EDITED BY J. R. MARTIN,
KARL MATON AND Y. J. DORAN

ACCESSING ACADEMIC DISCOURSE

Systemic Functional Linguistics and Legitimation Code Theory

Legitimation Code Theory

ROUTLEDGE

ACCESSING ACADEMIC DISCOURSE

Academic discourse is the gateway not only to educational success but to worlds of imagination, discovery and accumulated wisdom. Understanding the nature of academic discourse and developing ways of helping everyone access, shape and change this knowledge is critical to supporting social justice. Yet education research often ignores the forms taken by knowledge and the language through which they are expressed. This volume comprises cutting-edge work that is bringing together sociological and linguistic approaches to access academic discourse.

Systemic functional linguistics (SFL) is a long-established and widely known approach to understanding language. Legitimation Code Theory (LCT) is a younger and rapidly growing approach to exploring and shaping knowledge practices. Now evermore research and practice are using these approaches together. This volume presents new advances from this inter-disciplinary dialogue, focusing on state-of-the-art work in SFL provoked by its productive dialogue with LCT. It showcases work by the leading lights of both approaches, including the foremost scholar of SFL and the creator of LCT. Chapters introduce key ideas from LCT, new conceptual developments in SFL, studies using both approaches, and guidelines for shaping curriculum and pedagogy to support access to academic discourse in classrooms.

The book is essential reading for all appliable and educational linguists, as well as scholars and practitioners of education and sociology.

J. R. Martin is a world-leading authority in systemic functional linguistics.

Karl Maton is the creator and architect of Legitimation Code Theory.

Y. J. Doran is a leading young scholar combining both frameworks in research.

All three are members of the LCT Centre for Knowledge-Building.

Legitimation Code Theory: Knowledge-building in research and practice

Series editor: Karl Maton

LCT Centre for Knowledge-Building

This series comprises research and practice into knowledge-building in education and beyond. It focuses on Legitimation Code Theory or 'LCT', a cutting-edge approach rapidly being adopted by scholars and teachers across the disciplinary map to understand, change and improve their practice. LCT builds on sociological ideas from Pierre Bourdieu and Basil Bernstein and integrates insights from such diverse fields as linguistics, philosophy, literary criticism, physics and anthropology. The framework reveals the otherwise hidden principles embodied by knowledge practices, their different forms, and their effects. By making these 'codes' visible to be learned or changed, work using LCT is making a real difference, from supporting social justice in education to improving design processes. Books in this series will focus on both cutting-edge developments in theory and research and developing new forms of educational practice. Books will explore topics across the institutional and disciplinary maps of education, from physics to ballet, from pre-school to university, as well as other social fields, such as politics and law.

Other volumes in this series include:

Building Knowledge in Higher Education
Enhancing Teaching and Learning with Legitimation Code Theory,
Edited by Chris Winberg, Sioux McKenna and Kirstin Wilmot

Studying Science
Knowledge, Language, Pedagogy
Edited by Karl Maton, J. R. Martin and Y. J. Doran

Turning Access into Success
Improving University Education with Legitimation Code Theory
Sherran Clarence

For a full list of titles in this series, please visit: https://www.routledge.com/Legitimation-Code-Theory/book-series/LMCT

ACCESSING ACADEMIC DISCOURSE

Systemic Functional Linguistics and Legitimation Code Theory

Edited by
J. R. Martin, Karl Maton and Y. J. Doran

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2020
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
52 Vanderbilt Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record for this book has been requested

ISBN: 978-0-367-23608-3 (hbk)
ISBN: 978-0-367-23607-6 (pbk)
ISBN: 978-0-429-28072-6 (ebk)

Typeset in Bembo
by Apex CoVantage, LLC

In memory of Michael and Basil

CONTENTS

CONTRIBUTORS

Rainbow Tsai-Hung Chen is Associate Professor and Director of the Foreign Language Centre at National Chengchi University, Taiwan. Her research interests include cross-cultural teaching and learning, study abroad, English as a medium of instruction, and beliefs about language learning.

Y. J. Doran is Lecturer in the Department of Linguistics at the University of Sydney and Postdoctoral Research Fellow in the LCT Centre for Knowledge-Building (2017–19). His research centres on language, semiosis, knowledge and education, spanning the interdisciplinary fields of educational linguistics, multimodality, and language and identity. He works primarily on English and Sudanese, and from the perspectives of systemic functional linguistics and Legitimation Code Theory. His most recent book is *The Discourse of Physics: Building knowledge through language, mathematics and image* (2018, Routledge).

Susan Hood is an Honorary Associate Professor in the Department of Linguistics at the University of Sydney. Her research draws on systemic functional linguistics in studies of academic discourse that explore disciplinary differences in the expression of knowledge and values, the multimodal cooperation of language and embodied paralanguage in lectures, and storytelling as a research practice. Recent publications include *Appraising Research: Evaluation in academic writing* (2010, Palgrave), *Semiotic Margins: Meaning in multimodalities* (with S. Dreyfus and M. Stenglin, eds, 2012, Continuum), and *Knowledge-building: Educational studies in Legitimation Code Theory* (with K. Maton and S. Shay, eds, 2016, Routledge).

J. R. Martin is Professor of Linguistics at the University of Sydney and Deputy Director of the LCT Centre for Knowledge-Building. Recent publications include a book on teaching academic discourse online (*Genre Pedagogy in Higher Education,*

Palgrave Macmillan 2016), with Shoshana Dreyfus, Sally Humphrey and Ahmar Mahboob; and a book on 'Youth Justice Conferencing' (*Discourse and Diversionary Justice*, 2018, Palgrave Macmillan), with Michele Zappavigna. Eight volumes of his collected papers (edited by Wang Zhenhua, Shanghai Jiao Tong University Press) have been published in China (2010, 2012). In April 2014 Shanghai Jiao Tong University opened its Martin Centre for Appliable Linguistics, appointing Professor Martin as Director.

Karl Maton is Professor of Sociology at the University of Sydney and Director of the LCT Centre for Knowledge-Building, Honorary Professor at Rhodes University (South Africa) and Honorary Professor at University of the Witwatersrand (South Africa). He is the creator of Legitimation Code Theory. Karl's book *Knowledge and Knowers: Towards a realist sociology of education*, the founding text of LCT, was published by Routledge in 2014 and has been translated into Chinese (2019, FLTRP). A primer in how to enact LCT in research, *Knowledge-building: Educational studies in Legitimation Code Theory* (K. Maton, S. Hood and S. Shay, eds), was published by Routledge in 2016. Karl is currently co-editing a collection on *Studying Science* (with J. R. Martin and Y. J. Doran) and supervising the translation into Spanish of a primer of key LCT texts.

Erika Matruglio is a Senior Lecturer in TESOL at the University of Wollongong. She draws on systemic functional linguistics and Legitimation Code Theory to explore the nature of literacy practices in schooling, specifically the construction of interpersonal stance in student writing, disciplinary differences in student literacy practices, and epistemological and axiological bases of school subjects. Erika completed her PhD thesis at the University of Technology, Sydney, in 2014, into differential literacy demands of high stakes writing in senior secondary humanities subjects. She helped run a major research project for J. R. Martin and Karl Maton on cumulative knowledge-building in school classrooms and was involved in a longitudinal study with Pauline Jones investigating literacy transition points across the years of schooling. She is currently involved in research investigating conflicting notions of creativity and constraint in the disciplines and the effects different understandings of disciplinarity have on the teaching and learning of literacy in secondary and tertiary education.

Teresa Oteíza is an Associate Professor and Director of the Doctorate Program in Linguistics at the Pontifical Catholic University of Chile. Her interests include the social discourse analysis, educational linguistics and systemic functional linguistics. She is currently working with Claudio Pinuer on the project 'The language of appraisal in Spanish: Description and systematization of linguistic resources to build intersubjectivity'. She is the author of *El discurso pedagógico de la historia: Un análisis lingüístico sobre la construcción ideológica de la historia de Chile (1970–2001)* in 2006, and *En (re)construcción: Discurso, identidad y nación en los manuales escolares de historia y de ciencias sociales* (ed. with Derrin Pinto) in 2011. Her forthcoming book *What to*

Remember, What to Teach: Human rights violations in Chile's recent past and the pedagogical discourse of history, will be published by Equinox.

David Rose is Director of *Reading to Learn*, a literacy programme that trains teachers across school and university sectors in Australia, Africa, Asia and Europe (www.readingtolearn.com.au). He is an Honorary Associate in the Department of Linguistics at the University of Sydney. His research includes analysis and design of classroom discourse, pedagogic design for embedding literacy in curriculum learning and for beginning literacy, professional training for teachers in pedagogy and language, language typology, language evolution and social semiotic theory. Publications include: *The Western Desert Code: An Australian cryptogrammar* (2001, Pacific Linguistics), *Genre Relations: Mapping culture* (with J. R. Martin, 2008, Equinox) and *Learning to Write, Reading to Learn: Genre, knowledge and pedagogy in the Sydney School* (with J. R. Martin, 2012, Equinox).

1

ACADEMIC DISCOURSE

An inter-disciplinary dialogue

J. R. Martin, Karl Maton and Y. J. Doran

Introductions

As the gateway to educational success, academic discourse is a critical source of future opportunities and quality of life. Embodying worlds of discovery and imagination, academic discourse is also a key repository of accumulated human knowledge and wisdom. To access academic discourse is to access means for achieving social power, epistemological power, or axiological power. Access may lead to success in myriad ways. Of course, academic discourse is not the only form of knowledge with power. Scholars can succumb to the seductive illusion that their own professional discourse is the only legitimate currency and fail to see that non-academic knowledge possesses its own forms of power, its own wellsprings of understanding and luminous insight. Yet, academic discourse *is* particularly powerful. In its manifold forms it offers access to wealth, health and the capacity to create or destroy worlds, real or imaginative. Accessing academic discourse, that is to say the task of understanding its nature and developing ways of enabling everyone to grasp, shape and change academic discourse, is an issue of social justice. It is to explore diverse knowledge practices and determine how to enable everyone to have the opportunities offered by mastery of those knowledge practices, including the opportunity to fundamentally change them. This volume explores the nature of academic discourse from the perspective of two fields that enjoy a highly productive inter- and cross-disciplinary dialogue: systemic functional linguistics (SFL) and Legitimation Code Theory (LCT). Specifically, the papers brought together here illustrate how LCT is pushing and provoking SFL into generating greater explanatory power and theoretical innovation in its engagement with accessing academic discourse.

As you are likely to know, SFL is an approach to language originated by M. A. K. Halliday (1985, 1994) that is now the basis of an extremely wide-ranging international community of scholars and educators exploring all manner of

meaning-making. The field is well established: the *International Systemic Functional Congress* in 2020 will be the forty-seventh such conference. You may be less likely to know that LCT is a sociological approach to understanding and shaping social practice. Though quickly establishing itself through international conferences, book series, research centres and so forth, LCT is much younger. LCT extends ideas from Basil Bernstein and Pierre Bourdieu (among others) that were developed from the late 1960s and the first papers were published at the turn of the century (e.g. Maton 2000). However, it was not until 2009 that the name 'Legitimation Code Theory' appeared in print (Maton 2009) to describe the conceptual framework that had emerged as sui generis. Yet, LCT has become widely used to access academic discourse by a growing number of systemic scholars and educators. One reason is that the origins of this dialogue began earlier and built on existing foundations.

