literature, discussions of problems regarding the nature of linguistic units like sentence, word, morpheme, phoneme, stress, tone, distinctive feature, etc. by far exceed treatments of the ways in which such units combine into complex wholes, and of the descriptive devices needed to account for these complexes.	Neutral	Statement
P2	DIK	Reacting to this preoccupation with units, transformational generative grammar has gone to the other extreme by stressing the prime importance of structure-specifying rules, and by often treating questions regarding the establishment and definition of units as comparatively unimportant or even as pseudo-problems.	Evaluative	Statement
P2	DIK	Or rather, the units figuring in a generative grammar are regarded as constructs which receive their definition from the theoretical framework in which they are embedded, and whose relation to the facts of speech is at most an indirect one.	Neutral	Statement
P2	DIK	Discussion or definition of these units outside of the complete grammar or theory in which they find their place is judged to be impossible (el. Lees 1957: 39 I, Chomsky 1962a: ! 26, 1962b: 537, Bierwisch 1962).	Evaluative	Statement
P2	DIK	As a consequence of this view, no attempt has been made as yet within the context of transformational generative grammar to arrive at general[definitions of, or criteria for such units as 'morpheme', 'root', 'stem', 'affix', 'derivative'~ 'compound', 'word', etc.	Evaluative	Statement
P2	DIK	It is our contention that in the absence of at least a preliminary delimitation of such concepts as these, the study of intra-word grammatical structure cannot well proceed. 4)	Evaluative	Statement
P2	DIK	Partly as a result of these tendencies, factual treatments of morphological structure have so far been scarce and somewhat sketchy in the transformational literature.	Evaluative	Statement
P2	DIK	For English nominal composition there is, of course:, Lees' extensive discussion ,	Evaluative	Statement
P2	DIK	but it is to be noted that exactly this part of Lees' book has provoked most criticism.	Evaluative	Statement
P2	DIK	A transformational approach to Sanskrit composition was suggested by Staal (1966: 188--98).	Neutral	Statement
P2	DIK	As to ,derivation, it has been doubted whether derivational structures which are not fully productive can be satisfactorily dealt .with in a generative framework at all (see Lees 1957 : 414-5, Zimmer 196a: 18- 29, 26, 83-9, Chomsky 1965: 184ff, Marchand 1966: 141)	Evaluative	Statement
P2	DIK	Inflection, finally, has in part been incorporated in existing transformational descriptions,	Neutral	Statement

P2	DIK	though the emphasis on the description of Modern English with its comparatively simple inflectional structure has not confronted the theory with all the intricacies that may be met in this field.	Evaluative	Statement
P2	DIK	Chomsky, though being much more optimistic about the possibility to cope with these problems than in the case of derivation (1965: 171- 84), admits	Evaluative	Statement
P2	DIK	that there have been few precise descriptions of inflectional systems to substantiate this claim (ibid. 174).	Evaluative	Statement
P2	DIK	In the course of the following argument, we shall distinguish clearly between the two terms 'generative' and 'transformational'.	Evaluative	Statement
P2	DIK	which are sometimes used as if they were interchangeable equivalents.	Neutral	Statement
P2	DIK	though in fact they embody quite different principles.	Neutral	Statement
P2	DIK	A generative description is a complete and explicit description by means of rules.	Evaluative	Statement
P2	DIK	A transformational description is a generative description in which part of these rules are transformational rules, i.e. rules which operate on certain simple structures, changing or modifying these in certain ways to result in other, more complex structures.	Neutral	Statement
P2	DIK	The term 'generative' refers to the final and ideal aim of language description and linguistic theory.	Evaluative	Statement
P2	DIK	The term 'transformational' refers to a substantive proposal for reaching this aim.	Neutral	Statement
P2	DIK	Many points concerning generative grammar can and must be approached independently of the theory of transformational grammar.	Evaluative	Command
P2	DIK	One can be a generative grammarian	Evaluative	Statement
P2	DIK	even if one does not endorse the transformational view.	Neutral	Statement
P2	DIK	We can even go as far as saying that the expression 'generative grammar' is a pleonasm,	Evaluative	Command
P2	DIK	since the aim of any linguist must be to arrive at complete and explicit descriptions by means of rules.	Evaluative	Command
P2	DIK	When, therefore, we use the term 'generative' in the following pages,	Neutral	Statement
P2	DIK	we refer to such a description (or the theory underlying it),	Neutral	Statement
P2	DIK	regardless of whether it incorporates transformational rules.	Neutral	Statement
P2	DIK	When, on the other hand, we talk about the latter,	Neutral	Statement
P2	DIK	we shall explicitly note them as such.	Neutral	Statement

P2	DIK	We would now like to consider the question whether a complete generative description of morphological structure is at all possible.	Evaluative	Question
P2	DIK	The answer to this question depends on what we expect a generative description to be.	Neutral	Statement
P2	DIK	Two different points of view should be clearly distinguished.	Evaluative	Command
P2	DIK	The first view is that a generative description merely formalizes the way in which the linguist thinks the language in question should be analyzed.	Evaluative	Statement
P2	DIK	We shall call this the linguistic point of view.	Evaluative	Command
P2	DIK	The second opinion is that a generative grammar should in some way represent what a native speaker knows about his language.	Evaluative	Statement

Appendix 5.2²⁰ : Round 2 analysis of evaluative lexicogrammar

Career Period	AUTHOR	CLAUSE	Probability	Comment assessment	Appreciation
Early	DIK	Still, we have good reasons to take exception to it.	No	No	Yes
Early	DIK	Again, as is well-known, the clear distinction of derivation, and inflection in any one particular language has many problems of its own.	No	Yes	Yes
Early	DIK	One example may clarify the difference.	Yes	No	Yes
Early	DIK	In this way, certain significant differences within the class of plural-formations are obscured.	No	No	Yes
Early	DIK	We would say, rather, that Plural is a semantic aspect which is carried by different morphemes.	Yes	No	No
Early	DIK	In actual fact, the plural-formation of English nouns is much more complicated than this,	No	Yes	No
Early	DIK	but the few remarks made here may suffice to indicate the fundamental difference between our view of the morpheme and the prevailing American one.	Yes	No	Yes
Early	DIK	and certainly does not solve them.	No	Yes	Yes
Early	DIK	Again, this constitutes a radical and, in part, quite justified departure from the orientation of earlier linguistic theories.	No	No	Yes
Early	DIK	It is our contention that in the absence of at least a preliminary delimitation of such concepts as these, the study of intra-word grammatical structure cannot well proceed. 4)	No	Yes	No
Early	DIK	Partly as a result of these tendencies, factual treatments of morphological structure have so far been scarce and somewhat sketchy in the transformational literature.	No	No	Yes
Early	DIK	For English nominal composition there is, of course; Lees' extensive discussion (1960: 113-79),	No	Yes	Yes

²⁰This appendix shows an 32-clause sample of the analysis. The original dataset contains 2005 observations.

Early	DIK	though the emphasis on the description of Modern English with its comparatively simple inflectional structure has not confronted the theory with all the intricacies that may be met in this field.	Yes	No	Yes
Early	DIK	that there have been few precise descriptions of inflectional systems to substantiate this claim (ibid. 174).	No	No	Yes
Early	DIK	Of course, the psycholinguistic view of a generative grammar is by far the strongest theory:	No	Yes	Yes
Early	DIK	It is clear that under the first, linguistic interpretation of a generative grammar, a complete generative treatment of any type of linguistic structure is possible in principle.	No	Yes	Yes
Early	DIK	It is under the second, psycholinguistic interpretation, however, that serious problems arise.	No	No	Yes
Early	DIK	In our opinion, this psycholinguistic interpretation of the notion 'generative grammar' is untenable as a basis for linguistic description and theory, for several reasons.	Yes	No	Yes
Early	DIK	Chomsky has been careful to point out from very start	No	No	Yes
Early	DIK	Since a generative description is simply a complete and explicit description of the forms of a language,	No	No	Yes
Early	DIK	Of course, the use of natural language involves 'rule-governed behaviour' ;	No	Yes	No
Early	DIK	we would like to contend, however, that this is simply due to the fact that in English paradigms of this kind the singular noun is in the majority of cases identical in phonemic shape with the plural stem.	Yes	Yes	No
Early	DIK	It would almost seem absurd to doubt it,	Yes	Yes	Yes
Early	DIK	It is also inevitable in those paradigms where there is no simple form identical in phonemic shape with the stems of	No	Yes	No

		supposedly derived forms, as, e.g., in Latin hortus, etc.			
Early	DIK	We merely wish to point out that many of their morphological analyses certainly do not, for the following general reasons: (1)	Yes	Yes	Yes
Early	DIK	More often than not, the whole 'derivation' is already initially unacceptable insofar as the complex words concerned clearly function as irreducible wholes,	No	Yes	Yes
Early	DIK	Particularly instructive in this respect is a consideration of the transformational analyses of compounds advanced[by Lees (1960: 113-79).	No	No	Yes
Early	DIK	We merely list some of his derivations which, for obvious reasons, are totally unacceptable	No	Yes	Yes
Early	DIK	In spite of his high claims of scientific sophistication (see especially 1960: xxv), Lees' methodology cannot but be called crude, as is evident from the following summary of the implicit stages of his approach:	No	No	Yes
Early	DIK	The conclusion is that far from yielding results which are intuitively convincing, transformational descriptions of derivatives and compounds often lead to derivational complexities,	No	No	Yes
Early	DIK	the explanatory value of which is in many cases extremely doubtful and, in some, downright non-existent.	No	Yes	Yes
Early	DIK	that in our opinion the theory of transformational generative grammar has, in the field of morphological structure, so far achieved much less of lasting value than its proponents often want us to believe.	Yes	No	Yes
Early	DIK	it is extremely doubtful whether transformational generative grammar will be able to reach the goal which it has set itself.	No	Yes	Yes

Appendix 5.3²¹: Comment assessment analysis sample

TIME	AUTHOR	CLAUSE	Asseverative	Qualificative	Speech functional: qualified	Speech-functional unqualified
Early	CHAFE	From a practical point of view, it is obvious that sound, unlike sight, permits communication regardless of whether the sender and receiver are visible to each other.	Yes	No	No	No
Early	CHAFE	This remarkable ability and its significance for language has been given little or no attention,	No	No	No	No
Early	CHAFE	but clearly it enables us to retain linguistic utterances long enough to process them as wholes, not necessarily "from left to right . "	Yes	No	No	No
Early	CHAFE	The facsimile is usually imperfect for a variety of reasons: the inevitable differences between the conceptual repertoires of different individuals, for example, and the lack of complete congruence between their linguistic systems.	No	No	No	No
Early	CHAFE	but of ten remarkably devious.	No	No	No	No
Early	CHAFE	and it is evidently linked to the sound which we spell rain.	No	Yes	No	No
Early	CHAFE	One of the other concepts, apparently, that which has been associated with such labels as progressive aspect:	No	Yes	No	No
Early	CHAFE	I assume that understanding is derived from two essential pursuits.	No	No	No	No
Early	CHAFE	But observations alone can never be enough,	No	No	No	No
Early	CHAFE	because serious limitations on our capacities to observe provide us with only limited tastes of what is there.	No	No	No	No
Early	CHAFE	but attempts at understanding are by no means restricted to science	No	No	Yes	No
Early	CHAFE	It is typical of folk theories that their adherents believe them to be fully in accord with reality,	No	No	No	No

²¹This appendix shows an 100-clause sample of the analysis. The original dataset contains 890 observations.