In 2002 the English sociologist Karl Maton delivered a plenary address at the annual conference of the Australian Systemic Functional Linguistics Association. This was perhaps the first occasion on which scholars in SFL encountered Maton's work. Among the audience were linguists whose work on education had already been inspired by the sociological ideas of Basil Bernstein, who had died two years earlier. Many were excited to learn that those ideas were being extended further. Of particular interest at this time were developments of Bernstein's notion of 'knowledge structures' (2000) by Maton (2000) and fellow sociologists Rob Moore (2000) and Johan Muller (2000). Inspired by this work, Frances Christie and Jim Martin organized a conference at the University of Sydney in December 2004 at which Maton and Muller presented papers alongside talks by SFL scholars. This dialogue was extended further by a second Sydney conference in December 2008, organized by Frances Christie and Karl Maton, which included both linguistics papers and sociological talks by Maton, Moore and Muller.[1]

Much has happened since that plenary address in 2002. At the time Maton's ideas were extending existing concepts from Bernstein. Subsequently those new ideas expanded and cohered into a systematic conceptual framework that became known as LCT. In 2005 Maton migrated from England to Australia, intensifying the burgeoning dialogue by bringing him into direct relations with the Sydney register of SFL. Fast forward to 2020 and there is now a large and thriving community of scholars and students enacting LCT and SFL together in the study of education and other social contexts (e.g. Maton and Doran 2017c, Maton *et al.* 2016b). This dialogue has been extended at *International Systemic Functional Congresses* and at *International Legitimation Code Theory Conferences* through keynotes, courses and workshops. Formal links have been established between the Martin Centre for Appliable Linguistics at Shanghai Jiao Tong University in China and the LCT Centre for Knowledge-Building in Sydney, Australia. Intensive collaboration has been fuelled by major collaborative research studies and a growing number of PhDs that draw on both theories. In short, scholars from SFL and LCT have continued to work closely together. This volume illustrates some of the gains made from that dialogue and collaboration.

In this chapter we review the foundations for this dialogue and comment on key aspects of current research. Our use of 'academic discourse' in the book title does not limit this dialogue, which embraces practices far beyond education, including the legal field (Zappavigna and Martin 2018), museums (Blunden 2016) and the armed services (Thomson 2014). Nor does it concede to disparaging connotations of 'academic' as impractical or insignificant, for both SFL and LCT have direct appliability and their dialogue involves impact on practice (e.g. Martin and Maton 2013). Rather, it points both towards a regular foci for dialogue, the meaning-making practices of scholars, educators and students, and to the dialogue itself, an ongoing discourse between two academic approaches to meaning-making. There is a lot more to this dialogue than can be introduced here. LCT and SFL are proving particularly productive at challenging beliefs and provoking new ideas in one another. Nonetheless, we hope this introduction will provide insight into some of the issues bringing these complementary approaches together.

We start with SFL. We begin by reviewing work on the linguistic concept of field, before discussing how this brought educational researchers in SFL to engage during the early- to mid-2000s with Bernstein's model of 'knowledge structures'. We discuss how this engagement raised a series of questions that set up the ongoing encounter with LCT, a framework that extends and integrates Bernstein's concepts. We then introduce LCT and discuss how concepts from two dimensions – Specialization and Semantics – helped resolve problems raised by systemic linguists with Bernstein's notion of 'knowledge structures'. We conclude by briefly discussing issues requiring vigilance when bringing SFL and LCT together, based on our experiences on major research studies of education.

Field (SFL)

The strand of SFL research that first attracted systemicists to LCT (via Bernstein's ideas) was work developing the register variable field. This line of work emerged as part of the literacy focused action research associated with the 'Sydney School', as documented in Rose and Martin (2012).[2] The basic challenge here concerned moving on from a mastery of genres and their staging in primary school to developing genres which help build the uncommon sense knowledge of secondary school. For this, a focus on field and mode, alongside genre, was crucial. Initial work on physical geography (Wignell *et al.* 1989) and History (Eggins *et al.* 1993) was supplemented with work on a range of secondary school and workplace fields – see Rose *et al.* (1992), Halliday and Martin (1993), Iedema *et al.* (1994), Iedema (1995), Christie and Martin (1997), Martin and Veel (1998), Coffin (2006), Wignell (2007) and Martin (2012). Most of this research was based on a collaboration between the Department of Linguistics at the University of Sydney and the Metropolitan East Region's Disadvantaged Schools Programme, in the 'Language and Social Power' and 'Write it Right' projects (see Rose and Martin 2012; Veel 2006). By the mid-1990s federal funding for such programmes was diverted away from regional

centres by state departments of education and redistributed to individual schools. This led to a brief hiatus in this trajectory of educational linguistic research.

The model of field being developed in this work was inspired by Halliday's work on the language of science (Halliday 2004) and drew heavily on Martin's conception of field (1992) as a set of activity sequences oriented to some global institutional purpose, alongside the taxonomies of entities (people, places and things, both abstract and concrete) participating in these activities (organized by both classification and composition). The linguists involved were especially interested in how everyday sequences and taxonomies (Bernstein's 'common sense') differed from the academic ones (Bernstein's 'uncommon sense') challenging students across subject areas in secondary school. Particular attention was paid to the phenomenon of technicality whereby everyday or less specialized meanings were distilled as more specialized ones and used to build the uncommon sense taxonomies and implication sequences of humanities, social science and natural science disciplines. This process, of course, flagged the critical role played by grammatical metaphor in academic discourse (Halliday 1998; Martin 1993, 2008), both in definitions and explanations and in the composition of disciplinary genres. This brought the register variable mode into the picture, since abstraction was a critical resource affording technicality, cause/effect relations inside the clause and evaluation. For overviews of this work, see Martin (2007a, 2007b).

Martin (2007a) draws on meteorology to introduce the model of field in play here, drawing on information provided by the Australian Government's Bureau of Meteorology website.[3] As far as sequencing is concerned, they offer the following explanation of cloud formation:

> [1] Clouds have their origins in the water that covers 70 per cent of the earth's surface. Millions of tons of water vapour are evaporated into the air daily from oceans, lakes and rivers, and by transpiration from trees, crops and other plant life.
>
> As this moist air rises it encounters lower pressures, expands as a result, and in doing so becomes cooler. As the air cools it can hold less water vapour and eventually will become saturated. It is from this point that some of the water vapour will condense into tiny water droplets to form cloud (about one million cloud droplets are contained in one rain-drop). Thus, whenever clouds appear they provide visual evidence of the presence of water in the atmosphere.

This uncommon sense implication sequence gives a simple explanation of how clouds form, working through a set of logically connected steps: water evaporates from bodies of water and transpires from plant life, and if it does so and rises, then it encounters lower pressures, and if it does, then it expands, and if it does, it becomes cooler, and if it does, it becomes saturated, and if it does, then some water vapour will condense into tiny water droplets (and so we see clouds). Such a sequence

typifies uncommon sense ones – you cannot often see them happening (it takes too long, our eyes are not sharp enough and we rarely have a suitable vantage point), they are generalized (happening over and over again) and their steps are logically contingent (if one step happens another must follow).

Beyond uncommon sense sequencing, the entity emerging from this process (clouds) enters into uncommon sense taxonomies of both classification and composition. The following report introduces their classification into 27 subtypes and the criteria through which they are classified (their elevation):

> [2] There are ten main cloud types, which are further divided into 27 subtypes according to their height shape, colour and associated weather. Clouds are categorized as low (from the earth's surface to 2.5 km), middle (2.5 to 6 km), or high (above 6 km). They are given Latin names which describe their characteristics, e.g. cirrus (a hair), cumulus (a heap), stratus (a layer) and nimbus (rain-bearing). It's an interesting fact that all clouds are white, but when viewed from the ground some appear grey or dark grey according to their depth and shading from higher cloud.

The main groups and subtypes construed in this classifying report are outlined below; in addition, there is a vertically developed cloud type which has one end on a high level and the other on a low level.

1 High-level clouds

   1.1 Cirrus
   1.2 Cirrocumulus
   1.3 Cirrostratus
   1.4 Contrail

2 Medium-level clouds

   2.1 Altostratus . . .
   2.2 Altocumulus
   2.3 Nimbostratus

3 Low-level clouds

   3.1 Stratocumulus
   3.2 Stratus
   3.3 Cumulus

Each of these subtypes can be further divided; a subclassification for altostratus clouds is listed below, based largely on what is considered significant about their appearance (as it reflects their origins and precipitation potential).[4] They are usually formed as air rises due to a weather front activity sequence.

altostratus duplicatus
altostratus lenticularis
altostratus mammatus
altostratus opacus
altostratus pannus
altostratus praecipitatio
altostratus radiatus
altostratus translucidus
altostratus undulatus
altostratus virga

This kind of classification typifies uncommon sense taxonomies. The criteria on which the classification is based (here precise measures of elevation based on instrumental readings) are not directly available to the senses; the classification is exhaustive (the typology covers all cloud formations); and the classification typically involves several levels of delicacy (deep fine-grained typology). Terms derived from Latin (and sometimes Ancient Greek) are often deployed, in part to signal the uncommon sense technicality, in part because we run out of English words, and in part because English speakers still associate uncommon sense with the languages from which they had to reclaim it after French conquerors destroyed their native tradition of vertical discourse.

Comparable precision and delicacy are also found for decomposition. We know from Text [1] that clouds are made of water droplets, and we can pursue this further into the realms of Chemistry, and Physics.[5] There we learn that water is a V-shaped molecule, known chemically as H_2O (meaning two hydrogen atoms and one oxygen atom bonded together into a molecule). Pushing further we might find that water molecules are symmetric (point group C_{2v}), with two mirror planes of symmetry and a two-fold rotation axis; its electronic structure is modelled in Figure 1.1. Of special interest here is the way in which decomposition draws attention to the borders of disciplines, as we move from Meteorology through Chemistry to Physics. This highlights the sense in which the borders of uncommon sense disciplines are in fact more weakly classified than their excluding field specific technicality might lead one to expect.

Turning from science to humanities, linguists exploring these issues were struck by the relative paucity of technicality in school subjects such as English, History and Creative Arts. Not, of course, that there was none. History, for example, does divide the past into a composition hierarchy of periods of time (e.g. Old Kingdom Egypt, New Kingdom Egypt, World War I, World War II) and past worlds feature unfamiliar entities (people, places, products, artefacts, etc.) that have to be mastered. In addition, there are a number of socio-economic concepts that have to be explored (e.g. colonialism, imperialism, nationalism, communism, socialism, capitalism) in order to explain struggles over the control of resources both within societies and between (Martin *et al*. 2010). However, what struck educational linguists more strongly was the abstract nature of the discourse students were expected to read and write, often featuring even more grammatical metaphor than had been found

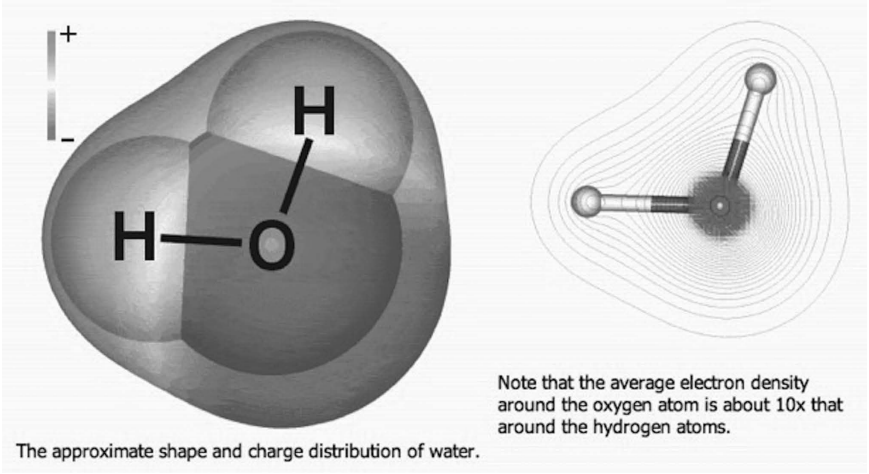


FIGURE 1.1 Water electronic structure (from http://www.lsbu.ac.uk/water/molecule.html)

deployed to define and explain in Physics, Chemistry, Biology and Physical Geography. The mode of the humanities in other words was equally, if not more, abstract and so equally, if not more, challenging for students moving into discourse of this kind for the first time upon entering secondary school.

So, instead of reading *Mt Vesuvius erupted*, they had to deal with *the eruption of Mt Vesuvius*; instead of writing *he excavated Pompeii*, they had to manage *his excavation of Pompeii*. What was this abstraction for? There is no simple answer to this question. Part of the answer has to do with managing information flow in academic discourse (as discussed in relation to periodicity in Martin and Matruglio, Chapter 4, this volume). Another part of the answer relates to explanation, since in history there is usually more than one factor influencing change and more than one effect ensuing (Martin 2002, 2003). There may be multiple causes in other words (i. *past neglect*, ii. *damage* and iii. *a failure to document carefully, if at all* below):

> [3] Andrew Wallace states that while Pompeii is one of the most studied of the world's archaeological sites, it is perhaps the least understood, due to past neglect, damage, and a failure [[to document carefully, if at all]].