Early	CHAFE	It is remarkable, for example, how many theories and subtheories of language blossomed during the last century,	No	Yes	No	No
Early	CHAFE	That procedure has a usefulness that should not be dismissed,	No	No	No	No
Early	CHAFE	but inevitably it misses something important,	Yes	No	No	No
Early	CHAFE	your knowledge is of a meagre and unsatisfactory kind;	No	No	No	No
Early	CHAFE	Of course the actual existence of an incompatible observation might lead us to reject a theory,	Yes	No	No	No
Early	CHAFE	During the twentieth century the list of unacceptable practices awarded first place to introspection,	No	No	No	No
Early	CHAFE	it means, of course, the looking into our own minds and reporting what we there discover.	Yes	No	No	No
Early	CHAFE	Introspection forms no essential part of its methods,	No	No	No	No
Early	CHAFE	It has been interesting to see psychology following the same path decades later.	No	Yes	No	No
Early	CHAFE	In 1988 the venerable American Psychological Association witnessed the defection of the American Psychological Society,	No	No	No	No
Early	CHOMSKY	a good traditional grammar often achieves a -high degree of success in this attempt.	No	No	No	No
Early	CHOMSKY	and that a sharp reversal in the direction of current linguistic studies will be necessary if any substantial insight into such questions is to be achieved.	No	No	No	No
Early	CHOMSKY	A traditional grammar has serious limitations so far as linguistic science is concerned.	No	No	No	No
Early	CHOMSKY	Its basic inadequacy lies in an essential appeal to what we can only call the 'linguistic intuition' of the intelligent reader.	No	No	No	No
Early	CHOMSKY	It is important to realize that a taxonomic grammar of the traditional kind is not merely a partial grammar that omits certain facts about the language.	No	No	No	No

Early	CHOMSKY	What he accomplishes can fairly be described as theory construction of quite a nontrivial kind.	No	No	No	No
Early	CHOMSKY	The reader is, of course, not at all aware of what he has done or how he has done it.	Yes	No	No	No
Early	CHOMSKY	For the student of human psychology, this fact merely adds to the interest and importance of the process of mastering a language.	No	No	No	No
Early	CHOMSKY	Reliance on the reader's intelligence is so commonplace that its significance may easily be overlooked.'	No	No	No	No
Early	CHOMSKY	This is quite appropriate in a grammar addressed to an intelligent reader	No	No	No	No
Early	CHOMSKY	it gives not only a very incomplete, but also a rather false picture of the language that it treats,	No	No	No	No
Early	CHOMSKY	There is actually very little support for the view that careful instruction and guidance, or careful arrangement of 'reinforcing contingencies' (in any interesting sense of this phrase), are necessary for developing language skills in the young child;	No	No	Yes	No
Early	CHOMSKY	nor can this view claim any serious analogical support from the study of lower organisms."	No	No	No	No
Early	CHOMSKY	It goes without saying that the problem of explaining how an untutored child can attain full mastery of a language is of much greater dimensions and importance than that of accounting for the ability of an intelligent adult to learn something of a second language from a well-constructed grammar. ³	No	No	Yes	No
Early	CHOMSKY	Clearly, he is not adapted to learning some particular language.	Yes	No	No	No
Early	CHOMSKY	That it is possible to construct a device with these characteristics may well be doubted.	Yes	No	No	No
Early	CHOMSKY	There are still other possibilities concerning the inputs to this hypothetical language-learning device that merit consideration.s	No	No	No	No

Early	CHOMSKY	The question is an important one,	No	No	No	No
Early	CHOMSKY	It is first of all clear that the formalized grammar, regarded as a predictive theory, is an idealization in at least two respects:	Yes	No	No	No
Early	CHOMSKY	It would be absurd to try to incorporate these phenomena directly into a formalized grammar.	No	No	No	No
Early	CHOMSKY	Actual speech is clearly a complex process in which many interacting factors play a part,	Yes	No	No	No
Early	CHOMSKY	There is other information about sentences that clearly belongs to the domain of grammar;	Yes	No	No	No
Early	CHOMSKY	A successful and interesting formalized grammar is one that assigns appropriate structural descriptions to each member of an infinite class of sentences and that does this in a formally motivated way.	No	No	No	No
Early	CHOMSKY	The latter requirement is of course essential.	Yes	No	No	No
Early	CHOMSKY	In this case, the correct structural description can be provided within the framework of Immediate Constituent Theory,	No	No	No	No
Early	CHOMSKY	but only by rules that are completely ad hoc and unmotivated.	No	No	No	No
Early	CHOMSKY	There is a certain irreducible vagueness in describing a formalized grammar as a theory of the linguistic intuition of the native speaker.	No	No	No	No
Early	CHOMSKY	but this is a misconception.	No	No	No	No
Early	CHOMSKY	Nothing is more simple than to construct a definition of 'grammaticalness' and an associated behavioral test that specify the same set of events."	No	No	No	No
Early	CHOMSKY	Clearly, these will not be of the slightest interest unless the events specified are, to a good approximation, what the native speaker knows to be well-formed sentences.	Yes	No	No	No
Early	CHOMSKY	As to the twin projects of developing grammatical theories and constructing behavioral tests, the former is clearly the much more interesting,	Yes	No	No	No

Early	CHOMSKY	In fact, we do not have a satisfactory formalized grammar for any language.	No	No	Yes	No
Early	CHOMSKY	but none that succeed in characterizing closely the set of grammatical sentences and correct structural descriptions.	No	No	No	No
Early	CHOMSKY	Furthermore, much of this work is not really relevant here (whatever its other interest may be)	No	No	No	No
Early	CHOMSKY	because it provides or suggests no conceivable basis for justifying the rules that assign structural descriptions.	No	No	No	No
Early	CHOMSKY	As I mentioned above, mere coverage of a mass of facts is not in itself of any particular interest in the context of the present discussion.	No	No	No	No
Early	CHOMSKY	As I have tried to indicate above, there is an enormous variety of perfectly clear cases that provide a very strong, though indirect, empirical condition of adequacy for this general theory.	No	No	No	No
Early	CHOMSKY	or one might argue that they are not a reasonable concern of linguistic theory.	No	No	No	No
Early	CHOMSKY	In any event, it seems to me that the scope and effectiveness of heuristic, inductive procedures has been greatly exaggerated.	No	No	No	No
Early	CHOMSKY	But the task remaining to heuristic procedures is obviously lightened as we make the specification of the form of grammars increasingly narrow and restrictive.	Yes	No	No	No
Early	CHOMSKY	No doubt something can be said about the heuristic and inductive principles that can be used as an aid to discovery.	Yes	No	No	No
Early	CHOMSKY	Although there is near unanimity on the fundamental place of procedures of analysis in linguistic theory,	No	No	No	No
Early	CHOMSKY	the appearance of agreement is misleading because the word 'procedure' is understood in so many different senses.	No	No	No	No

Early	CHOMSKY	and it is a matter of relative unimportance which procedures a linguist uses,	No	No	No	No
Early	CHOMSKY	For Fries and Pike, at the other extreme, the term 'procedure' is interpreted so loosely that they suggest as one possible procedure, quite objective though ultimately inadequate, 'to study the data carefully and attempt to make the simplest description which includes all the facts.' 18	No	No	No	No
Early	CHOMSKY	On the basis of the work of the last quarter-century, I see no reason to believe that we are at all close to having rigorous procedures that lead in a mechanical way to the kind of grammatical description that a trained linguist (in a nonmethodological frame of mind) would consider important and illuminating,	No	No	No	No
Early	CHOMSKY	although this work has provided suggestions that many linguists appear to find useful as a guide in their analytic work.	No	No	No	No
Early	CHOMSKY	that is, before we have a clear conception of the form of grammars and the nature of structural descriptions.	No	No	No	No
Early	CHOMSKY	It is this problem that is central to linguistic theory,	No	No	No	No
Early	CHOMSKY	Clearly, a grammar must contain two basic elements: a 'syntactic component' that generates an infinite number of strings representing grammatical sentences and a 'morphophonemic component' that specifies the physical shape of each of these sentences.	Yes	No	No	No
Early	CHOMSKY	Recognition and understanding of speech is the obvious topic to study in developing this idea.	Yes	No	No	No
Early	CHOMSKY	It is extremely complex and 'natural' to normal human beings;	No	No	No	No
Early	CHOMSKY	and it is unique in that we have, in this case, at least the beginnings of a plausible and precise generative theory that gives a picture of the organizing principles underlying the input stimuli.	No	No	No	No

Early	CHOMSKY	In fact, modern classificatory linguistics has rarely tried to state the rules that determine the phonetic content of utterances.	No	No	Yes	No
Early	CHOMSKY	A classificatory grammar that does not go beyond a statement of allomorphs would be no more complex	No	No	No	No
Early	CHOMSKY	It would, in fact, be simpler if there were a single form in all contexts.	No	No	Yes	No
Early	CHOMSKY	Clearly a grammar that predicts phonetic form in a large class of cases by general rules is to be preferred over a list of variants and their distribution.v'	Yes	No	No	No
Early	CHOMSKY	And the success of a grammar in providing a simple and unified treatment for such cases is strong evidence in support of the correctness of the general theory of linguistic structure that underlies it.	No	No	No	No
Early	CHOMSKY	Any serious investigation of syntax, too, will quickly bring to light peculiarities of distribution that appear to require numerous special and isolated rules.	No	No	No	No
Early	CHOMSKY	In a transformational grammar, it is not difficult to show a deeper relation among them.	No	No	No	No
Early	CHOMSKY	A characterization of the form of grammars will be of limited interest	No	No	No	No
Early	CHOMSKY	Gross coverage of many facts can undoubtedly be obtained in many different ways.	Yes	No	No	No
Early	CHOMSKY	What we want in a grammar is not mere coverage of facts, but insightful coverage, something much more difficult to define or to attain.	No	No	No	No
Early	CHOMSKY	And what we demand of a linguistic theory is a general account of the formal features of those grammars that correctly predict the linguistic intuition of the native speaker, and that give what the skilled linguist knows to be significant generalizations.	No	No	No	No
Early	CHOMSKY	Research has naturally focused on I-languages and	Yes	No	No	No

		UG, the problems of descriptive and explanatory adequacy.				
Early	CHOMSKY	The Principles-and-Parameters approach opened the possibility for serious investigation of the third factor, and the attempt to account for properties of language in terms of general considerations of computational efficiency,	No	No	No	No
Early	CHOMSKY	Many of the leading questions discussed at the 1974 conference, and in the years leading up to it, remain very much alive today.	No	No	No	No
Early	CHOMSKY	Answers to these questions are fundamental not only to understanding the nature and functioning of organisms and their subsystems, but also to investigating their growth and evolution.	No	No	No	No
Early	CHOMSKY	Several preliminary qualifications should be obvious.	Yes	No	No	No
Early	CHOMSKY	One is that the picture is personal; others would no doubt make different choices.	Yes	No	No	No
Early	CHOMSKY	so there is some anachronism in this account,	No	No	No	No

Appendix 5.4²²: Appreciation analysis sample

TIM E	AUTHOR	CLAUSE	Attitudinal item	Evaluated item	Attitudinal domain	Polarity	Evaluated domain
2	CHAFE	I assume that understanding is derived from two essential pursuits.	essential	pursuits	Valuation	Positive	Metaphor
2	CHAFE	But observations alone can never be enough,	can never be enough	observations alone	Composition: Complexity	Negative	Metaphor
2	CHAFE	because serious limitations on our capacities to observe provide us with only limited tastes of what is there.	seriously limited	capacities to observe	Composition: Complexity	Negative	Metaphor
2	CHAFE	That procedure has a usefulness that should not be dismissed,	useful	procedure	Valuation	Positive	Metaphor
2	CHAFE	your knowledge is of a meagre and unsatisfactory kind;	meagre	knowledge	Composition: Complexity	Negative	Metaphor
2	CHAFE	your knowledge is of a meagre and unsatisfactory kind	unsatisfactory	knowledge	Reaction: Quality	Negative	Metaphor
2	DIK	it can also be used in thought experiments aimed at long-term clarification of deep and ultimately philosophical questions concerning the structure and the operation of the human mind.	deep and ultimately philosophical	questions	Valuation	Positive	Thing
2	DIK	It is in the latter sense that I believe devising a C*M*NLU is a useful thinking tool for the theoretical linguist.	useful	thinking tool	Valuation	Positive	Thing
2	DIK	and Lk raises a number of intriguing questions.	intriguing	questions	Reaction: Impact	Positive	Thing
2	DIK	As for the language-independent cognitive symbolism, the idea is crystal clear,	crystal clear	Idea	Composition: Complexity	positive	Thing
2	DIK	The following properties of FG are relevant to the present issue:	relevant	properties of FG	Valuation	positive	Thing

²² This appendix shows an 66-clause sample of the analysis. The original dataset contains 539 observations.

2	DIK	(i) FG tries to reach an interesting level of typological adequacy:	interesting	level of typological adequacy	Reaction: Impact	positive	Thing
2	DIK	In order to reach an interesting level of typological adequacy,	interesting	level of typological adequacy	Reaction: Impact	Positive	Thing
2	DIK	it will be rejected as wildly inadequate.	wildly inadequate	theory	Valuation	Negative	Thing
2	DIK	This yields a promising strategy for developing a system of automatic translation:	Promising	Strategy	Valuation	Positive	Thing
2	ABBOTT	but his paper "PRO? No!" is probably the most enjoyable,	probably the most enjoyable	his paper "PRO? No!"	Reaction: Impact	Positive	Thing
2	ABBOTT	One of these benefits is a much more satisfactory view of wanna contraction.	a much more satisfactory	view of wanna contraction.	Reaction: Quality	Positive	Thing
2	ABBOTT	since this will be relevant later.	relevant	this (to think about what propositions are)	Valuation	Positive	Macro-Thing
2	ABBOTT	One weakness is that there would only be one necessary proposition on this view, and so sentences (or utterances) like those in (6a, b) would not be distinguished.	one weakness	that there would only be one necessary proposition on this view, and so sentences (or utterances) like those in (6a, b) would not be distinguished.	Reaction: Quality	Negative	Macro-Thing
2	ABBOTT	The following (Chierchia's ex. 10) seems valid.	valid	The following (Chierchia's ex. 10)	Valuation	Positive	Thing
2	ABBOTT	Making a parallel argument with know how is slightly tricky,	slightly tricky	Making a parallel argument with know how	Composition: complexity	Negative	Macro-Thing
2	ABBOTT	However (11) seems like a valid argument.	a valid argument	11	Valuation	Positive	Thing
2	ABBOTT	For a long time John Perry has pointed out the essential nature of indexicals in characterizing certain beliefs. ³	essential	indexicals	Valuation	Positive	Thing

2	ABBOTT	It doesn't matter whether we take the complement clause to denote a set of possible worlds, or a set of situations, or a Russellian singular proposition consisting of Lingens and the property of being in the Stanford library, or the individual concept type of object-dependent proposition –	doesn't matter	whether we take the complement clause to denote a set of possible worlds, or a set of situations, or a Russellian singular proposition consisting of Lingens and the property of being in the Stanford library, or the individual concept type of object-dependent proposition –	Valuation	Negative	Meta-Thing
2	ABBOTT	However in the case of the infinitival VP complements we have been looking at in this paper, as we have seen, the property analysis makes a lot of sense.	makes a lot of sense	the property analysis	Composition: complexity	Positive	Thing
2	AIKHENVALD	There is now enough evidence to show that evidentiality and mirativity are different categories.	enough	evidence to show that evidentiality and mirativity are different categories.	Composition: complexity	Positive	Thing
2	CHESHIRE	It may be relevant that the six MLE speakers use man as a pronoun in emotionally charged sections of their discourse,	relevant	that the six MLE speakers use man as a pronoun in emotionally charged sections of their discourse,	Valuation	positive	Meta-Thing
2	CHESHIRE	In any event, the future fate of the pronoun is irrelevant for the topic of this paper	irrelevant for the topic of this paper	the future fate of the pronoun	Valuation	Negative	Thing

2	CHESHIRE	It is relevant, then, that the data includes seven tokens of man that could be analysed both as plural nouns and as pronouns.	relevant	that the data includes seven tokens of man that could be analysed both as plural nouns and as pronouns.	Valuation	positive	Meta-Thing
2	CHESHIRE	One possible relevant factor is the frequency with which young people in inner-city areas use man as an address term and pragmatic marker.	One possible relevant factor	the frequency with which young people in inner-city areas use man as an address term and pragmatic marker.	Valuation	Positive	Meta-Thing
1	DIK	Again, as is well-known, the clear distinction of derivation, and inflection in any one particular language has many problems of its own.	has many problems of its own.	the clear distinction of derivation, and inflection in any one particular language	Valuation	Negative	Metaphor
1	DIK	In this way, certain significant differences within the class of plural-formations are obscured.	significant	differences within the class of plural-formations	Valuation	Positive	Metaphor
1	DIK	Again, this constitutes a radical and, in part, quite justified departure from the orientation of earlier linguistic theories.	a radical and, in part, quite justified	departure from the orientation of earlier linguistic theories.	Valuation	Positive	Metaphor
1	DIK	Partly as a result of these tendencies, factual treatments of morphological structure have so far been scarce and somewhat sketchy in the transformational literature.	scarce and somewhat sketchy	factual treatments of morphological structure	Composition: complexity	Negative	Metaphor
1	DIK	that there have been few precise descriptions of inflectional systems to substantiate this claim (ibid. 174).	few precise	descriptions of inflectional systems	Composition: complexity	Negative	Metaphor
1	DIK	It is under the second, psycholinguistic interpretation, however, that	serious problems	the second, psycholinguistic interpretation,	Valuation	Negative	Thing

		serious problems arise.					
1	DIK	It would almost seem absurd to doubt it,	would almost seem absurd	to doubt it	Valuation	Negative	Macro-Thing
1	DIK	More often than not, the whole 'derivation' is already initially unacceptable insofar as the complex words concerned clearly function as irreducible wholes,	initially unacceptable	the whole 'derivation'	Reaction: Quality	Negative	Thing
1	DIK	Particularly instructive in this respect is a consideration of the transformational analyses of compounds advanced[by Lees (1960: 113-79).	Particularly instructive in this respect	a consideration of the transformational analyses of compounds advanced[by Lees (1960: 113-79).	Valuation	positive	Metaphor
1	DIK	The conclusion is that far from yielding results which are intuitively convincing, transformational descriptions of derivatives and compounds often lead to derivational complexities,	not intuitively convincing	results	Composition: Balance	Negative	Thing
1	DIK	the explanatory value of which is in many cases extremely doubtful and, in some, downright non-existent.	extremely doubtful and, in some, downright non-existent.	the explanatory value of which	Valuation	Negative	Thing
1	ABBOTT	but I believe it merits consideration on the independent grounds of plausibility.	merits consideration on the independent grounds of plausibility.	it (This approach)	Valuation	positive	Thing
1	ABBOTT	I will argue, furthermore, that it stands up favorably on both theoretical and heuristic grounds against a potential competitor from the first category the 'inner language' theory described and defended by Fodor	stands up favorably on both theoretical and heuristic grounds	it (This approach)	Valuation	Positive	Thing

		(1975, 1978) and Lycan (1981). 2					
1	ABBOTT	It needs to be acknowledged that there are a number of important issues in the area of language and thought that will not be addressed here.	important	issues in the area of language and thought	Valuation	Positive	Thing
1	ABBOTT	The development of semantics for formalized languages has provided the basis for one of the richest and most fruitful modern traditions for describing natural language semantics.	one of the richest and most fruitful modern traditions for describing natural language semantics.	The development of semantics for formalized languages	Composition: Complexity	Positive	Metaphor
1	ABBOTT	I have no argument with the principle that it is both possible and desirable to treat natural languages like formal languages	desirable	to treat natural languages like formal languages	Valuation	Positive	Macro-Thing
1	ABBOTT	The preceding sketch raises a delicate issue.	delicate	issue	Composition: Complexity	Neutral	Thing
1	ABBOTT	But the problems with belief sentences mentioned above and to be discussed below in section 3 indicate a difficulty with this modern, straightforward view.	modern, straightforward	view	Composition: Complexity	Negative	Thing
1	ABBOTT	An adequate semantics for English ought to reflect the fact that (1) is in a sense analytic,	adequate	semantics	Valuation	Positive	Thing
1	ABBOTT	The problems concern an adequate representation for beliefs about oneself.	adequate	representation for beliefs about oneself.	Valuation	Positive	Metaphor
1	ABBOTT	Instead a proper solution ought to make it clear why we cannot answer it,	proper	solution	Valuation	Positive	Thing