There may be multiple effects (i. *greater documentation*, ii. *more archaeological artefacts left in site* and iii. *the breakthrough process of injecting liquid plaster into the body-shaped cavities* below):

> [4] Fiorelli's stage of occupation allowed for greater documentation, more archaeological artefacts left in site and the breakthrough process of injecting liquid plaster into the body-shaped cavities made by solidified ash and the eventual decomposition of bodies.

Grammatical metaphor allows historians to parcel up multiple causes and effects inside the clause by way of managing the complexity of what leads on to or follows on from what. Explaining the past moreover involves more than packaging up complex causes and effects; it also involves interpreting the kind of causal connection between the packages. Historical explanation is a finely nuanced process, involving degrees and types of influence. Consider, for example, just a few of the ways in which we might relate Fiorelli's archaeology to its legacy:

> [4] Fiorelli's stage of occupation
> **allowed for**
> greater documentation, more archaeological artefacts left in site and the breakthrough process of injecting liquid plaster into the body-shaped cavities made by solidified ash and the eventual decomposition of bodies.
> [5] Fiorelli's stage of occupation
> **encouraged**
> greater documentation…
> [6] Fiorelli's stage of occupation
> **contributed to**
> greater documentation…
> [7] Fiorelli's stage of occupation
> **precipitated**
> greater documentation…

Cause in the clause is thus a critical resource nuancing History's interpretation of the past. The congruent resources of spoken discourse are nowhere near delicate enough.

We should also note here the role played by grammatical metaphor in targeting the attitudes that historians cultivate towards the past. The opening and closing paragraphs of the factorial explanation considered in Martin (Chapter 5, this volume), for example, feature negative appreciation of the conservation of Pompeii as an archaeological site:

> [8] While Pompeii is one of the most studied of the world's archaeological sites, it has been plagued with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management…
>
> As a result of this, the description of Pompeii as a victim of state neglect and indifference and an archaeological catastrophe of the first order is an apt one. Its ongoing destruction since its discovery in the 1590s has arguably resulted in a greater disaster than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

In its introductory paragraph, cause in the clause is deployed to set up the lexical metaphor whereby various factors infect Pompeii (i.e. a plague of i. *conservation*

problems, ii. *poor restoration work*, iii. *pressure from tourism* and iv. *poor site management).* In the final paragraph the packaging of Pompeii as a victim of neglect and an archaeological catastrophe is evaluated as *apt*; and its ongoing destruction is evaluated as an even greater *disaster* than its initial destruction by Mt Vesuvius. The requisite historical sensibility could not be more clear here – namely that archaeological sites are priceless treasures and need to be carefully conserved. In History, as in the humanities in general, demonstrating how you value what you know is as important as demonstrating what you know (see Doran, Chapter 6 and Oteíza, Chapter 7, this volume).

In summary, by 1995 language in education research informed by SFL had arrived at a characterization of science oriented to field and featuring technicality, and a complementary characterization of the humanities oriented to mode and featuring abstraction. The critical linguistic resources at play in science concerned elaboration (across ranks and strata) – the resources whereby less specialized meanings are distilled as more specialized ones. The critical linguistic resources at play in the humanities concerned grammatical metaphor – the resources whereby explanations of change are proposed and evaluated. A rough outline of this phase of understanding is presented in Figure 1.2, setting aside genre and concentrating on field and mode in relation to metafunctions.[6]

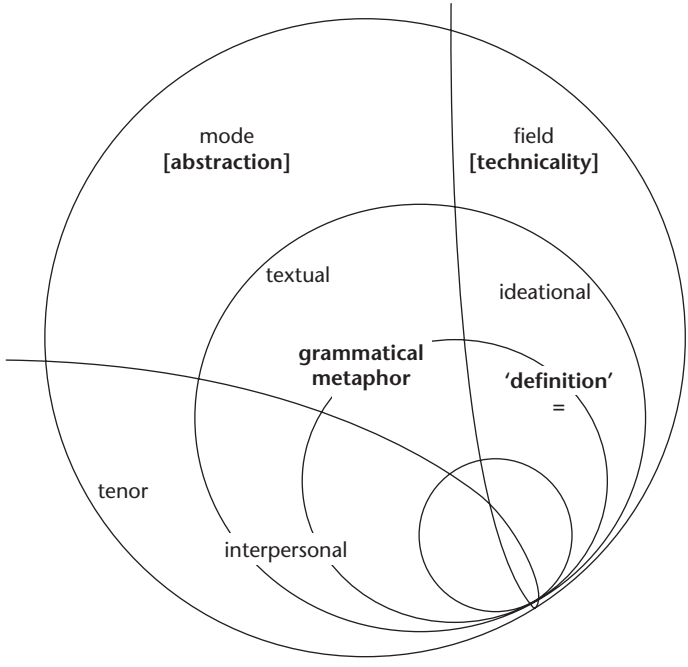


FIGURE 1.2 Knowledge structure – an SFL perspective, circa 1995

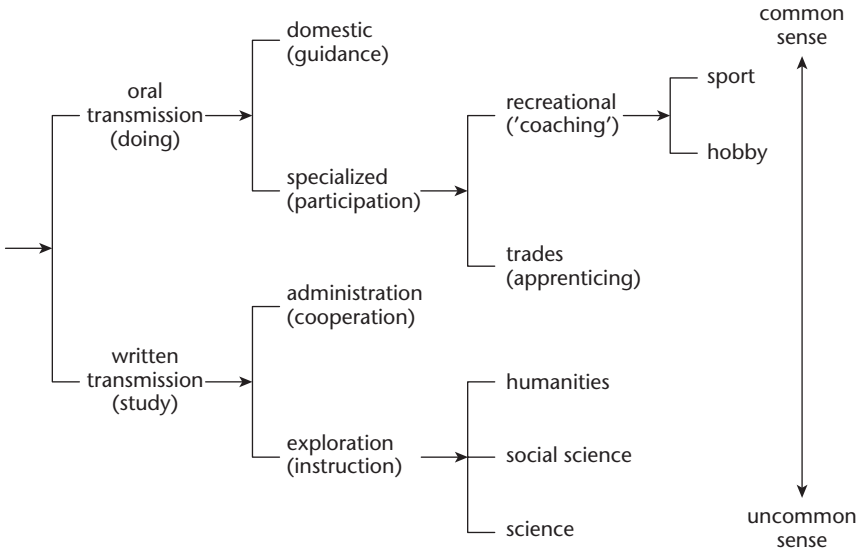


FIGURE 1.3 Field typology (Martin 1992: 544)

As far as relations among fields were concerned, Martin (1992: 544) proposed a crude mapping based on the implications of distinctive sequencing and taxonomy for the ways fields are learned. This typology is reproduced as Figure 1.3, with fields graded along a common sense to uncommon sense cline.[7] As we will see below, an orientation to field of this kind was comparable to Bernstein's late work on 'knowledge structure' and thus encouraged dialogue.

SFL and Bernstein's 'knowledge structures'

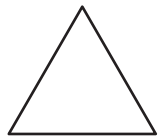
SFL and sociological research enacting the framework of Basil Bernstein have engaged in a productive dialogue for decades (Martin 2011a; Maton and Doran 2017c). Bernstein and Halliday began collaborating in the 1960s in London in a project involving sociologists and linguists that focused on Bernstein's theory of codes (Bernstein 1995; Halliday 1995). Hasan (2009) developed this work in her studies during the 1980s of semantic variation in relation to gender and class in the language of pre-school mothers and children. Throughout the 1980s and 1990s 'Sydney School' literacy programmes drew on Bernstein's notion of 'pedagogic discourse' to refine their pedagogy and curriculum and interpret the class basis of their struggles with traditional and progressivist/constructivist pedagogues (Martin 1999; Rose and Martin 2012). As flagged earlier above, by the 2000s interaction around SFL's concept of field and Bernstein's concept of 'knowledge structures' came to the fore. At this point in our introduction, we discuss this notion from the perspective of SFL: what educational linguists found valuable about Bernstein's concept and why.

Fundamental to the ideas that gripped educational linguists at the turn of the century was Bernstein's distinction between 'horizontal discourse' and 'vertical discourse':

> A *Horizontal discourse* entails a set of strategies which are local, segmentally organized, context specific and dependent, for maximizing encounters with persons and habitats. . . . This form has a group of well-known features: it is likely to be oral, local, context dependent and specific, tacit, multi-layered and contradictory across but not within contexts . . . a *Vertical discourse* takes the form of a coherent, explicit and systematically principled structure, hierarchically organized as in the sciences, or it takes the form of a series of specialized languages with specialized modes of interrogation and specialized criteria for the production and circulation of texts as in the social sciences and humanities.
>
> *(Bernstein 2000: 157; original emphases)*

This is a late development of Bernstein's abiding concern with differences between common sense and uncommon sense and their implications for success and failure in education as shaped by the social backgrounds of students. The distinction resonates strongly with the everyday versus academic discourse opposition reflected in Figure 1.3 and which was the focus of the educational linguistic work on field and mode, reviewed earlier in this chapter.

Next, Bernstein made a distinction within vertical discourse between 'hierarchical knowledge structures' and 'horizontal knowledge structures'. Bernstein defined a hierarchical knowledge structure as 'a coherent, explicit and systematically principled structure, hierarchically organized' (2000: 160) which 'attempts to create very general propositions and theories, which integrate knowledge at lower levels, and in this way shows underlying uniformities across an expanding range of apparently different phenomena' (2000: 161). Bernstein used a triangle to symbolize a knowledge structure of this kind, commenting in a footnote that there 'is likely to be more than one triangle in a hierarchical knowledge structure' but that 'the motivation is towards triangles with the broadest base and the most powerful apex' (2000: 172), where the apex refers to 'propositions' and the base to 'phenomena':



Bernstein defined a horizontal knowledge structure as 'a series of specialized languages with specialized modes of interrogation and criteria for the construction and circulation of texts' (2000: 162), such as often illustrated by the disciplines of the humanities and social sciences. Bernstein suggested that these segmented

knowledge structures can be visualized as a series of Ls (standing for their specialized languages):

$$L^1\ L^2\ L^3\ L^4\ L^5\ L^6\ L^7\ \ldots\ L^n$$

The motivation in hierarchical knowledge structures to subsume more data in more cohesive and economical theories is well known. Einstein's relativity theory has to explain everything explained by Newton's classical mechanics and more, just as the search for a Grand Unified Theory attempts to embrace and go beyond the existing insights of relativity theory and quantum mechanics. Horizontal knowledge structures are in a sense more modest in their knowledge claims, offering alternative interpretations of past ideas from particular points of view. The new interpretations present themselves as offering better interpretations of past ideas without necessarily subsuming predecessors (Martin 2003). By way of illustration we might caricature traditional, Marxist, feminist and post-colonial readings of the conservation of Pompeii, focusing on agency (i.e. what is ultimately responsible for the destruction: a plague of problems, the concentration of wealth in private hands, irresponsible patriarchs or discourses of scientism):

> [8] While Pompeii is one of the most studied of the world's archaeological sites, it has been plagued with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.
>
> [8'] While Pompeii is one of the most studied of the world's archaeological sites, the concentration of wealth in private hands in capitalist Italy has left the site with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.
>
> [8''] While Pompeii is one of the most studied of the world's archaeological sites, the non-custodial attitudes of the irresponsible patriarchs responsible for the site have left it with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.
>
> [8'''] While Pompeii is one of the most studied of the world's archaeological sites, the lack of interrogation of the prevailing discourses of scientism has left the site with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.