1	ABBOTT	It is hard to say what proposition he has, in fact, expressed.	hard	to say what proposition he has, in fact, expressed.	Composition: Complexity	Negative	Macro-Thing
1	ABBOTT	My proposal should provide two relevant propositions for this sentence.	relevant	propositions for this sentence.	Valuation	Positive	Thing
1	ABBOTT	Nevertheless it is an advantage of the approach sketched above that it encompasses the possibility of a multiplicity of distinct, necessarily true, propositions.	an advantage of the approach sketched above	that it encompasses the possibility of a multiplicity of distinct, necessarily true, propositions.	Valuation	Positive	Meta-Thing
1	ABBOTT	First, it is an extremely rich system, having expressive power equal to that of any natural language.	extremely rich	system	Composition: Complexity	Positive	Thing
1	ABBOTT	Fodor, however, (via some interesting argumentation which I will not be able to discuss in this paper) arrives at the conclusion that an inner language capable of expressing the logical form of natural language sentences may not in fact be very different from a natural language (cf. 1975, p. 156).	interesting	argumentation	Reaction: Impact	Positive	Metaphor
1	ABBOTT	The crucial difference as far as these arguments go is in the nature of the mental representations postulated.	crucial	difference	Valuation	Positive	Metaphor
1	ABBOTT	Nevertheless for the purposes of the following discussion it may be useful to have something concrete to oppose to the inner sentence idea,	useful	to have something concrete to oppose to the inner sentence idea,	Valuation	Positive	Macro-Thing
1	ABBOTT	The responses here are quite simple.	quite simple	The responses	Composition: Complexity	Positive	Metaphor
1	ABBOTT	I find their argument here somewhat specious.	somewhat specious	their argument	Valuation	Negative	Metaphor

1	ABBOTT	this is a remarkable thing to say.	remarkable	thing to say	Reaction: Impact	Positive	Thing
1	ABBOTT	But that analysis must have one of two unfortunate conclusions.	unfortunate	conclusions	Reaction: Quality	Negative	Metaphor
1	ABBOTT	This, I think, strains credulity beyond repair.	strains credulity beyond repair.	This (that the inner language contains from the beginning separate expressions corresponding to every possible natural kind term of a natural language)	Composition: Complexity	Negative	Meta-Thing
1	ABBOTT	but it is not clear that this is the case.	not clear	that this is the case.	Composition: Complexity	Negative	Meta-Thing
1	ABBOTT	Some of the other examples Fodor adduces also fail to make his case.	fail to make his case.	Some of the other examples Fodor adduces	Composition: Balance	Negative	Thing

Appendix 7.1: Papers in Halliday text archive

Year	Title	Mode	Extension (words)
1959	The language of the Chinese secret history of the Mongols	Written: Thesis	60,191
1960	General Linguistics and its application to language teaching	Written: Article	17,608
1961	Categories of the theory of grammar	Written: Article	24,888
1962	Linguistics and machine translation		5,919
1963	Class in relation to the axes of chain and choice in language	Written: Article	4,339
1964	The users and the uses of language	Written: Chapter	14,531
1966	Notes on deep grammar	Written: Article	5,028
1967	Notes on transitivity I	Written: Article	19,700
1968	Notes on transitivity III	Written: Article	17,664
1969	A brief sketch of systemic grammar	Written: Chapter	1820
1970	Functional diversity in language	Written: Article	15,779
1971	Linguistic function and literary text	Written: Article	9,554
1972	Towards a sociological semantics	Written: Article	11,056
1973	The functional basis of language	Written: Chapter	9,550
1974	A socio-semiotic perspective on language development	Written: Article	9,801
1975	Learning how to mean	Written: Chapter	27,222
1976	Early language learning: a sociolinguistic approach	Written: Chapter	14,149
1977	Text as semantic choice	Written: Chapter	18,958
1978	Meaning and the construction of Reality in Early Childhood	Written: Chapter	12,985
1979	Differences between spoken and written language	Written: Chapter	7,918
1980	Three aspects of children's language development	Written: Chapter	8,151
1981	Text semantics and clause grammar: How is a text like a clause?	Written: Chapter	14,866
1982	The deautomatization of grammar	Written: Chapter	7356
1983	On the transition from child tongue to mother tongue	Written: Article	7475
1984	On the ineffability of grammatical categories	Written: Article	10,907
1985	Dimensions of discourse analysis: grammar	Written: Chapter	6,478
1987	Spoken and written modes of meaning	Written: Chapter	10,927
1989	Some grammatical problems in scientific English	Written: Article	8308
1990	The construction of knowledge and grammar	Written: Chapter	16.129
1991	The place of dialogue in children's construction of meaning	Written: Chapter	5,270
1992	Systemic Grammar and the concept of a science of language	Written: Article	5,789
1993	Towards a language-based theory of learning	Written: Article	10,422
1994	The contexts of English	Written: Chapter	9,414
1995	On language in relation to the evolution of human consciousness	Written: Chapter	19,763

1996	On grammar and grammatics	Written: Chapter	23,156
1997	On the grammar of scientific English	Written: Chapter	7296
1998	Things and relations: regrammaticizing experience as technical	Written: Chapter	19,211
1999	Grammar and the construction of education knowledge	Written: Chapter	7,611
2001	Is grammar neutral, is the grammarian neutral?	Written: Article	10039
2002	Probabilistic grammar and the corpus		11967

10. References

- Ai, Haiyang & Lu, Xiaofei (2010). A web-based system for automatic measurement of lexical complexity. Paper presented at the 27th Annual Symposium of the Computer-Assisted Language Consortium (CALICO-10). Amherst, MA., United States. June 8-12.
- Alwin, Duane F., & McCammon, Ryan. J. (2001). Aging, cohorts, and verbal ability. *Journal of Gerontology, Social Sciences*, 56B(3), 151–161.
- Andreev, Vanim (2019). Patterns in style evolution of poets. *SAGE Open*, 4, 1-6.
- Anthony, Laurence (2019). AntConc (Version 3.5.7) [Computer Software]. Tokyo, Japan: Waseda University. Available from <http://www.laurenceanthony.net/software>
- Banks, David (2005a). Emerging scientific discourse in the late seventeenth century: a comparison of Newton's *Opticks*, and Huygens' *Traité de la lumière*. *Functions of Language*, 12(1), 65-86.
- Banks, David (2005b). The position of ideology in a systemic functional model. *WORD*, 60(1), 39-63.
- Banks, David (2006). Referring to others in the scientific journal article: A brief history. *Linguistics and the Human Sciences*, 2(3), 329-353.
- Banks, David (2012). Thematic structure in eighteenth century astronomical texts: a study of a small sample of articles from the Corpus of English Texts on Astronomy. In Isabel Moskowich & Begoña Crespo (Eds.), *Astronomy 'playne and simple': the writing of science between 1700 and 1900* (pp. 221-238). Amsterdam: John Benjamins.
- Banks, David (2017). The extent to which the passive voice is used in the scientific journal article. *Functional Linguistics*, 4 (12), 1985–2015.
- Baxter, Gareth & Croft, William (2016). Modelling language change across the lifespan: Individual trajectories in community change. *Language variation and change*, 28, 129-173.

- Bazerman, Charles (1988). *Shaping written knowledge: The genre and activity of the experimental article in science*. Madison: University of Wisconsin Press.
- Bazerman, Charles, Applebee, Arthur, Berninger, Virginia., Brandt, Deborah, Graham, S., Matsuda, Paul K., Murphy, Sandra, Wells, Deborah & Schleppegrell, Mary (2017). Taking the long view on writing development. *Research in the Teaching of English* 51(3), 351-360.
- Beaugrande de, Robert (1998). Performative speech acts in linguistic theory: The rationality of Noam Chomsky. *Journal of Pragmatics*, 29(6), 765-803.
- Beckner, Clay; Blythe, Richard; Christiansen, Morten H.; Croft, William; Ellis, Nick C.; Holland, John; Ke, Jinyun; Larsen-Freeman, Diane & Shoenemann, Tom (2009). Language is a complex adaptive system: position paper. *Language Learning* 59: Supplement 1, Language as a complex adaptive system, edited by Ellis, N.C. & Larsen-Freeman, D. 1–26.
- Belcher, Diane & Connor, Ulla (Eds.) (2001). *Reflections on multiliterate lives*. Clevedon, UK: Multilingual Matters.
- Belz, Julie A. & Kinginger, Celeste (2002). The cross-linguistic development of address form use in telecollaborative language learning: Two case studies. *The Canadian Modern Language Review*, 59, 189–214.
- Berkenkotter, Carol; Huckin, Thomas N. & Ackerman, John (1991). Social contexts and socially constructed texts: The initiation of a graduate student into a writing research community. In Charles Bazerman & James 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.
- Berman, Ruth; Nayditz, Ronit & Ravid, Dorit (2011). Linguistic diagnostics of written texts in two school-age populations. *Written Language and Literacy*, 14(2), 161–187.

- Bernstein, Basil. (1999). Vertical and horizontal discourse: an essay. *British Journal of Sociology of Education*, 20 (2), 157-173.
- Bialystok, Ellen; Craik, Fergus I. M. & Ryan, Jennifer (2006). Executive control in a modified antisaccade task, Effects of aging and bilingualism. *Journal of Experimental Psychology, Learning, Memory, and Cognition*, 32(6), 1341–1354.
- Biber, Douglas & Finegan, Edward (1988). Adverbial stance types in English. *Discourse Processes* 11(1), 1–34.
- Biber, Douglas & Finegan, Edward (1989). Styles of stance in English: Lexical and grammatical marking of evidentiality and affect. *Text*, 9 (1): 93–124.
- Biber, Douglas & Finegan, Edward (1997). Diachronic relations among speech-based and written registers in English. In Terttu Nevalainen & L. Kahlas-Tarkka (Eds.), *To explain the present: studies in the changing English language in honour of Matti Rissanen* (p. 253-275). Helsinki: Société Néophilologique.
- Biber, Douglas; Johansson, Stig; Leech, Geoffrey; Conrad, Susan & Finegan, Edward (1999). *Longman grammar of spoken and written English*. Edinburgh: Pearson Education Limited.
- Biber, Douglas & Gray, Bethany (2010). Challenging stereotypes about academic writing: Complexity, elaboration, explicitness. *Journal of English for Academic Purposes*, 9, 2-20.
- Biber, Douglas; Gray, Bethany & Poonpon, Kornwipa (2011). Should we use the characteristics of conversation to measure grammatical complexity in L2 writing development? *TESOL Quarterly*, 45, 5–35.
- Biber, Douglas & Gray, Bethany (2016). *Grammatical complexity in academic English: Linguistic change in writing*. Cambridge: Cambridge University Press.