Wignell suggested the social sciences can be characterized as 'warring triangles' – since they model themselves on science and struggle for institutional rather than epistemological ascendency – when compared with the humanities where technicality and the drive to integration via general models and propositions is less strong.[8]

These characteristics were glossed by Muller (2007) as 'verticality' and 'grammaticality'. First, 'verticality' characterized how Bernstein's 'knowledge structures' progress: via ever more integrative or general propositions or via the introduction of a new 'language' (theory or approach) which constructs a 'fresh perspective, a new set of questions, a new set of connections, and an apparently new problematic, and most importantly a new set of speakers' (Bernstein 2000: 162). This helped highlight that Bernstein's opposition of hierarchical to horizontal knowledge structures concerns how intellectual fields progress, not the number of theories struggling for legitimacy at any given time. In some intellectual fields (illustrated best by natural science) there is typically relatively collegial consensus over what counts as progress (i.e. a theory that explains more phenomena) whereas in other intellectual fields (e.g. many social sciences and humanities) such collegial consensus on what constitutes progress is typically less evident. Second, 'grammaticality' described how theoretical statements deal with their referents. The stronger the grammaticality, the more unambiguously a knowledge structure generates empirical correlates. Where correlates are clear, there are shared referents for competing knowledge claims; where correlates are unclear or vague, the tendency is for endless reinterpretation of 'data' that cannot be compared. One thinks, for example, of the aims of scientific experiment in contrast to the hermeneutic interpretations of texts common in many humanities disciplines.

The notions of verticality and grammaticality echoed Bernstein's model of individual theories as comprising internal (L^1) and external (L^2) 'languages of description' (2000: 131–41). L^1 'refers to the syntax whereby a conceptual language is created' or how constituent concepts of a theory are interrelated; and L^2 'refers to the syntax whereby the internal language can describe something other than itself' (2000: 132) or how a theory's concepts are related to referents. Grammaticality also recapitulates Bernstein's notions of strong and weak 'grammar' (2000: 163–6). From the perspective of SFL such terminology is potentially confusing. In linguistics, L1 and L2 are generally used to distinguish between a speaker's native tongue (L1) and a second language (L2); and the term 'grammar (or 'syntax', which Bernstein also used) refers to one level of organization in language, not the conceptual organization of a theory. In addition, the term 'grammaticality' in formal linguistics concerns whether an utterance is well formed with respect to the syntactic rules formalized for a language. Such terms are thus more likely to mislead linguists than guide them. (In Legitimation Code Theory, such confusion is avoided: 'external languages' are termed 'translation devices' and 'grammar' is subsumed by 'epistemic relations'; see Maton 2016b).

This potential misreading is unfortunate because Bernstein's distinction between internal and external languages of description, or L^1 and L^2 (with numbers in superscript), is useful for clarifying relations between theory and description in SFL. Over the years, confusion has arisen in SFL about the nature of concepts within the framework. Much of the extravagant conceptual array of SFL is viewed by proponents as an internal language of description when it is in fact an external language

for engaging with a specific object of study. This is to say that much SFL theory is not a description of language *per se* but of a *specific* language or language variety. This confusion may arise in part from the name of Halliday's well-known book, *An Introduction to Functional Grammar* (1985), which is not for the most part an introduction to functional grammar (which would constitute an internal language or L^1) but rather offers a description of *English* grammar (an external language for relating functional grammar to the specific object of the study of English).[9] It may also arise in part from the widespread consumption of SFL descriptions of language and other modalities of communication by users untrained in SFL theory; Martin (2017) discusses this problem in the context of appraisal 'theory', which is not in fact a theory, but a description of English evaluative discourse semantics. To reinforce this point for systemicists, consider the book covers of the second (1994) and third (2004) editions of Halliday's grammar. The 1994 cover involves a circular image of a colour spectrum around which process types are arranged topologically: this is a part of Halliday's description of English grammar (an external language). The 2004 cover involves a series of rectangular images representing various dimensions of SFL theory – stratification, metafunction, rank and instantiation in particular (the internal language). The typical way in which linguists talk about internal and external languages of description is in terms of theory and description; their ability to enact a productive dialectic between these languages of description is another matter (see Matthiessen and Nesbitt 1996). Among the many problems which arise when description (L^2) is mistaken for theory (L^1), one is locking the specificities of one language into the central core of the theory, restricting its capacity to embrace language more generally and thereby constraining knowledge-building.

Figure 1.4 (created by Martin for the 2008 Sydney conference, noted above) summarizes the common understanding in SFL by the mid-2000s of how Bernstein's concepts of 'knowledge structures' could be viewed in relation to subject areas in education. This, we should emphasize, represented a recontextualization of sociological concepts by SFL scholars attempting to enact the ideas in research. For example, Muller (2007) stated that 'verticality' was categorical: knowledge structures either had it or did not, rather than exhibiting degrees of verticality. Instead, the SFL version arranged knowledge structures on a cline of degrees of verticality and grammaticality and adopted Wignell's metaphor of 'warring triangles' to describe the social sciences, with the larger triangle in the centre representing the tendency in such disciplines for one theory to occupy a position of institutional hegemony for a period of time before it is 'overthrown'. The size of the 'Ls' was similarly designed to reflect the wax and wane of institutional control in the humanities. The science triangle was also given a wider base and taller apex to symbolize its greater capacity for knowledge-building. As we shall see further below, these modifications are important because they point to problems with the model presented in Figure 1.4.

This interpretation of concepts originally developed by Bernstein raised a series of questions for educational linguists. How could these ideas be enacted in research? What do the concepts refer to empirically? If the humanities have no verticality or grammaticality, then in what sense do they involve vertical discourse rather than

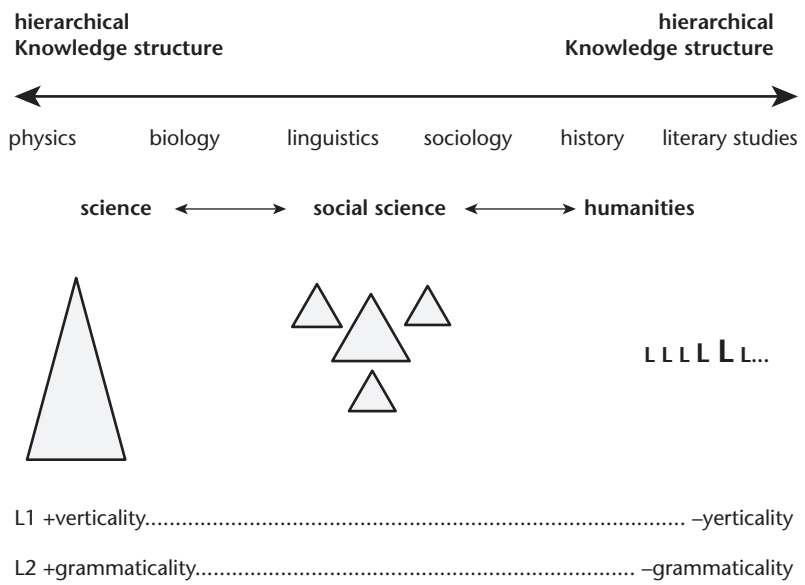


FIGURE 1.4 SFL perspective on 'knowledge structures', circa 2008

simply being common sense knowledge? Is this not a deficit model of the arts and humanities in which everything is measured against the natural sciences, compared to which they have no verticality or grammaticality? Where can 'specialized' discourse (trades, crafts, etc.) fit? How can the highly technical yet segmentalized discipline of mathematics fit in a topology of this kind? As suggested by these and other questions, the value of Bernstein's ideas lay in highlighting issues about the cartography of intellectual fields. They represent a starting point that raised more questions than they answered. However, such questions were also being addressed within sociology that was building on Bernstein's ideas. Indeed, the answers offered by Legitimation Code Theory recast the inherited model in ways that not only enabled many of these problems to be resolved but also led to an intensification of dialogue and collaboration between the two disciplinary traditions.

Legitimation Code Theory

Legitimation Code Theory extends and integrates Bernstein's code theory to embrace a greater range of phenomena within a more systematic framework (Maton 2014b, 2016a). LCT does not begin solely from 'knowledge structures'; it builds on concepts from across Bernstein's framework, as well as from other theories, most notably the sociological approach of Pierre Bourdieu. Moreover, the direction from which SFL scholars originally reached LCT is fundamentally different to that of other scholars. Many researchers and educators from other disciplines turn to LCT because of endemic 'knowledge-blindness' in education and

social research (see Maton 2014b). Most approaches to education focus on the ways of knowing of knowers rather than knowledge as an object in itself. The forms taken by knowledge practices in research, curriculum, pedagogy, assessment and social interactions more widely are ignored in favour of focusing on the cognitive and affective states of students. In contrast, SFL scholars were already attuned to exploring the effects of different forms of knowledge practices, but were reaching the limits of Bernstein's framework. Thus, in terms of introducing recent dialogue with SFL, the model outlined above is a useful starting point because Maton was addressing similar questions to those raised by educational linguists.

Put simply, Maton (2000, 2007, 2009, 2011, 2014b) argued that Bernstein's concepts of 'discourses' and 'knowledge structures' were good to think with but less useful to analyse with. The concepts valuably highlighted issues of how intellectual fields develop over time, but did not provide the means to engage in empirical research about those issues. The model suffered from two main problems highlighted by the modifications made by SFL scholars when trying to make it work.

The first problem is revealed by what can be called 'Wignell's mixture'. As discussed earlier, when attempting to relate the concepts to the realities of social science, Wignell suggested the notion of 'warring triangles' that mixed attributes from hierarchical and horizontal knowledge structures. However, attempts to use the concepts to study other disciplines, including the humanities, revealed this mixture of attributes was not unique to social science (Maton 2000, 2010). Every intellectual field exhibits characteristics of both knowledge structures – they all involve 'warring triangles'. The problem this reflected was that Bernstein's model offered binary types. One can easily find suggestive generalized examples that resonate with descriptions of the knowledge structures (as we did ourselves earlier). However, detailed study of empirical data soon reveals that no actual intellectual field or set of knowledge practices readily fit into either category.

A second problem reflects what can be called 'Martin's cline'. The use by Martin of a continuum of strengths (Figure 1.4) to represent 'verticality' and 'grammaticality' aimed at moving beyond the strongly-bounded types of Bernstein's model. As Bernstein himself stated, dichotomous types are 'limited' and 'very weak' in their 'generating power' (2000: 124); the key is to conceptualize the organizing principles that generate such types. However, 'verticality' and 'grammaticality' did not do so. Ironically, the concepts were characterized by weak grammar (using Bernstein's terms) and their unclear referents did not enable empirical research.

Attempts by SFL scholars in the mid-2000s to modify Bernstein's model thus reflected fundamental problems with his concepts. The key issue was that the concepts redescribed empirical characteristics: they highlighted the presence or absence of knowledge-building but not the basis of knowledge-building. The questions remained unanswered as to what gives a knowledge structure 'verticality' or 'grammaticality' and what makes internal or external languages of description 'strong' or 'weak'. The need, then, was to conceptualize the organizing principles underlying knowledge practices. This was precisely what Maton had been doing by developing LCT since the late 1990s.

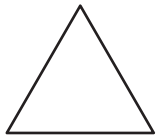
LCT is a sociological framework for researching and changing practice that comprises a multi-dimensional conceptual toolkit.[10] There are currently four active dimensions: Specialization, Semantics, Autonomy and Temporality. Each dimension comprises a series of concepts centred on capturing a set of organizing principles underlying dispositions, practices and contexts as a species of *legitimation code* that is named after that dimension. The two most relevant dimensions to this volume are Specialization and Semantics, which are centred on exploring *specialization codes* and *semantic codes*, respectively. For a fuller introduction to these two dimensions see Maton (2014b, 2016a), which defines and illustrates the concepts, and Maton *et al*. (2016a), which sets out how to enact the concepts in empirical research. See also Maton and Chen (Chapter 2, this volume) for a brief introduction to how LCT construes social fields and the notion of 'legitimation codes'.

Specialization (LCT)

Specialization was the first dimension of LCT to be developed (Maton 2000, 2004, 2006, 2007; Moore and Maton 2001).[11] The concepts have been widely used in research, including by numerous studies also utilizing SFL (see Maton and Doran 2017c; Maton *et al*. 2016b). Most relevant to our focus in this paper is that Specialization helped resolve problems indicated by Wignell's mixture and Martin's cline in two main ways. First, the concept of 'knower structures' highlighted that knowledge structures were not the only attribute of social fields; and, second, the concept of 'specialization codes' revealed the organizing principles generating different structures of knowledge and knowers.

Knower structures

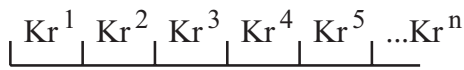
First, the dimension of Specialization extends Bernstein's concepts by additionally exploring intellectual and educational fields in terms of their *knower structures* which can be horizontal or hierarchical.[12] A *hierarchical knower structure* is 'a systematically principled and hierarchical organization of knowers based on the construction of an ideal knower and which develops through the integration of new knowers at lower levels and across an expanding range of different dispositions' (Maton 2014b: 70). This can be represented as a triangle, with an ideal knower at the apex and a range of novices at the base:



We can illustrate this knower hierarchy by considering the ways in which, as education has expanded over the past century, the humanities have aimed at embracing a greater range of learners and cultivating their dispositions to inculcate

a particular 'gaze', such as a literary or artistic gaze. In other words, over time the base widens to embrace more kinds of knowers and the aim is to cultivate or socialize their dispositions towards becoming similar to the ideal knower at the apex of the triangle and thereby move those knowers up the triangle.

In contrast, a *horizontal knower structure* is 'a series of strongly bounded knowers, each with specialized modes of being, thinking, feeling and acting, with non-comparable dispositions based on different trajectories and experiences' (Maton 2014b: 92). This can be represented as a series of segmented knowers ('Kr'):



A horizontal knower structure can be illustrated by claims made by many proponents of natural science that the social profile of scientists is irrelevant for scientific insight and anyone can claim legitimate knowledge so long as they follow the correct principles and procedures. In terms of their non-scientific dispositions, scientists thereby represent a segmented series of strongly bounded knowers – they can be very different to each other (Maton 2014b: 91).

Each social field of practice is, then, more than just a knowledge structure; it is also a knower structure.[13] Specialization brings these together to construe social fields as *knowledge–knower structures*. This begins to resolve the problem of binary categories and Wignell's mixture. The humanities and sciences illustrate that every social field may involve a mixture of triangles and segments: a hierarchical knowledge structure (triangle) may be accompanied by a horizontal knower structure (segments), and vice versa. Specialization moves beyond a dichotomous binary to describe four types, comprising hierarchical/horizontal knowledge structures and hierarchical/horizontal knower structures. This also avoids a deficit model of the humanities: social fields that exhibit horizontal knowledge structures may exhibit hierarchical knower structures. That is to say, the humanities primarily aim at cultivating or socializing knowers rather than cumulative knowledge-building. Moreover, as Maton (2010, 2014b) showed, such hierarchical knower structures do enable some knowledge-building within a knowledge segment. Put simply, they too exhibit a series of mini-triangles of knowledge.

Specialization codes

Martin's cline reflected a need to conceptualize the organizing principles generating these different structures of knowledge and, now, knowers. In Specialization, these organizing principles are given by *specialization codes* comprising *epistemic relations* (ER) between knowledge practices and their object and *social relations* (SR) between practices and their subject, author or actor. Each relation may be more strongly (+) or weakly (−) bounded and controlled or, simply put, more or less emphasized as the legitimate basis of practices, beliefs and identity.[14] These two strengths may be varied independently to generate *specialization codes* (ER+/−, SR+/−). As shown

in Figure 1.5, these can be visualized as the *specialization plane*, a topological space with four principal modalities:

- *knowledge codes* (ER+, SR−), where possession of specialized knowledge, principles or procedures concerning specific objects of study is emphasized as the basis of achievement, and the attributes of actors are downplayed;
- *knower codes* (ER−, SR+), where specialized knowledge and objects are downplayed and the attributes of actors are emphasized as measures of achievement, whether viewed as born (e.g. 'natural talent'), cultivated (e.g. 'taste') or social (e.g. feminist standpoint theory);
- *élite codes* (ER+, SR+), where legitimacy is based on both possessing specialist knowledge and being the right kind of knower; and
- *relativist codes* (ER−, SR−), where legitimacy is determined by neither specialist knowledge nor knower attributes – 'anything goes'.

Specialization codes generate knowledge–knower structures of different kinds. Stronger and weaker epistemic relations generate hierarchical and horizontal

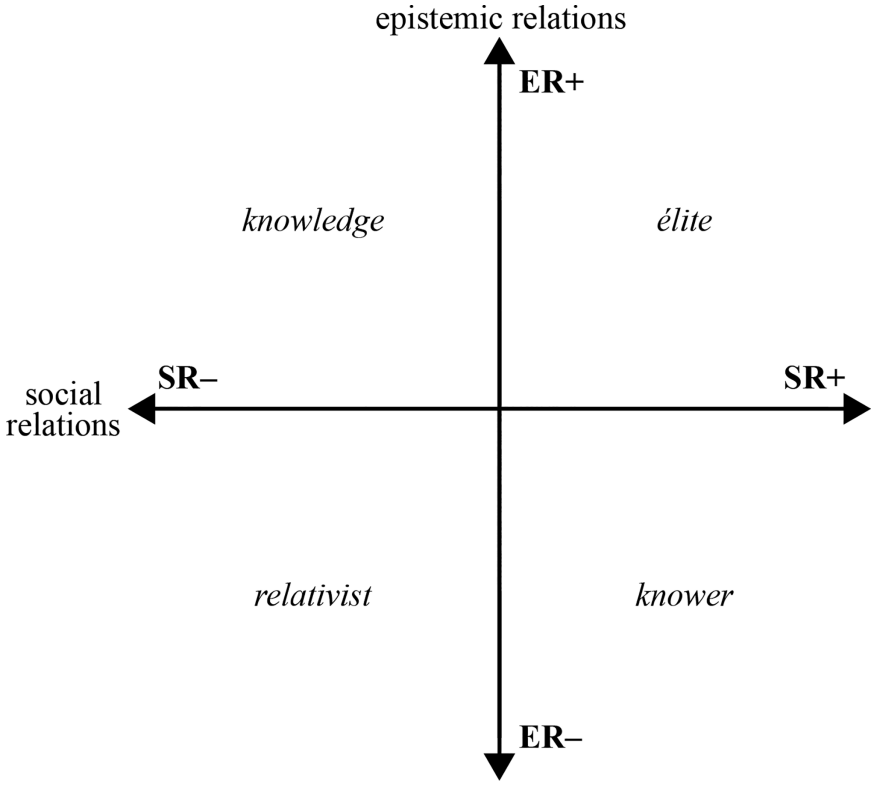


FIGURE 1.5 The specialization plane (Maton 2014b: 30)

knowledge structures, respectively; stronger and weaker social relations generate hierarchical and horizontal knower structures, respectively. In Figure 1.6 we have added these structures to the specialization plane to make clear how specialization codes are the organizing principles underlying the knowledge–knower structures of social fields. For example, knowledge codes (ER+, SR−) underlie social fields with hierarchical knowledge structures and horizontal knower structures. Specialization codes thereby offer a means of conceptualizing the organizing principles of different kinds of educational and intellectual practices. (We should emphasize that it is the specialization plane of Figure 1.5 that is used in LCT research; we have drawn Figure 1.6 only to make explicit how LCT extends Bernstein's framework).

More significantly, LCT provides a fundamentally different approach to conceiving knowledge practices that offers a number of advantages over the previous model. First, Specialization moves beyond a limited number of structures. LCT empirical research enacts the concepts of specialization codes and not those of 'structures'. The concepts of 'knowledge structures' and 'knower structures' can be

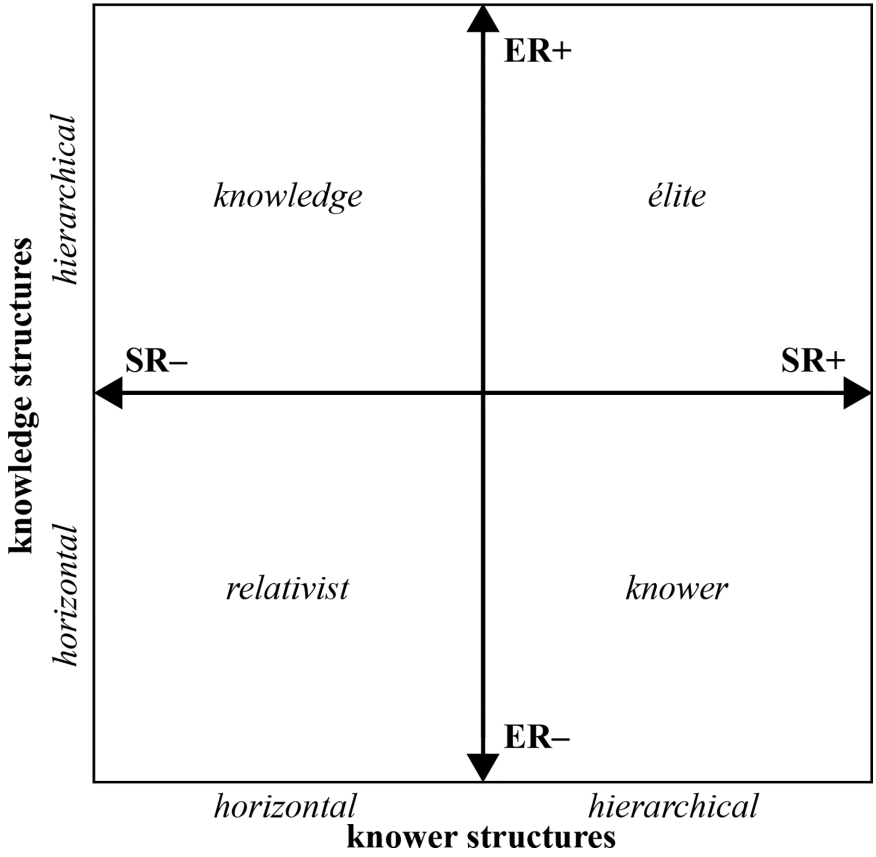


FIGURE 1.6 Specialization codes and knowledge–knower structures

left behind when one reaches specialization codes. They were useful metaphors for stimulating thinking but not useful concepts for analysing data. The new concepts offer a number of advances.

First, with specialization codes we can now think in terms of a topology in which there are endless possibilities for capturing difference. For example, returning to knowledge structures, one can describe different degrees of stronger epistemic relations (anywhere in the top half of Figure 1.5 or Figure 1.6), thereby capturing differences in how hierarchical each knowledge structure may be. (The same is true, of course, for stronger social relations and differences in how hierarchical each knower structure may be.)

Second, we can capture differences not only between subject areas but also *within* each subject area. Rather than having to fit a diverse set of practices into a single category, a set of instances can be represented as a scatter pattern across the plane, showing the diversity of codes present and which code dominates the context.

Third, the concepts are far more versatile in application. Where Bernstein's concepts were defined in terms of whole intellectual fields or theories, specialization codes can be used to analyse objects of study at any level, from subject areas to individual pedagogic or textual practices.

Fourth, instead of analysing practices in terms of static structures, we can use the specialization plane to plot changes in the pattern, tracing changes on the plane over time as relations are strengthened or weakened (ER↑/↓, SR↑/↓). This enables a more dynamic analysis of *code shift* (when the dominant code changes – movement between quadrants of the plane) and *code drift* (changes within a code – movement within a quadrant).

Fifth, specialization codes can be enacted to analyse not only forms of knowledge but also a wide variety of other practices, such as pedagogy and assessment, as well as the dispositions of actors. This enables a more relational analysis of degrees of *code clash* and *code match*, such as between learners' dispositions and pedagogic practices or between curriculum and pedagogy.

Last, specialization codes can be enacted in empirical research. As a rapidly growing body of studies is showing, the concepts can be used in fine-grained analysis of empirical data (e.g. Maton *et al.* 2016a). We illustrate an early example of this work in Chapter 2 (Maton and Chen) of this volume.

There is a lot more to the dimension of Specialization than we can cover here (see Maton 2014b). However, this gives a flavour of some key concepts that have been enacted alongside SFL in research. Specialization is, though, not the only dimension of LCT relevant to our narrative as it does not embrace all features of social fields. For example, questions remain of how some social fields can build knowledge over time while others create knowledge that is locked into its context or, from the perspective of SFL, how linguistic resources for the construction of uncommon sense knowledge, such as 'grammatical metaphor', are realized in knowledge practices. For these and other issues, we turn to another dimension of LCT.

Semantics (LCT)

The LCT dimension of Semantics (not to be confused with 'discourse semantics' in SFL) was developed from the late 2000s (Maton 2009, 2011, 2013, 2014b) in response to two stimuli.[15] First, empirical studies enacting concepts from Specialization 'spoke back' to the framework, highlighting issues of context-dependence and complexity of meaning that had yet to be theorized. Second, collaborative studies with SFL scholars raised questions of how linguistic features such as 'grammatical metaphor' were expressed in knowledge practices. The dimension of Semantics construes social fields of practice as *semantic structures* whose organizing principles are conceptualized as *semantic codes* comprising *semantic gravity* and *semantic density*.