- Bloch, Bernard (1948). A set of postulates for phonemic analysis. *Language*, 24(1), 3–46.
- Bondi, Marina & Cavalieri, Silvia (2012). The evolution of the abstract as a genre: 1988-2008. The case of applied linguistics. In G. Garzone, P. Catenaccio, & Degano, C. (Eds.), *Genre change in the contemporary world short-term diachronic perspectives* (p. 43-55). Bern: Peter Lang.
- Braine, George (Ed.). (1999). *Non-native educators in English language teaching*. Mahwah, NJ: Erlbaum.
- Bronson, Matthew D. (2004). Writing passage: Academic literacy socialization among ESL graduate students. A multiple case study. Unpublished doctoral thesis, University of California, Davis.
- Brook, Marisa; Jankowski, Bridget; Konnelly, Lex & Tagliamonte, Sally (2018). ‘I don’t come off as timid anymore’: Real-time change in early adulthood against the backdrop of the community. *Journal of Sociolinguistics* 22(4), 351-374.
- Brunner, Edgar; Domhof, S. & Langer, Frank (2002). *Nonparametric Analysis of Longitudinal Data in Factorial Experiments*. John Wiley & Sons, New York.
- Bruster, Douglas & Smith, Geneviève (2016). A new chronology for Shakespeare’s plays. *Literary and Linguistic Computing*, 31(2), 301–320.
- Bulté, Bram & Housen, Alex (2014). Conceptualizing and measuring short-term changes in L2 writing complexity. *Journal of Second Language Writing*, 26, 42-65.
- Butt, David (2009). Context and text in scientific disciplines of English: A social semiotic perspective. *Language, Context and Text*, 1(1), 4–38.

- Caffarel, Alice (2018). Simone de Beauvoir's construal of language and literature in *Mémoires d'une Jeune Fille Rangée* (1958): A Hasanian perspective. In Rebekah Wegener, Stella Neumann & Antje Oesterle (Eds.), *On verbal art: essays in honour of Ruqaiya Hasan* (pp.132-165). London: Equinox.
- Campbell, Lyle (2002). The history of linguistics. In Mark Aronoff, & Janie Rees-Miller (Eds.), *The Handbook of linguistics* (pp. 627-643). Blackwell Publishing.
- Camps, David & Ivanič, Roz (2001). I am how I sound: Voice as self-representation in L2 writing. *Journal of Second Language Writing*, 10(1-2), 3-33.
- Casanave, Christine P. (1992). Cultural diversity and socialization: A case study of a Hispanic woman in a doctoral program in sociology. In Denise E. Murray (Ed.), *Diversity as resource: Redefining cultural literacy* (pp. 148-182). Alexandria, VA: TESOL.
- Casanave, Christine P., & Vandrick, Stephanie (Eds.). (2003). *Writing for scholarly publication: Behind the scenes in language education*. Mahwah, NJ: Erlbaum.
- Cheung, Lok Ming (2018). Development of evaluative stance and voice in postgraduate academic writing. Unpublished Ph.D. thesis: The Hong Kong Polytechnic University.
- Christie, Frances (2010). The ontogenesis of writing in childhood and adolescence. In Dominic Wyse, Richard Andrews & James Hoffman (Eds.), *The Routledge international handbook of English, language and literacy teaching* (pp. 146-58). New York, NY.: Routledge.
- Christie, Frances (2018). Halliday as an educational linguist. Revised version of "Halliday's contribution to education", paper presented at the 45th International Systemic Functional Congress. Boston College, United States. July 19-21.
- Christie, Frances & Derewianka, Beverly (2008). *School discourse: Learning to write across the years of schooling*. London: Continuum.

- Christie, Frances & Maton, Karl (Eds.). (2011). *Disciplinary: Functional linguistic and sociological perspectives*. London: Continuum.
- Clemen, Wolfgang (1977). *The development of Shakespeare's imagery*. New York, NY: Routledge.
- Cohen, Andrew. (2001). From L1 to L12: The confessions of a sometimes frustrated multiliterate. In Diane Belcher & Ulla Compton (Eds.), *Reflections on multiliterate lives*, (pp. 79-95). Cleveland, Oh.: Multilingual Matters.
- Connor, Lisa T., ; Spiro, Avron ; Obler, Loraine K. & Albert, Martin L. (2004). Change in object naming ability during adulthood. *Journal of Gerontology and Psychological Sciences*, 59B(5), 203–209.
- Connor, Ulla (1999). Learning to write academic prose in a second language: A literacy autobiography. In George Braine (Ed.), *Non-native educators in English language teaching* (pp. 29–42). Mahwah, NJ: Erlbaum.
- Conrad, Susan & Biber, Douglas (2000). Adverbial marking of stance in speech and writing. In Susan Hunston & Geoff Thompson (Eds.), *Evaluation in text: Authorial stance and the construction of discourse* (pp. 57-73). Oxford: Oxford University Press.
- Coulthard, Malcolm (2004). Author identification, idiolect, and linguistic uniqueness. *Applied Linguistics*, 25(4), 431–447.
- Cunningham, C. (1971). Breakthrough to Literacy. *Literacy*, 5(1), 23-30.
- Davidse, Kristin & Simon-Vandenberg, Anne (2008). Introduction: The realization of interpersonal meaning. *WORD*, 59 (1–2), 3–23.
- Davies, Eirian C. (2014). A retrospective view of Systemic Functional Linguistics, with notes from a parallel perspective. *Functional Linguistics*, 1(4), <https://doi.org/10.1186/2196-419X-1-4>.

- De Smet, Hendrik (2016). How gradual change progresses: The interaction between convention and innovation. *Language variation and change*, 28(1), 83-102.
- Derewianka, Beverly (1995). Language development in the transition from childhood to adolescence: the role of grammatical metaphor. Ph.D. thesis: Macquarie University.
- Dressen-Hammouda, Dacia (2008). From novice to disciplinary expert: disciplinary identity and genre mastery. *English for Specific Purposes*, 27, 233-252.
- Dreyfus, Shoshana; Humphrey, Sally; Mahboob, Ahmar & Martin, James R. (2016). *Genre Pedagogy in higher education. The SLATE project*. Basingtoke, Hampshire, UK: Palgrave McMillan.
- Duff, Patricia A. (2010). Language socialization into academic discourse communities. *Annual Review of Applied Linguistics*, 30, 169–192.
- Duff, Patricia A. (2014). Case study research on language learning and use. *Annual Review of Applied Linguistics*, 34, 233-255.
- Evans, Mel (2018). Style and chronology: a stylometric investigation of Aphra Behn's dramatic style and the dating of *The Young King*. *Language and Literature: International Journal of Stylistics* 27(2), 103-132.
- Fairclough, Norman (1992). *Discourse and social change*. Cambridge: Polity Press.
- Fairclough, Norman (2003). *Analysing discourse: Text analysis for social research*. London: Routledge.
- Feyereisen, Pierre (1997). A meta-analytic procedure shows an age-related decline in picture-naming: Comments on Goulet, Ska, and Kahn. *Journal of Speech and Hearing Research*, 40, 1328–1333.
- Field, Andy (2009). *Discovering statistics using SPSS*. 2nd Edition. London: SAGE.

- Firth, J.R. (1950). Personality and language in society. *Sociological Review* 42(1), 37-52.
Reprinted in *J.R. Firth, 1957, Papers in linguistics 1934-1951*. London: Oxford University Press. 177-189.
- Forsyth, Richard S. (1999). Stylochronometry with substrings, or a poet young and old. *Literary and Linguistic Computing*, 14(4), 467–77.
- Freddi, Maria (2006). Arguing linguistics: corpus investigation of one functional variety of academic discourse. *Journal of English for Academic Purposes*, 4(1), 5-26.
- Frischer, Bernard (1991). *Shifting Paradigms: new approaches to Horace's Arts Poetica*. Atlanta, GA: Scholars Press.
- Fruehwald, Josef (2017). Generations, lifespans, and the zeitgeist. *Language Variation and Change*, 29, 1–27.
- Geisler, Cheryl (1994). *Academic literacy and the nature of expertise: Reading, writing and knowing in academic philosophy*. Hillsdale, NJ: Lawrence Erlbaum.
- Gilbert, G. Nigel & Mulkay, Michael (1984). *Opening Pandora's box: A sociological analysis of scientific discourse*. Cambridge: Cambridge University Press.
- Goodman, G. (2010). The British government and the challenge of McCarthyism in the early cold war. *Journal of Cold War Studies*, 12(1), 62–97.
- Gotti, Maurizio (Ed.) (2009). *Commonality and individuality in academic discourse*. Frankfurt am Main: Peter Lang.
- Grant, Tim & Baker, Kevin (2001). Identifying reliable, valid markers of authorship: a response to Chaski. *Forensic Linguistics* 8(1), 66–79.
- Gray, Tara (1999). Publish, don't perish: Twelve steps to help scholars flourish. *Journal of Staff, Program, and Organization Development*, 16 (3), 135-142.

- Guba, Egon & Lincoln, Yvonna S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In Norman K. Denzin & Yvonna S. Lincoln (Eds.), *The SAGE handbook of qualitative research*, 3rd Edition (pp. 191-215). Thousand Oaks, CA: Sage.
- Gumport, Patricia J. (2007). *Sociology of higher education. Contributions and their contexts*. Baltimore: The Johns Hopkins University Press.
- Habibie, Pejman (2015). An investigation into writing for scholarly publication by novice scholars: practices of Canadian anglophone doctoral students. Unpublished doctoral thesis: The University of Western Ontario.
- Halliday, Michael A.K. (1956). The linguistic basis of a mechanical thesaurus. *Mechanical Translation*, 3(3), 81-88. Reprinted in Halliday, M.A.K. (2005). Computational and quantitative studies. Volume 6 in *The Collected Works of M.A.K. Halliday* edited by Jonathan Webster. London and New York: Continuum.
- Halliday, Michael A.K. (1961). Categories of the theory of grammar. *Word* 17(3), 241–292. (Reprinted in M.A.K. Halliday (2002) *On Grammar*. Volume 1 in the *Collected Works of M.A.K. Halliday*, edited by Jonathan J. Webster. London and New York: Continuum. 37-94.)
- Halliday, Michael A.K. (1963). Class in relation to the axes of chain and choice in language. *Linguistics* 2, 5–15. (Reprinted in M.A.K. Halliday (2002) *On Grammar*. Volume 1 in the *Collected Works of M.A.K. Halliday*, edited by Jonathan J. Webster. London and New York: Continuum. 37-94.)
- Halliday, Michael A.K. (1969). Options and functions in the English clause. *Brno Studies in English* 8, 81–88. (Reprinted in M.A.K. Halliday (2005) *Studies in English Language*. Volume 7 in the *Collected Works of M.A.K. Halliday*, edited by Jonathan J. Webster. London and New York: Continuum. 154-163.)