Semantic gravity refers to the degree to which meaning relates to its context. Where semantic gravity is stronger (SG+), meaning is more dependent on its context; where semantic gravity is weaker (SG−), meaning is less dependent on its context. Semantic gravity traces a continuum of strengths. One can also analyse *weakening* semantic gravity (SG↓), such as moving from the local particulars of a specific case towards generalizations, and *strengthening* semantic gravity (SG↑), such as moving from generalized ideas towards concrete and delimited cases.

Semantic density refers to the complexity of practices. Where semantic density is stronger (SD+), more meanings are condensed within practices; where semantic density is weaker (SD−), fewer meanings are condensed. This strength is not intrinsic to a practice but rather relates to the *semantic structure* within which that practice is located. For example, 'gold' commonly denotes a bright yellow, shiny and malleable metal used in coinage, jewellery, dentistry and electronics. However, within Chemistry gold is related to an atomic number, atomic weight, electron configuration, and many other meanings which involve compositional structures, taxonomies and explanatory processes. It is thus located within a complex semantic structure that imbues the term with a greater range of meanings. Put another way, the meaning has a greater number of relations to other meanings (see Maton and Doran 2017a, 2017b). Semantic density traces a continuum of strengths which can be dynamized to describe *strengthening* semantic density (SD↑), such as moving from a simple symbol towards a more technical concept, and *weakening* semantic density (SD↓), such as 'unpacking' technical concepts into simpler terms.

The strengths of semantic gravity and semantic density may be varied independently to generate *semantic codes* (SG+/−, SD+/−). As shown in Figure 1.7, these can be visualized as the *semantic plane*, a topological space with four principal modalities:

- *rhizomatic codes* (SG−, SD+), where the basis of achievement comprises relatively context-independent and complex stances;
- *prosaic codes* (SG+, SD−), where legitimacy accrues to relatively context-dependent and simpler stances;
- *rarefied codes* (SG−, SD−), where legitimacy is based on relatively context-independent stances that condense fewer meanings; and
- *worldly codes* (SG+, SD+), where legitimacy is accorded to relatively context-dependent stances that condense manifold meanings.

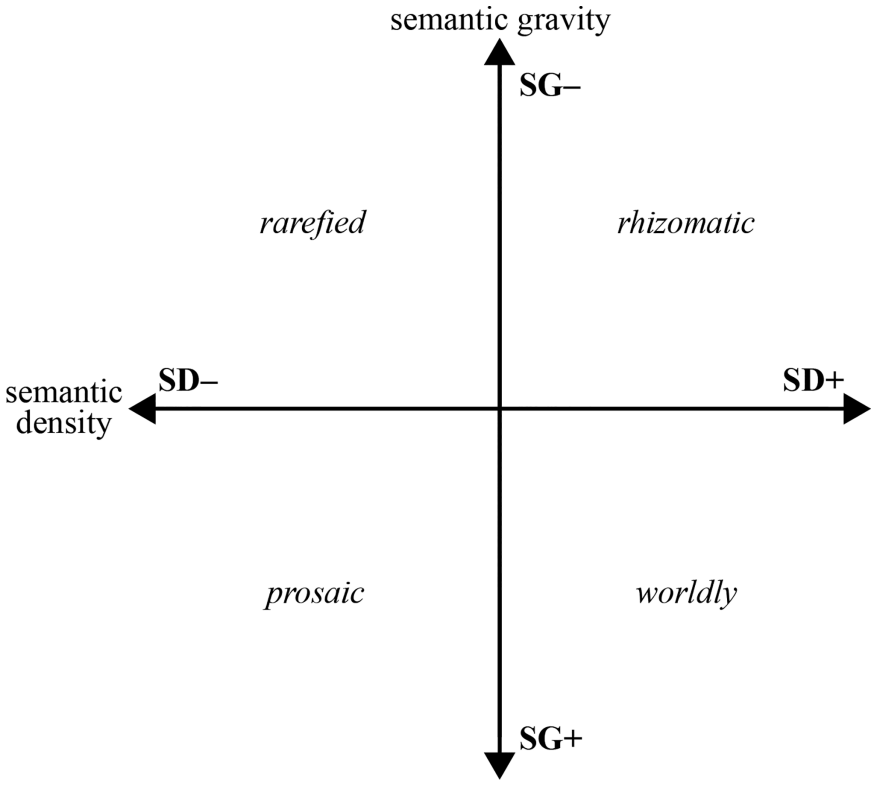


FIGURE 1.7 The semantic plane (Maton 2016a: 16)

The concepts should sound familiar from our earlier introduction to Specialization: there are structures, two constitutive relations, four codes, a plane, etc. This is because all dimensions of LCT share analogous properties (see Maton 2016b). Rather than exploring different kinds of practices, they conceptualize different organizing principles that may underlie the same practices. Thus, dimensions can be and are often used together in research (e.g. Maton *et al.* 2016a). Accordingly, the advantages we outlined above of thinking in terms of Specialization also hold for Semantics: the concepts enable a topology, allow for analysis of code shift and code drift, can be used for all kinds of practices, and enable us to see code clashes and code matches. In doing so, they have further helped resolve questions raised of the model of knowledge structures by systematically conceptualizing and enabling empirical research into issues highlighted by notions such as 'verticality'. For example, unlike the earlier model, and indeed, most education debates that posit oppositions between 'theoretical' and 'practical' knowledges, semantic codes do not exclude what SFL terms 'specialized' discourse (trades, crafts, etc.). These social fields exhibit relatively strong semantic gravity (like 'practical' or horizontal forms) but also relatively strong semantic density (like 'theoretical' or hierarchical forms): *worldly codes* (SG+, SD+).

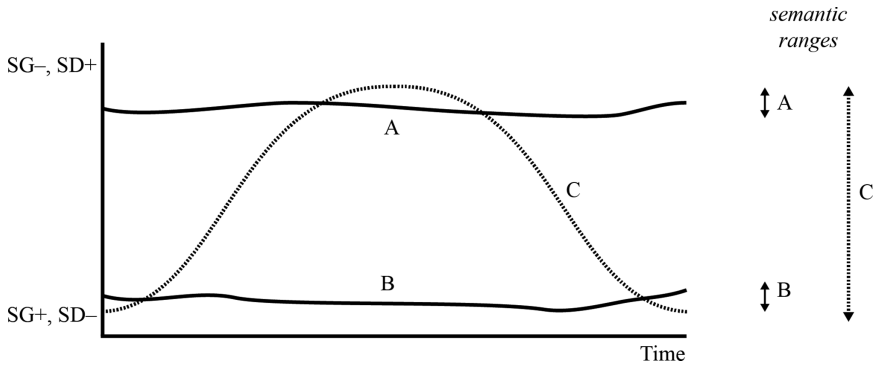


FIGURE 1.8 Three illustrative semantic profiles (Maton 2014b: 143)

Another affordance of LCT code concepts is shown by the analytic method of *profiling*. Tracing strengths of semantic gravity and semantic density over time (such as unfolding of an intellectual field, classroom practice, curriculum, or a text) reveals a *semantic profile* and an associated *semantic range* between their highest and lowest strengths. Figure 1.8 offers a heuristic representation of three simplified profiles and their ranges: a high *semantic flatline* (A), a low *semantic flatline* (B) and a *semantic wave* (C). The value of profiling is being illustrated by a growing body of research that is revealing further 'rules of the game' for achievement and bases of cumulative knowledge-building across different kinds of practices (Maton 2014a; Maton *et al.* 2016a).

These ideas from LCT are being increasingly used alongside concepts from across the framework of SFL. We began this chapter with a review of SFL work in the 1990s on the register variable field. This helped bring educational linguists into engagement with Bernstein's notions of 'discourses' and 'knowledge structures', which in turn brought them into dialogue with LCT. However, the ongoing exchange between SFL and LCT has reached far wider, involving mode, field, APPRAISAL, individuation/affiliation and many other areas of SFL. Moreover, studies enacting both frameworks range across issues in education, including academic writing (Hood 2016), school English (Christie 2016), and Physics (Doran 2018), as well as other social fields such as Law (Martin *et al.* 2014) and Politics (Siebörger and Adendorff 2015). Enacting both theories together offers greater explanatory power, challenges deeply held beliefs and provokes new theoretical developments. This book offers insights into ways this dialogue with LCT is pushing SFL forward.

Introducing *Accessing Academic Discourse*

This volume explores the dialogue with LCT from the viewpoint of SFL. Part I serves as a simple introduction to key ideas from the two dimensions of LCT we have briefly discussed above. Chapter 2 (Maton and Chen) illustrates the usefulness

of 'specialization codes' in the context of a study of Chinese students in Australia. Chapter 3 (Maton) introduces concepts from Semantics and illustrates how the ideas are revealing key attributes of knowledge-building. Part II comprises responses from SFL to provocations from LCT, most explicitly to concepts from Semantics (though Specialization serves as the backdrop). In short, the capacity of 'semantic gravity' and 'semantic density' from LCT to conceptualize organizing principles associated with complexes of linguistic practices stimulated Martin into rethinking the register variables field and mode. In these chapters, Martin highlights that linguistic theorizations of context-dependence and complexity of meaning are not as clear as many SFL scholars assume, and proposes a more comprehensive account in terms of 'presence' and 'mass'. Chapter 4 (Martin and Matruglio) defines 'presence' as concerning context-dependence and involving 'implicitness' (concerning textual resources such as exophoric reference to the outside situation), 'negotiability' (mobilizing interpersonal resources around the arguability of a proposal or proposition), and 'iconicity' (the amount of ideational grammatical metaphor). Chapter 5 (Martin) turns to the issue of complexity of meaning and explicates the notion of 'mass'. Central to this discussion is consideration of technicality (the distillation of ideational meaning in terms, symbols and diagrams), iconization (charging ideas with values) and aggregation (the synoptic accumulation of knowledge, in often multimodal texts). These new concepts characterize the array of linguistic resources potentially at stake during changes in semantic gravity and semantic density of knowledge practices – precisely which resources are enacted in a text is a matter for empirical research.

Part III illustrates how the way LCT brings knowers into the picture is supporting explorations of values by SFL. Chapter 6 (Doran) examines the highly implicit evaluative language that is often used to organize values systems that position people into different communities. Doran develops a methodology for seeing this evaluative language and the values they invoke in terms of networks of meaning known as 'axiological constellations' in LCT. This method involves a careful analysis using ATTITUDE and ENGAGEMENT in SFL to progressively uncover elements known as 'affording attitude' that are often the most evaluative yet least explicit meanings used in a range of discourses. Chapter 7 (Oteíza) analyses how events and processes are constructed and evaluated in the discourse of History, drawing on Martin and White's (2005) appraisal framework and Oteíza and Pinuer's (2012) proposals for the semantic domain of APPRECIATION. It also draws on semantic gravity and semantic density from LCT to explore levels of context-dependence and complexity that build cumulative knowledge and integrate personal and social memories of the recent past.

Part IV explores the fruits of dialogue with LCT for SFL understanding and practices in classrooms. Chapter 8 (Hood) focuses on the role of lectures as interactive multimodal events and their effect on knowledge-building in academic discourse. Drawing in particular on the concept of 'presence' outlined in Chapter 4, Hood explores the nature of intermodal explanation in a Biology lecture, relating this analysis to the LCT concept of 'semantic gravity' and changes in the

context-dependence of the knowledge being expressed, to explore how lectures can support the apprenticeship of students into the specialized, uncommon sense knowledge of their field. Chapters 9 and 10 (Rose) shift the focus to building a pedagogic metalanguage. Chapter 9 focuses on pedagogy, outlining the training programme that Rose and colleagues have developed for introducing teachers to the curriculum genres that have been designed for teaching reading and writing in his Reading to Learn programme. Rose introduces Martin's notions of 'mass' and 'presence' – developed in response to LCT – as measures of how training is enacted in practice and how it is best taught in teacher training. Chapter 10 turns to curriculum, the knowledge genres that are the focus of embedded literacy programmes informed by Reading to Learn. Here 'mass' and 'presence' are used to explore how academic metalanguage informed by functional linguistics is recontextualized for use in teacher training and in classroom practice. As such these chapters provide an invaluable model of how the ideas canvassed in this volume can be brought to bear on real world issues – in this case the challenge of providing a wider range of students with access to disciplinary knowledge in education.