- Halliday, Michael A.K. (1973). *Explorations in the functions of language*. London: Edward Arnold.
- Halliday, Michael .A.K. (1975/2003). *Learning how to mean: explorations in the development of language*. London: Edward Arnold. (Reprinted in Jonathan J. Webster (Ed.), *The language of early childhood* (Vol 4 in *The Collected Works of M.A.K. Halliday*). London and New York: Continuum. 28-59)
- Halliday, Michael A. K. (1977). Some thoughts on language in the middle school years. Published by the Australian Association for the Teaching of English (AATE). (Reprinted in Halliday, M.A.K. (2004). *Language and Education*. Volume 9 of *The Collected Works of M.A.K. Halliday* edited by Jonathan Webster. London & New York: Continuum. 49-62)
- Halliday, Michael A.K. (1978). *Language as social semiotic: the social interpretation of language and meaning*. London: Edward Arnold.
- Halliday, Michael A.K. (1979). Modes of meaning and modes of expression: types of grammatical structure and their determination by different semantic functions. In D. J. Allerton, E. Carney & D. Holdcroft (Eds.), *Function and Context in Linguistic Analysis* (pp. 57–79). Cambridge: Cambridge University Press. (Reprinted in M.A.K. Halliday (2002) *On Grammar*. Volume 1 in the Collected Works of M.A.K. Halliday, edited by Jonathan J. Webster. London and New York: Continuum. 196-218.)
- Halliday, Michael A.K. (1984). Language as code and language as behaviour: a systemic-functional interpretation of the nature and ontogenesis of dialogue. In Michael A.K. Halliday, Robin P. Fawcett, Sydney Lamb & Adam Makkai (Eds.), *The semiotics of language and culture*. London: Frances Pinter. Volume 1: 3-35. (Reprinted in Halliday, M.A.K. 2003. *On Language and Linguistics*. Volume 3 of Collected Works of M.A.K. Halliday. Edited by Jonathan Webster. London & New York: Continuum. Chapter 10: 226-250.)

- Halliday, Michael A. K. (1985a). *An introduction to functional grammar*, 1st edition.
London: Edward Arnold.
- Halliday, Michael A.K. (1985b). *Spoken and Written Language*. Geelong, Victoria: Deakin University Press.
- Halliday, Michael A.K. (1988). On the language of physical science. In Mohsen Ghadessy (Ed.), *Text and context in functional linguistics* (pp. 162-178). Amsterdam: Benjamins.
- Halliday, Michael A.K. (1989). Part A. In Michael Halliday & Ruqaiya Hasan (Eds.), *Language, context, and text: aspects of language in a social semiotic perspective*. Oxford: Oxford University Press.
- Halliday, M.A.K. (1992). Language as system and language as instance: the corpus as a theoretical construct. In Jan Svartvik (Ed.), *Directions in corpus linguistics: proceedings of Nobel Symposium 82, Stockholm, 4-8 August 1991*. Berlin: Mouton de Gruyter. 61-77. (Reprinted in Halliday, M.A.K. 2005. *Computational and quantitative studies*. Volume 6 in the *Collected Works of M.A.K. Halliday*, edited by Jonathan J. Webster. London & New York: Continuum. Chapter 5: 76-92.)
- Halliday, Michael A.K. (1993). Towards a language-based theory of learning. *Linguistics and Education* 5(2), 93-116. (Reprinted in Halliday, M.A.K. (2004). *The Language of Early Childhood*. Volume 4 of *The Collected Works of M.A.K. Halliday* edited by Jonathan Webster. London & New York: Continuum. 327-354).
- Halliday, Michael A.K. (1998). Things and relations. In James R. Martin & Robert Veel (Eds.), *Reading science: Critical and functional perspectives on discourses of science* (pp. 185-235). London and New York: Routledge.
- Halliday, Michael A.K. (2002). "M.A.K. Halliday." In Keith Brown & Vivien Law (Eds.), *Linguistics in Britain: personal histories* (pp. 116-126). Oxford: Blackwell.

- Halliday, Michael A.K. (2008). On grammar as the driving force from primary to higher order consciousness. In Annabelle Lukin & Geoff Williams (Eds.), *The development of language: functional perspectives on species and individuals*. London and New York: Continuum, pp. 15-44.
- Halliday, Michael & Hasan, Ruqaiya (1976). *Cohesion in English*. London: Longman.
- Halliday, M.A.K. & Hasan, Ruqaiya (1985). *Language, context, and text: Aspects of language in a social-semiotic perspective*. Geelong, Victoria: Deakin University Press.
- Halliday, Michael A.K. & Martin, James R. (1993). *Writing science: literacy and discursive power*. London: Falmer.
- Halliday, Michael A.K. & Matthiessen, Christian M.I.M. (1999/2006). *Construing experience through meaning: a language-based approach to cognition*. London and New York: Continuum.
- Halliday, Michael A.K. & Matthiessen, Christian M.I.M. (2014). *Halliday's introduction to Functional Grammar*, 4th edition. London: Routledge.
- Hasan, Ruqaiya (1985). The structure of a text. In Michael A.K Halliday & Ruqaiya Hasan (Eds.), *Language, context, and text: aspects of language in a social-semiotic perspective* (pp. 52-69). Oxford: Oxford University Press.
- Hasan, Ruqaiya (1987). The grammarian's dream: lexis as most delicate grammar. In Michael A.K. Halliday & Robin P. Fawcett (Eds.), *New developments in systemic linguistics* (pp. 184-211). London: Pinter.
- Hasan, Ruqaiya (1990). A sociolinguistic interpretation of everyday talk between mothers and children. Reprinted in Jonathan J. Webster (Ed.), *The collected works of Ruqaiya Hasan. II. Semantic variation: Meaning in society and in sociolinguistics* (pp. 73–118). London: Equinox Publishing.

- Hasan, Ruqaiya (1996). Semantic networks: a tool for the analysis of meaning. In Carmel Cloran, David Butt & Geoff Williams (Eds.), *Ways of saying: Ways of meaning* (pp. 104–131). London: Cassell.
- Hasan, Ruqaiya (1999). Speaking with reference to context. In Mohsen Ghadessy (Ed.), *Text and context in functional linguistics* (pp. 219-328). Amsterdam: Benjamins.
- Hasan, Ruqaiya; Kress, Gunther; & Martin, James R. (2013). With Ruqaiya Hasan, Gunther Kress and J. R. Martin (1986). In James R. Martin (Ed.), *Interviews with M.A.K. Halliday: Language turned back on himself* (pp. 95-134). London: Bloomsbury Academic.
- Hoey, Michael (2000). Persuasive rhetoric in linguistics: a stylistic study of some features of the language of Noam Chomsky. In Susan Hunston & Geoff Thompson (Eds.), *Evaluation in text: Authorial stance and the construction of discourse* (pp. 28-37). Oxford: Oxford University Press.
- Hollan, John (1992). *Adaptation in natural and artificial systems. An introductory analysis with applications to biology, control and artificial intelligence*. Cambridge, MA: The MIT Press.
- Hood, Susan. (2006). The persuasive power of prosodies: Radiating values in academic writing. *Journal of English for Academic Purposes*, 5(1), 37–49.
- Hood, Susan (2010). *Appraising research: evaluation in academic writing*. New York: Palgrave Macmillan.
- Hood, Susan (2012). Voice and stance as APPRAISAL: Persuading and positioning in research writing across intellectual fields. In Ken Hyland & Carmen Sancho-Guinda (Eds.), *Stance and voice in written academic genres* (pp. 51-68). London: Palgrave Macmillan.
- Hood, Susan & Martin, J.R. (2007). Invoking attitude: the play of graduation in appraising discourse. In Jonathan Webster, Christian M. I. M. Matthiessen & Ruqaiya Hasan (Eds.), *Continuing Discourse on Language* (Vol. 2) (pp. 739-764). London: Equinox.

- Hori, Masahiro (2004). *Investigating Dickens' style. A collocational analysis*. Basingstoke: Palgrave MacMillan.
- Huerta, M., Goodson, P., Beigi, M. & Chlup, D. (2017). Graduate students as academic writers: writing anxiety, self-efficacy and emotional intelligence. *Higher Education Research and Development*, 36(4), 716-729.
- Hultsch David; Hertzog Christopher; Small Brent; McDonald-Miszczak Lesley & Dixon Roger A. (1992). Short-term longitudinal change in cognitive performance in later life. *Psychol Aging*, 7(4), 571-584.
- Hundt, Marianne & Mair, Christian (1999). "Agile" and "uptight" genres: the corpus-based approach to language change in progress. *International Journal of Corpus Linguistics*, 4, 221–242.
- Hunston, Susan & Thompson, Geoff (Eds.) (2000). *Evaluation in text: Authorial stance and the construction of discourse*. Oxford: Oxford University Press.
- Hunt, Kellogg W. (1970). Recent measures in syntactic: development. In Mark Lester (Ed.), *Readings in applied transformation grammar*. New York: Holt, Rinehart and Winston.
- Hyland, Ken (2000). *Disciplinary discourses: social interactions in academic writing*. Harlow, UK: Pearson Education.
- Hyland, Ken (2004). *Disciplinary discourses: Social interactions in academic writing*. Ann Arbor: University of Michigan Press.
- Hyland, Ken (2020). The communication of expertise: changes in academic writing. In Maurizio Gotti, Stefania Maci & Michelle Sala (Eds.), *Scholarly pathways: knowledge transfer and knowledge exchange in academia* (pp. 33-56). Bern: Peter Lang.

- Hyland, Ken & Jiang, Feng (2016). Change of attitude? A diachronic study of stance. *Written Communication*, 33(3), 251-274.
- Ivanič, Roz & Camps, David (2001). I am how I sound: Voice as self-representation in L2 writing. *Journal of Second Language Writing*, 10(1-2), 3-33.
- Jarvis, Scott (2013). Capturing the diversity in lexical diversity. *Language Learning*, 63(1), 87–106.
- Jaynes, Joseph. T. (1980). A search for trends in the poetic style of W.B. Yeats. *Association for Literary and Linguistic Computing Journal*, 1: 11–19.
- Johansson, Victoria (2008). Lexical diversity and lexical density in speech and writing: a developmental perspective. *Linguistics and Phonetics Working Papers*, 53, 61–79.
- Johnson, Wendell (1944). Studies in language behavior: I. A program of research. *Psychological Monographs*, 56, 1–15.
- Kemper, Susan. (1987). Life-span changes in syntactic complexity. *Journal of Gerontology*, 42, 323-328.
- Kemper, Susan; Kynette, Donna; Rash, Shannon; O'Brien, Kevin & Sprott, Richard (1989). Lifespan changes to adults' language: Effects of memory and genre. *Applied Psycholinguistics* 10, 49-66.
- Kemper, Susan; Greiner, Lydia; Marquis, Janet; Prenovost, Katherine & Mitzner, Tracy (2001). Language decline across the lifespan. Findings from the Nun Study. *Psychology and Aging*, 16 (2), 227–239.
- Kemper, Susan; Herman, Ruth & Lian, Cindy (2003). Age differences in sentence production. *Journals of Gerontology: Psychological Science*, 58, 260-269.

- Labov, William (1963). The social motivation of a sound change. *Word*, 19, 273-309.
(Reprinted as Ch.1 of W. Labov, *Sociolinguistic Patterns*. Philadelphia: University of Pennsylvania Press, 1972, pp.1-42.)
- Laffal, Julius (1995). A concept analysis of Jonathan Swift's 'A Tale of a Tub' and 'Gulliver's Travels'. *Computers and Humanities*, 29(5): 339–62.
- Larsen-Freeman, Diane (2006). The emergence of complexity, fluency, and accuracy in the oral and written production of five Chinese learners of English. *Applied Linguistics*, 27(4), 590–619.
- Laybourn, Keith (2006). *Marxism in Britain: Dissent, decline and re-emergence 1945-c.2000*. London: Routledge.
- Leech, Geoffrey (2004). Recent grammatical change in English: Data, description, theory. In Karin Aijmer & Bengt Altenberg (Eds.), *Advances in corpus linguistics* (pp. 61-81). Amsterdam: Rodopi.
- Leech, Geoffrey; Hundt, Marianne; Mair, Christian & Smith, Nicholas (2009). *Change in contemporary English. A grammatical study*. Cambridge: Cambridge University Press.
- Lemke, Jay L. (1995) *Textual Politics: Discourse and social dynamics*. London and Bristol, P.A.: Taylor and Francis.
- Lemke, Jay (2003). Language development and identity: Multiple timescales in the social ecology of learning. In Alan Miller, Shannon Taylor & Arthur Bedeian (Eds.), *Language acquisition and language socialization* (pp. 68-87). London and New York: Continuum
- Lindsay S., Gaskell M.G. (2012). Word learning and lexical development across the lifespan. In Norbert M. Seel (Ed.), *Encyclopedia of the sciences of learning* (pp. 345-381). Boston, M.A.: Springer. DOI: https://doi.org/10.1007/978-1-4419-1428-6_1018
- Litvinova, Tatiana; Seredin, Pavel; Litvinova, Olga; Dankova, Tatiana & Zagorovskaya, Olga (2018). On the stability of some idiolectal features. In A. Karpov, O. Jokisch, R. Potapova (Eds.) *Speech and Computer. SPECOM 2018. Lecture Notes in Computer Science*, Vol. 11096 (pp. 211-216). Boston, M.A.: Springer.

- Liu, Jun (2001). Writing from Chinese to English: My cultural transformation. In Diane Belcher & Ulla Compton (Eds.), *Reflections on multiliterate lives* (pp. 121-131). Cleveland, Oh.: Multilingual Matters.
- Liu, Li Ming (2018). Examining syntactic complexity in EFL academic writing. Unpublished doctoral thesis. The Hong Kong Polytechnic University.
- Lu, Xiaofei (2010). Automatic analysis of syntactic complexity in second language writing. *International Journal of Corpus Linguistics*, 15 (4), 474-496.
- Lu, Xiaofei (2011). A corpus-based evaluation of syntactic complexity measures as indices of college-level ESL writers' language development. *TESOL Quarterly*, 45(1), 36-62.
- Lu, X., & Ai, H. (2015). Syntactic complexity in college-level English writing: Differences among writers with diverse L1 backgrounds. *Journal of Second Language Writing*, 29, 16-27.
- Lukin, A. & Williams, G. (Eds.). (2008). *The development of language: functional perspectives on species and individuals*. London and New York: Continuum.
- Mair, Christian & Leech, Geoffrey (2006). Current changes in English syntax. In Bas Aarts & April McMahon (Eds.), *The Handbook of English linguistics* (pp. 318-342). Oxford: Blackwell Publishing Ltd.
- Mann, William C., Matthiessen, Christian M.I.M. & Thompson, Sandra A. (1992). Rhetorical structure theory and text analysis. In William C. Mann & Sandra A. Thompson (Eds.), *Discourse description: Diverse analyses of a fund raising text* (pp. 39–78). Amsterdam: Benjamins.
- Martin, James R. (1992). *English text: System and structure*. Amsterdam and Philadelphia, P.A.: John Benjamins.
- Martin, James R. (2011). Bridging troubled waters: interdisciplinarity and what makes it stick. In Frances Christie & Karl Maton (Eds.), *Disciplinarity. Functional linguistic and sociological perspectives*, (pp. 14-35). London and New York: Continuum.

- Martin, James R. (Ed.) (2013). *Interviews with M.A.K. Halliday: Language turned back on himself*. London: Bloomsbury Academic.
- Martin, James R. & White Peter (2005). *The language of evaluation. Appraisal in English*. London: Palgrave.
- Martin, James R. & Rose, David (2008). *Genre Relations: Mapping Culture*. London and Oakville: Equinox.
- Martin, James R. & Thibault, Paul (2013). With J.R. Martin and Paul Thibault (2011). In James R. Martin (Ed.), *Interviews with M.A.K. Halliday: Language turned back on himself* (pp. 234-288). London: Bloomsbury Academic.
- Masle, D. D. (2013). Writing self-efficacy and written communication skills. *Business and Professional Communication Quarterly*, 76, 216–225.
- Maton, Karl (2006). On knowledge structures and knowledge structures. In R. Moore, M. Arnot, J. Beck & H. Daniels (Eds.), *Knowledge, power and educational reform. Applying the sociology of Basil Bernstein* (pp. 44-59). New York, N.Y.: Routledge.
- Matthews, P.H. (1999). Linguistic theory and the philological society from the 1930's to the 1960's. *Transactions of the Philological Society*, 97(2), 259-285.
- Matthiessen, Christian M.I.M. (1992). Interpreting the textual metafunction. In Martin Davies & Louise Ravelli (Eds.), *Advances in systemic linguistics: recent theory and practice* (pp. 37–82). London: Pinter.
- Matthiessen, Christian M.I.M. (1993). Register in the round: diversity in a unified theory of register analysis. In Mohsen Ghadessy (Ed.), *Register analysis. Practice and theory* (pp. 221-292). London: Frances Pinter.
- Matthiessen, Christian M.I.M. (1995). *Lexicogrammatical Cartography: English Systems*. Tokyo: International Language Sciences Publishers.
- Matthiessen, Christian M.I.M. (2006). The lexicogrammar of emotion and attitude in English. Third International Congress on English Grammar (ICEG 3), Sona College, Salem, Tamil Nadu, India, January 23-27.

- Matthiessen, Christian M.I.M. (2007). The “architecture” of language according to systemic functional theory: developments since the 1970s. In Ruqaiya Hasan, Christian M.I.M. Matthiessen & Jonathan J. Webster (Eds.), *Continuing Discourse on Language*, Volume 2 (pp. 505–561). London and Oakville: Equinox.
- Matthiessen, Christian M.I.M. (2009). Meaning in the making: Meaning potential emerging from acts of meaning. *Language Learning*, 59(1), 206-229.
- Matthiessen, Christian M.I.M. (2013). Register in the round: registerial cartography. *Functional Linguistics*, 2 (9), 1-48.
- Matthiessen, Christian M.I.M. (2013). Talking and writing about literature: some observations from Systemic Functional Linguistics. *Indian Journal of Applied Linguistics* 39(2), 5-49.
- Matthiessen, Christian M.I.M. & Nesbitt, Christopher (1996). On the idea of theory-neutral descriptions. In Ruqaiya Hasan, Carmel Cloran & David Butt (Eds.), *Functional descriptions: theory in practice* (pp. 39-85). Amsterdam: Benjamins.
- Matthiessen, Christian M.I.M, Teruya, Kazuhiro & Lam, Marvin (2010). *Key terms in Systemic Functional Linguistics*. London: Continuum.
- Miller, Alan; Taylor, Shannon & Bedeian, Arthur (2011). Publish or perish: academic life as management faculty live it. *Career Development International*, 16(5), 422-445.
- Milroy, James & Milroy, Lesley (1991). *Authority in language: investigating language prescription and standardization*, 2nd Ed. London and New York: Routledge.
- Mollin, Sandra (2009). ‘I entirely understand’ is a Blairism: The methodology of identifying idiolectal collocations. *International Journal of Corpus Linguistics*, 14(3), 367–392.
- Montemayor-Borsinger, Anne B. (2001). *Academic writing in the sciences: a focus on the development of writing skills*. Unpublished PhD thesis, University of Glasgow.
- Montemayor-Borsinger, Anne B. (2001b). Linguistic choices in two research articles in physics: study of an author’s development. *The ESPecialist*, 22 (1), 51-74.

- Montemayor-Borsinger, Anne B. (2005). Authorial development in research writing: coding changes in grammatical subject. *The ESPecialist*, 26 (1), 53-78.
- Montemayor-Borsinger, Anne B. (2008). Text type and texture: the meaning potential of Theme for the study of research writing development. In Geoff Thompson & Gail Forey (Eds.) *Text type and texture* (pp. 156-167). London: Equinox.
- Morgan, Brian (2003). Writing across the theory-practice divide: a longitudinal confession. In Christine P. Casanave & Stephanie Vandrick (Eds.), *Writing for scholarly publication: Behind the scenes in language education* (pp. 263-278). Mahwah, NJ: Erlbaum.
- Nanri, Keizo (1994). An attempt to synthesize two systemic contextual theories through the investigation of the process of the evolution of the discourse semantic structure of the newspaper reporting article. University of Sydney: Ph.D. thesis.
- Nevalainen, Terttu, Raumolin-Brunberg, Helena, & Mannila, Heikki. (2011). The diffusion of language change in real time: Progressive and conservative individuals and the time depth of change. *Language Variation and Change* 23, 1–43.
- Noguchi, Kimihiro; Gel, Yulia ; Brunner Edgar & Konietzschke, Frank (2012). nparLD: An R Software Package for the Nonparametric Analysis of Longitudinal Data in Factorial Experiments. *Journal of Statistical Software*, 50(12), 1-22.
- Norris, John M. & Ortega, Lourdes (2009). Towards an organic approach to investigating CAF in instructed SLA: The case of complexity. *Applied Linguistics*, 30, 555-578.
- Oba, Sadao (1995). *The Japanese war: London University's WWII secret teaching programme and the experts sent to help beat Japan*. Translated by Anne Kaneko. Sandgate, Folkestone, Kent: The Japan Library.
- OECD (2020). Population with tertiary education (indicator). doi: 10.1787/0b8f90e9-en (Accessed on 28 April 2020)

- Opas, Lisa Lena (1996). A multi-dimensional analysis of style in Samuel Beckett's prose works. *Research in Humanities Computing*, 4, 81-114.
- Opdebeeck, Carol; Martyr, Anthony & Clare, Linda (2015). Cognitive reserve and cognitive function in healthy older people: a meta-analysis. *Aging, Neuropsychology, and Cognition: A Journal on Normal and Dysfunctional Development*, 23(5), 40-60.
- Ortega, Lourdes (2000). Understanding syntactic complexity: The measurement of change in the syntax of instructed L2 Spanish learners. Ph.D. thesis: University of Hawai'i at Manoa.
- Ortega, Lourdes (2003). Syntactic complexity measures and their relationship to L2 proficiency: A research synthesis of college-level L2 writing. *Applied Linguistics*, 24, 492–518.
- Ortega, Lourdes & Iberri-Shea, Gina (2005). Longitudinal research in SLA: Recent trends and future directions. *Annual Review of Applied Linguistics*, 25, 26–45.
- Ortega, Lourdes & Byrnes, Heidi (Eds.) (2008). *The longitudinal study of advanced L2 capacities*. New York and London: Routledge.
- Painter, Claire (1984). *Into the mother tongue: A case study in early language development*. London: Frances Pinter.
- Painter, Claire (1999). *Learning through language in early childhood*. London: Cassell.
- Painter, Claire (2003). The use of a metaphorical mode of meaning in early language development. In Anne-Marie Simon-Vandenberg, Miriam Taverniers & Louise Ravelli (Eds.), *Grammatical metaphor: Views from systemic functional linguistics* (pp. 151-168). Amsterdam and Philadelphia: John Benjamins.
- Painter, Claire; Derewianka, Beverly & Torr, Jane (2007). From microfunctions to metaphor: Learning language and learning through language. In Ruqaiya Hasan, Christian M. I. M. Matthiessen, & Jonathan J. Webster (Eds.), *Continuing discourse on language: A functional perspective*, Vol. 2 (pp. 563–588). London: Equinox Publishing.