While this volume is focused on influences from LCT on SFL, we should emphasize that this is not a one-way street. Collaboration with Martin and other SFL scholars provoked Maton into working with Yaegan Doran, a young scholar versed in both approaches, to develop means for semantic gravity and semantic density to be used to analyse discourse in detail. In two papers, Maton and Doran (2017a, 2017b) outline 'translation devices' for enacting semantic density in the analysis of English discourse at the level of wording, clausing and sequencing. Such granular tools that delineate referents with such precision are unprecedented in the disciplinary tradition that LCT builds upon; they bring sociological analysis closer to the kind of detailed exploration characteristic of SFL. These concepts are being followed by further translation devices for semantic gravity and for images.

We should also emphasize that influence and provocation do not equate to domination or integration. Occasionally scholars new to LCT or SFL are dazzled by the intensity of their dialogue into believing the two frameworks are one theory. LCT is *not* part of SFL; LCT and SFL are different and separate theories. This difference is crucial: the approaches stimulate each other *because* they are different. Each theory offers different insights that are complementary and which together can offer greater explanatory power. As made clear in Maton *et al.* (2016b), it is crucial to conduct SFL and LCT analyses *separately* before bringing those analyses together. Only then can their explanations inform one another. Moreover, when doing so, one must still be careful to avoid confusing the theories by, for example, wrongly identifying 'semantic density' with 'field' or reducing 'semantic gravity' to 'mode' (or vice versa). Thus it is mistaken to claim, to take one example, that 'semantic waves are caused by grammatical metaphor'. What happens in language cannot be equated to what happens to knowledge practices and may vary dramatically between modes and contexts. We can, though, bring them together to argue (in this example) that grammatical metaphor is *one* linguistic resource that *may contribute* to semantic waves *in the case being studied*. It is also extremely important

to understand which concepts belong to which approach. For example, 'semantic gravity', 'semantic density' and 'semantic waves' are concepts from LCT (not SFL) and unrelated to uses of 'wave' as a metaphor in SFL. Similarly, the 'Semantics' dimension of LCT is not related directly to 'discourse semantics' from SFL.[16] Only when understood in the proper context of their own theoretical framework can the concepts of each approach be fully understood. It is also crucial to understand their different architectures. As described earlier above, many of the most familiar SFL concepts are an external language of description for English; whereas, legitimation codes are an internal language of description for which external languages ('translation devices') are being developed. Thus, equating concepts is fundamentally mistaken. In difference lies their dialogic strength.

While working with two theories can be demanding, it is extremely rewarding. We hope that by bringing together cutting-edge papers that illustrate these theoretical developments and reveal the greater explanatory power and insights into education and knowledge offered by enacting SFL and LCT together, this volume will give you a flavour of the excitement, energy and explanatory power generated by this academic discourse.

Notes

1 Selected papers from these conferences were published as Christie and Martin (2007) and Christie and Maton (2011).
2 See also Derewianka and Jones (2012), de Silva Joyce and Feez (2012), de Oliveira and Iddings (2014), and Brisk (2015).
3 http://www.bom.gov.au/info/clouds/
4 From http://namesofclouds.com/index.html
5 Information drawn from http://www.lsbu.ac.uk/water/molecule.html
6 For discussion of the genres underpinning this profile see Martin and Rose (2008) and Rose and Martin (2012); Schleppegrell (2004) provides an engaging introduction to uncommon sense school discourse for language educators.
7 We are indebted to Jing Hao for this rendering of J. R. Martin's network from 1992.
8 Wignell's suggestion was made at the 2004 Sydney conference but not published. Martin (2014) explores the hierarchical potential of SFL; for discussion of some of the segmental tendencies in SFL, see Martin (2011b).
9 For introductions to functional grammar, see Matthiessen and Halliday (2009) and Martin (2014).
10 For the rapidly growing field of studies enacting LCT, see http://www.legitimationcodetheory.com
11 Specialization shaped the emergence of 'social realism' in the sociology of education during the late 1990s and early 2000s. This loose 'coalition of minds' (Maton and Moore 2010) comprised scholars who were influenced by Bernstein's approach and shared a concern with 'taking knowledge seriously' (Maton 2014b: 9). Once arguments for taking knowledge seriously had been made, however, the 'coalition' slowly dissolved as the ideas of its former members significantly diverged. Unfortunately, the name 'social realism' has sometimes been associated with subsequent claims that academic discourse (especially disciplinary or theoretical knowledge) is powerful and that non-academic dis-course (such as practical and common sense knowledge) are lesser forms. This scholastic viewpoint is not shared by LCT (see, for example, Maton 2014a), which holds that all forms of knowledge practices possess powers and tendencies.

12 Bernstein's 'knowledge structures' were a model of intellectual fields of knowledge production only (not curriculum or pedagogy). Maton's development extended the resultant model to embrace all social fields of practice.
13 We shall refer to educational and intellectual fields as kinds of 'social fields' to avoid confusion with the SFL register variable field and to highlight that these LCT concepts are applicable not just to education but to all social fields of practice (law, medicine, politics, etc.).
14 See Maton (2014b: 31) for a distinction between *focus* and *basis* of practices. For example, knowledge claims may *focus* on a 'knower' issue (such as physical experience of pain) but on the *basis* of specialized knowledge (such as a medical report). Specialization codes concern the *basis* rather than the *focus* of practices – organizing principles underlying practices rather than their content.
15 See Maton (Chapter 3, this volume) for more detail.
16 It is also worth noting that Martin and Maton are different scholars – one has occasionally been attributed a quote by the other. Martin is the taller one; Maton is the charismatic and handsome one writing this footnote to show they are not one person.

References

Bernstein, B. (1995) 'A response', in A. Sadovnik (ed.) *Knowledge and Pedagogy: The sociology of Basil Bernstein*, Norwood: Ablex, 385–424.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique* (revised edition), Oxford: Rowman & Littlefield.

Blunden, J. (2016) *The Language with Displayed Art(efacts): Linguistic and sociological perspectives on meaning, accessibility and knowledge-building in museum exhibitions*, Unpublished PhD Thesis, Faculty of Arts and Social Sciences, University of Technology, Sydney.

Brisk, M. E. (2015) *Engaging Students in Academic Literacies: Genre-based pedagogy for K-5 classrooms*, London: Routledge.

Christie, F. (2016) 'Secondary school English literary studies: Cultivating a knower code', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 158–75.

Christie, F. and Martin, J. R. (eds) (1997) *Genre and Institutions: Social processes in the workplace and school*, London: Cassell.

Christie, F. and Martin, J. R. (eds) (2007) *Language, Knowledge and Pedagogy: Functional linguistic and sociological perspectives*, London: Continuum.

Christie, F. and Maton, K. (eds) (2011) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum.

Coffin, C. (2006) *Historical Discourse: The language of time, cause and evaluation*, London: Continuum.

de Oliveira, L. C. and Iddings, J. (2014) *Genre Pedagogy across the Curriculum: Theory and application in US classrooms and contexts*, London: Equinox.

Derewianka, B. and Jones, P. (2012) *Teaching Language in Context*, Melbourne: Oxford University Press.

de Silva Joyce, H. and Feez, S. (2012) *Text-based Language and Literacy Education: Programming and methodology*, Sydney: Phoenix Education.

Doran, Y. J. (2018) *The Discourse of Physics: Building knowledge through language, mathematics and image*, London: Routledge.

Eggins, S., Martin, J. R. and Wignell, P. (1993) 'The discourse of history: Distancing the recoverable past', in M. Ghadessy (ed.) *Register Analysis: Theory and practice*, London: Pinter, 75–109.

Halliday, M. A. K. (1985) *An Introduction to Functional Grammar*, London: Edward Arnold.
Halliday, M. A. K. (1994) *An Introduction to Functional Grammar* (second edition), London: Edward Arnold.
Halliday, M. A. K. (1995) 'Language and the theory of codes', in A. Sadovnik (ed.) *Knowledge and Pedagogy: The sociology of Basil Bernstein*, Norwood: Ablex, 127–44.
Halliday, M. A. K. (1998) 'Things and relations: Regrammaticising experience as technical knowledge', in J. R. Martin and R. Veel (eds) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge, 185–236.
Halliday, M. A. K. (2004) *The Language of Science*, London: Continuum.
Halliday, M. A. K. and Martin, J. R (eds) (1993) *Writing Science: Literacy and discursive power*, London: Falmer.
Hasan, R. (2009) *Semantic Variation: Meaning in society and in sociolinguistics*, London: Equinox.
Hood, S. (2016) 'Ethnographies on the move, stories on the rise: Methods in the humanities', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 117–38.
Iedema, R. (1995) *Literacy of Administration (Write it Right Literacy in Industry Research Project – Stage 3)*, Sydney: Metropolitan East Disadvantaged Schools Program.
Iedema, R, Feez, S. and White, P. (1994) *Media Literacy (Write it Right Literacy in Industry Research Project – Stage 2)*, Sydney: Metropolitan East Disadvantaged Schools Program.
Martin, J. R. (1992) *English Text: System and structure*, Amsterdam: John Benjamins.
Martin, J. R. (1999) 'Mentoring semogenesis: "Genre-based" literacy pedagogy', in F. Christie (ed.) *Pedagogy and the Shaping of Consciousness: Linguistic and social processes*, London: Cassell, 123–55.
Martin, J. R. (1993) 'Life as a noun', in M. A. K. Halliday and J. R Martin (eds) *Writing Science: Literacy and discursive power*, London: Falmer, 221–67.
Martin, J. R. (2002) 'Writing history: Construing time and value in discourses of the past', in M. Schleppegrell and C. Colombi (eds) *Developing Advanced Literacy in First and Second Languages*, Mahwah, N. J.: Erlbaum, 87–118.
Martin, J. R. (2003) 'Making history: Grammar for explanation', in J. R. Martin and R. Wodak (eds) *Re/reading the Past: Critical and functional perspectives on time and value*, Amsterdam: John Benjamins, 19–57.
Martin, J. R. (2007a) 'Genre and field: Social processes and knowledge structures in systemic functional semiotics', in L. Barbara and T. Berber Sardinha (eds) *Proceedings of the 33rd International Systemic Functional Congress*, São Paulo: PUCSP. http://www.pucsp.br/isfc
Martin, J. R. (2007b) 'Construing knowledge: A functional linguistic perspective', in F. Christie and J. R. Martin (eds) *Language, Knowledge and Pedagogy*, London: Continuum, 34–64.
Martin, J. R. (2008) 'Incongruent and proud: De/vilifying "nominalisation"', *Discourse and Society*, 19(6): 801–10.
Martin, J. R. (2011a) 'Bridging troubled waters: Interdisciplinarity and what makes it stick', in F. Christie and K. Maton (eds) *Disciplinarity*, London: Continuum, 35–61.
Martin, J. R. (2011b) 'Metalinguistic divergence: Centrifugal dimensionality in SFL', *Annual Review of Functional Linguistic*, 3: 8–32.
Martin, J. R. (2012) *Register Studies*, Shanghai: Shanghai Jiao Tong University Press.
Martin, J. R. (2014) 'Evolving systemic functional linguistics: Beyond the clause', *Functional Linguistics*, 1(3): 1–24.
Martin, J. R. (2017) 'The discourse semantics of attitudinal relations: Continuing the study of lexis', *Russian Journal of Linguistics Vestnik RUDN*, 21(1): 22–47.
Martin, J. R. and Maton, K. (eds) (2013) 'Special Issue: Cumulative Knowledge-Building in Secondary Schooling', *Linguistics and Education*, 24(1): 1–74.

Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.

Martin, J. R. and Veel, R. (eds) (1998) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge.

Martin, J. R. and White, P. (2005) *The Language of Evaluation: Appraisal in English*, New York: Palgrave Macmillan.

Martin, J. R., Maton, K. and Matruglio, E. (2010) 'Historical cosmologies: Epistemology and axiology in Australian secondary school history discourse', *Revista Signos*, 43(74): 433–63.