- Paltridge, Brian & Phakiti, Aek (Eds.) (2010). *Continuum companion to research methods in applied linguistics*. London, UK: Continuum.
- Parkinson, Jean & Musgrave, Jill (2014). Development of noun phrase complexity in the writing of English for Academic Purposes students. *Journal of English for Academic Purposes*, 14, 48-59.
- Parodi, Giovanni (Ed.) (2010). *Discourse genres in Spanish: academic and professional connections*. Amsterdam: Benjamins.
- Plug, Leendert (2008). J. R. Firth: a new biography. *Transactions of the Philological Society*, 106(3), 337–374.
- Raumolin-Brunberg, Helena & Arja Nurmi (2011). Grammaticalization and language change in the individual. In Heiko Narrog & Bernd Heine (Eds.). *The Oxford Handbook of Grammaticalization* (pp. 251–262). Oxford: Oxford University Press.
- Rose, David (1997). Science, technology and technical literacies. In Frances Christie & James R. Martin (Eds.), *Genre and institutions: Social processes in the workplace and school* (pp. 3-39). London and New York: Continuum.
- Rudman, J. (1997). The State of Authorship Attribution Studies: Some Problems and Solutions. *Computers and the Humanities*, 31(4), 351-365.
- Ryshina-Pankova, Marianna (2011). Developmental changes in the use of interactional resources: Persuading the reader in FL book reviews. *Journal of Second Language Writing*, 20 (4), 243-256.
- Salthouse, Timothy (2010). *Major issues in cognitive aging*. Oxford: Oxford University Press.
- Sankoff, Gillian & Blondeau, H el ene (2007). Language change across the lifespan: /r/ in Montr eal French. *Language*, 83, 566–588.
- Sapir, Edward (1921). *Language: an introduction to the study of speech*. New York: Harcourt, Brace.

- Schaie, K. Warner & Caskie, Grace I.L. (2005). Methodological issues in aging research. In Douglas M. Teti (Ed.), *Handbook of research methods in developmental science* (pp. 21-29). Oxford: Blackwell Publishing.
- Schaie, K. Warner (1965). A general model for the study of developmental problems. *Psychological Bulletin*, 64, 92–107.
- Schleppegrell, Mary J. & M. Cecilia Colombi (Eds.) (2002). *Developing advanced literacy in first and second languages: meaning with power*. Mahwah, N.J.: Lawrence Erlbaum.
- Schleppegrell, Mary J. (2004). *The language of schooling: A functional linguistics approach*. Mahwah, NJ: Lawrence Erlbaum.
- Schrauf, Robert (2009). Longitudinal Designs in Studies of Multilingualism. In Kees de Bot & Robert W. Schrauf (Eds.), *Language development over the lifespan* (pp. 245-270). New York: Routledge.
- Scott, Mike & Tribble, Christopher (2006). *Textual Patterns. Keywords and Corpus Analysis in Language Education* [Studies in Corpus Linguistics 22]. Amsterdam: John Benjamins.
- Seoane, Elena & Loureiro-Porto, Lucía (2005). On the colloquialization of scientific. British and American English. *ESP Across Cultures*, 2, 106–118.
- Seoane, Elena and Christopher Williams (2006). Changing the rules: A comparison of recent trends in English in academic scientific discourse and prescriptive legal discourse. In Marina Dossena & Irma Taavitsainen (Eds.), *Diachronic perspectives on domain-specific English* (pp. 255-276). Bern: Peter Lang.
- Seuren, P. A. M. (1998). *Western linguistics: An historical introduction*. Oxford: Blackwell.
- Simon-Vandenberg, Anne M., Taverniers, Miriam & Ravelli, Louise (Eds.) (2003). *Grammatical metaphor: views from Systemic Functional Linguistics*. Amsterdam: John Benjamins.

- Sinclair, John (1981). Planes of discourse. In S.N.A. Rizvi (Ed.) *The two-fold voice: Essays in honour of Ramesh Mohan* (pp. 70–89). Salzburg: University of Salzburg.
- Sliwinski, Martin & Buschke, Herman (1999). Cross-sectional and longitudinal relationships among age, cognition, and processing speed. *Psychology and Aging*, 14(1), 18–33.
- Smith, J. A. and Kelly, C. (2002). Stylistic constancy and change across literary corpora: using measures of lexical richness to date works. *Computers and the Humanities*, 36, 411–430.
- Stamou, Constantina (2005). Dating Victorians: an experimental approach to stylochronometry. Unpublished Ph.D. thesis: University of Luton.
- Stamou, Constantina (2007). Stylochronometry: Stylistic development, sequence of composition, and relative dating. *Literary and Linguistic Computing*, 23(2), 181–199.
- Stamou, Constantina (2008). Stylochronometry: Stylistic development, sequence of composition, and relative dating. *Literary and Linguistic Computing*, 23(2), 181–199.
- Swales, John M. (1981). *Aspects of Article Introductions*. The University of Aston: Language Studies Unit.
- Swales, John M. (1990). *Genre analysis: English in academic and research settings*. Cambridge: Cambridge Applied Linguistics.
- Taavitsainen, Irma (2011). Medical case reports and scientific thought-styles. In F. Alonso Almeida (Ed.), *Special Issue: Diachronic English for Specific Purposes (Revista de Lenguas para Fines Específicos; No. 17)* (pp. 75–98). Spain: Universidad de Las Palmas de Gran Canaria.
- Taverniers, Miriam (2008). Interpersonal grammatical metaphor as double scoping and double grounding. *WORD*, 59 (1–2), 83–109.
- Teich, Elke; Degaetano-Ortlieb, Stefania; Fankhouser, Peter; Kermes, Hannah & Lapshinova-Koltunski, Ekaterina (2016). The linguistic construal of disciplinarity: A

- data-mining approach using register features. *Journal of the Association for Information Science and Technology*, 67(7), 1668-1678.
- Teruya, Kazuhiro & Matthiessen, Christian M.I.M. (2015). Grammatical realizations of rhetorical relations in different registers. *WORD*, 61(3), 232-281.
- Thetela, Puleng (1997). Evaluated entities and parameters of value in academic research articles. *English for Specific Purposes*, 16 (2), 101–18.
- Thompson, Geoff (2001). Interaction in academic writing: learning to argue with the reader. *Applied Linguistics*, 22(1), 58-78.
- Thompson, Paul (2013). Thesis and dissertation writing. In Brian Paltridge & S. Starfield (Eds.), *The handbook of English for specific purposes* (pp. 283-299). Chichester: Wiley-Blackwell.
- Torr, Jane (1997). *From child tongue to mother tongue: A case study of language development in the first two and a half years*. Nottingham, UK: University of Nottingham.
- Trevarthen, Colwyn (1979). Communication and cooperation in early infancy: A description of primary intersubjectivity. In M. Bullowa (Ed.), *Before speech* (pp. 321-347). Cambridge: Cambridge University Press.
- Trevarthen, Colwyn (1998). The concept and foundations of infant intersubjectivity. In Stein Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (pp. 15-46). Cambridge: Cambridge University Press.
- Trevarthen, Colwyn (2001). Intrinsic motives for companionship in understanding: Their origin, development and significance for infant mental health. *Infant Mental Health Journal*, 22, 95–131.
- Trevarthen, Colwyn & Hubley, Peter (1978). Secondary intersubjectivity: Confidence, confiding and acts of meaning in the first year. In A. Lock (Ed.), *Action, gesture and*

- symbol: The emergence of language (pp.183–229). London: Academic Press, Jossey-Bass.
- Tucker, Gordon (1997). *The lexicogrammar of adjectives: a systemic functional approach to lexis*. London: Cassell.
- Ure, Jean (1971). Lexical density and register differentiation. In G. Perren and J.L.M. Trim (Eds.), *Applications of Linguistics* (pp. 443-452). London: Cambridge University Press.
- Van Compernelle, Rémi (2011). Developing second language sociopragmatic knowledge through concept-based instruction: A microgenetic case study. *Journal of Pragmatics*, 43(13), 3267-3283.
- Van Linden, An (2015). Comparative modals: (Dis)similar diachronic tendencies. *Functions of Language*, 22(2), 192-231.
- Vande Kopple, William (1985). Some exploratory discourse on metadiscourse. *College Composition and Communication*, 36: 82–93.
- Veel, Robert (1997). Learning how to mean – scientifically speaking: apprenticeship into scientific discourse in the secondary school. In Frances Christie & James R. Martin (Eds.), *Language, knowledge and pedagogy: Functional linguistic and sociological perspectives* (pp. 161-195) .London: Continuum.
- Verhaeghen, P. (2003). Aging and vocabulary scores: A meta-analysis. *Psychology and Aging*, 18(2), 332–339.
- Whissell, C. (1999). Holding emotional and linguistic rulers up to the poetry of Robert Frost. *Psychological Reports*, 85, 751–758.
- Wignell, Peter (1998). Technicality and Abstraction in Social Science. In J.R. Martin & R. Veel, (Eds.), *Reading Science* (pp. 297-326). London: Routledge.

- Wignell, Peter; Martin, James R. & Eggins, Suzanne (1989). The discourse of geography: Ordering and explaining the experiential world. *Linguistics and Education*, 1(4), 359-391.
- Wignell, Peter (2007). *On the discourse of social science*. Darwin, N.T: Charles Darwin University Press.
- Wolfe-Quintero, Kate; Inagaki, Shunji & Kim, Hae-Young (1998). *Second language development in writing: Measures of fluency, accuracy, and complexity*. Honolulu: University of Hawai'i Press.
- Xu, Xiaoyu (2017). An analysis of stance and voice in research articles across Chinese and British cultures, using the Appraisal framework. Ph.D. thesis: Coventry University.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th Edition). Los Angeles, CA: SAGE.