Martin, J. R., Zappavigna, M. and Dwyer, P. (2014) 'Beyond redemption: Choice and consequence in youth justice conferencing', in F. Yan, J. J. Webster (eds), *Developing Systemic Functional Linguistics: Theory and application*, Sheffield, UK: Equinox Publishing, 18–47.

Maton, K. (2000) 'Recovering pedagogic discourse: A Bernsteinian approach to the sociology of educational knowledge', *Linguistics and Education*, 11(1): 79–98.

Maton, K. (2004) 'The wrong kind of knower: Education, expansion and the epistemic device', in J. Muller, B. Davies and A. Morais (eds) *Reading Bernstein, Researching Bernstein*, London: Routledge, 218–31.

Maton, K. (2006) 'On knowledge structures and knower structures', in R. Moore, M. Arnot, J. Beck and H. Daniels (eds) *Knowledge, Power and Educational Reform: Applying the sociology of Basil Bernstein*, London: Routledge, 44–59.

Maton K. (2007) 'Knowledge–knower structures in intellectual and educational fields', in F. Christie and J. R. Martin (eds) *Language, Knowledge and Pedagogy: Functional linguistic and sociological perspectives*, London: Continuum, 87–108.

Maton, K. (2009) 'Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building', *British Journal of Sociology of Education*, 30(1): 43–57.

Maton, K. (2010) 'Canons and progress in the arts and humanities: Knowers and gazes', in K. Maton and R. Moore (eds) *Social Realism, Knowledge and the Sociology of Education: Coalitions of the mind*, London: Continuum, 154–78.

Maton, K. (2011) 'Theories and things: The semantics of disciplinarity', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 62–84.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014a) 'Building powerful knowledge: The significance of semantic waves', in Barrett, B. and Rata, E. (eds) *Knowledge and the Future of the Curriculum: International studies in social realism*, London: Palgrave Macmillan, 181–97.

Maton, K. (2014b) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Maton, K. (2016a) 'Legitimation Code Theory: Building knowledge about knowledge-building', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory,* London: Routledge, 1–24.

Maton, K. (2016b) 'Starting points: Resources and architectural glossary', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 233–43.

Maton, K. and Doran, Y. J. (2017a) 'Semantic density: A translation device for revealing complexity of knowledge practices in discourse, part 1 – wording', *Onomázein Special Issue*, March: 46–76.

Maton, K. and Doran, Y. J. (2017b) 'Condensation: A translation device for revealing complexity of knowledge practices in discourse, part 2 – clausing and sequencing', *Onomázein Special Issue*, March: 77–110.

Maton, K. and Doran, Y. J. (2017c) 'SFL and code theory', in T. Bartlett and G. O'Grady (eds) *The Routledge Systemic Functional Linguistic Handbook*, London: Routledge, 605–18.

Maton, K. and Moore, R. (eds) (2010) *Social Realism, Knowledge and the Sociology of Education: Coalitions of the mind*, London: Continuum.

Maton, K., Hood, S. and Shay, S. (eds) (2016b) *Knowledge-building: Educational studies in Legitimation Code Theory,* London: Routledge.

Maton, K., Martin, J. R. and Matruglio, E. (2016a) 'LCT and systemic functional linguistics: Enacting complementary theories for explanatory power', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 93–113.

Matthiessen, C. M. I. M. and Halliday, M. A. K. (2009) *Systemic Functional Grammar: A first step into the theory,* Beijing: Higher Education Press.

Matthiessen, C. M. I. M. and Nesbitt, C. (1996) 'On the idea of theory-neutral descriptions', in R. Hasan, C. Cloran and D. Butt (eds) *Functional Descriptions: Theory in practice*, Amsterdam: John Benjamins, 39–83.

Moore, R. (2000) 'For knowledge: Tradition, progressivism and progress in education – reconstructing the curriculum debate', *Cambridge Journal of Education*, 30(1): 17–36.

Moore, R. and Maton, K. (2001) 'Founding the sociology of knowledge: Basil Bernstein, intellectual fields and the epistemic device', in A. Morais, I. Neves, B. Davies and H. Daniels (eds) *Towards a Sociology of Pedagogy: The contribution of Basil Bernstein to research,* New York: Peter Lang, 153–82.

Muller, J. (2000) *Reclaiming Knowledge: Social theory, curriculum and education policy,* London: Routledge.

Muller, J. (2007) 'On splitting hairs: Hierarchy, knowledge and the school curriculum', in F. Christie and J. R. Martin (eds) *Language, Knowledge and Pedagogy*, London: Continuum, 65–86.

Oteíza, T. and Pinuer, C. (2012) 'Prosodia valorativa: Construcción de eventos y procesos en el discurso de la historia', *Discurso & Sociedad*, 6(2): 418–46.

Rose, D. and Martin, J. R. (2012) *Learning to Write, Reading to Learn: Genre, knowledge and pedagogy in the Sydney School*, London: Equinox.

Rose, D., McInnes, D. and Korner, H. (1992) *Scientific Literacy (Write it Right Literacy in Industry Research Project – Stage 1)*, Sydney: Metropolitan East Disadvantaged Schools Program.

Schleppegrell, M. J. (2004) *The Language of Schooling: A functional linguistic perspective*, Mahwah, N. J.: Erlbaum.

Siebörger, I. and Adendorff, R. D. (2015) 'Resemiotizing concerns from constituencies in the South African parliament', *Southern African Linguistics and Applied Language Studies*, 33(2): 171–97.

Thomson, E. A. (2014) *Battling with Words: A study of language, diversity and social inclusion in the Australian Department of Defence*, Canberra: Australian Government.

Veel, R. (2006) 'The "Write it Right" project', in R. Whittaker, M. O'Donnell and A. McCabe (eds) *Language and Literacy: Functional approaches*, London: Continuum, 66–92.

Wignell, P. (2007) *On the Discourse of Social Science,* Darwin: Charles Darwin University Press.

Wignell, P., Martin, J. R and Eggins, S. (1989) 'The discourse of geography: Ordering and explaining the experiential world', *Linguistics and Education*, 1(4): 359–92.

Zappavigna, M. and Martin, J. R. (2018) *Discourse and Diversionary Justice: An analysis of Youth Justice Conferencing*, London: Palgrave Macmillan.

PART I

Legitimation Code Theory: Opening ideas

2

SPECIALIZATION CODES

Knowledge, knowers and student success

Karl Maton and Rainbow Tsai-Hung Chen

Introduction

Why are some students more successful than others? This is a central and enduring question for education. In this chapter we show how concepts from the Specialization dimension of Legitimation Code Theory (LCT) – specifically *specialization codes* – can help to shed light on this issue. At the same time, we aim to illustrate how these concepts can generate powerful explanations as a way into understanding why they are increasingly drawn upon by scholars and educators from systemic functional linguistics (SFL). As the rapidly growing number and diversity of LCT studies reveals, our focus is only one problem for which 'specialization codes' can be valuable and our analysis is only one way the concepts can be enacted in research.[1] Moreover, we shall not explicitly discuss how these ideas can complement SFL analyses of academic discourse; for how to bring the approaches together, see Maton and Doran (2017) and Maton *et al.* (2016b); for examples of studies enacting 'specialization codes' alongside SFL, see Christie (2016), Hood (2010, 2016), Martin *et al.* (2013, 2014), Vidal Lizama (2017), and Chapters 6–8 of this volume. Nonetheless, the question of student success offers a grounded way of demonstrating 'specialization codes' at work on a significant issue and so offers insights into why they are being adopted in SFL.

To do so we draw on a major study that brings together three stimuli to change in higher education in Anglophone countries that remain under-explained. First, the growth in international students attending higher education over recent decades has outpaced studies into the suitability of different pedagogic practices for these diverse students (Leask 2015; Ryan 2013). Educational debate tends to advance forms of teaching and learning as universally valuable or limited; how specific practices may support or constrain learning among specific groups of international students remains under-explored (Byram 2018; Clifford and Montgomery

2014). Second, online learning is viewed by university policymakers as a key area of growth, but there remains limited evidence of positive effects for student achievement (Henderson *et al.* 2016). Third, the literature espousing 'student-centred learning' approaches has grown dramatically since the 1990s. Often loosely defined under a variety of names, these approaches downplay direct instruction by teachers in favour of independent learning said to empower students by enabling them to 'construct' their own understandings (e.g. Jonassen and Land 2012). Though influential in higher education in Anglophone countries, these claims rest on relatively limited research (Kirschner *et al.* 2006; Muijs and Reynolds 2018; Tobias and Duffy 2009). The study we shall discuss as a means of illustrating 'specialization codes' in action brought these three issues together by focusing on Chinese students who were taught online at an Australian university with student-centred pedagogy (Chen 2010).

The study also serves to highlight a problem emblematic of education research more generally to which LCT offers a solution: 'knowledge-blindness' (Maton 2014; see also Chapter 3, this volume). Prior to this study, research into Chinese students overseas typically focused solely on the attributes of students. For example, challenges faced by Chinese students were often attributed to their ways of thinking and acting, such as a desire to 'save face' (e.g. Leedham 2015; Smith *et al.*, 2005; Zhao and McDougall 2008). In contrast, the knowledge practices with which students are engaging, such as curriculum, pedagogy and assessment, were typically ignored or downplayed. From this perspective it mattered little what students are learning or how they are taught and assessed – they succeed or fail because of who they are or how they think or act. In short, studies analyze only knowers' ways of knowing and overlook knowledge as an object of study. However, the tradition of work bringing knowledge back into the picture was also tending to become one-sided. As discussed in Chapter 1 of this volume, the later ideas of Basil Bernstein emphasized the significance of 'knowledge structures' but at the expense of obscuring the ways of knowing brought by actors. While these 'coding orientations' had been a concern of Bernstein's earlier work (1971), the focus of scholars building on his later concepts backgrounded the issue of knowers.

In contrast, LCT allows analysis to see both knowledge and knowers; LCT concepts bring knowledge practices into view and enable their forms to be analyzed in relation to students' dispositions. From this perspective, educational experiences (or, indeed, any practices) are an outcome of what the French sociologist Pierre Bourdieu (1996: 256) called 'the meeting of two histories' or logics: the dispositions (ways of acting, thinking and being) brought by actors to a social context and the nature of that context itself. Put simply, actors' practices are shaped by how their dispositions relate to their contexts. Crucially, LCT offers concepts capable of analyzing and relating together all parts of this equation: the dispositions of actors, the contexts within which they are situated, and their resultant experiences and practices. In doing so, LCT can generate powerful explanations of social practice. Before discussing the empirical study of Chinese students, we shall thus briefly introduce LCT and the specific concepts enacted in this research. Chapter 1 of this volume

introduced some of these ideas, but from the viewpoint of the concerns of systemic functional linguistics in the 1990s; here we briefly introduce LCT on its own terms.

Legitimation Code Theory: Specialization

Legitimation Code Theory or 'LCT' is a framework for researching and shaping practice. The framework integrates insights from a range of influences, but most explicitly articulated are its relations with the work of Pierre Bourdieu (e.g. 1996, 2000) and, above all, Basil Bernstein (e.g. 1977, 1990, 2000). LCT extends and integrates these sociological approaches to embrace more phenomena within a more systematic and integrated framework.[2] This theoretical development is, however, always in dialogic relations with empirical research. LCT is a 'practical theory' used to explore a host of issues, practices and contexts in education and beyond (e.g. Maton *et al*. 2016a), both on its own and alongside complementary frameworks such as systemic functional linguistics (Chapter 1 of this volume; Maton and Doran 2017; Maton *et al*. 2016b).

In accord with its sociological foundations, LCT construes society as a series of relatively autonomous social fields of practice (such as law, medicine, education, etc.) characterized by distinctive resources and forms of status. In each social field, actors cooperate and struggle, both for more of what is viewed as signs of success and over what defines success. In other words, actors' practices embody messages concerning what should be the dominant measures of achievement within a field – they are 'languages of legitimation' (Maton 2014: 23–42). Put another way, LCT highlights that there is more to what we say or do than what we say or do. For example, if an art teacher takes a group of students to a gallery and discusses the art they see there, the teacher is teaching those students not only knowledge of art but also that art is worth their time and attention, that it is important to discuss art, and that it is important to see first-hand the art they discuss. Similarly, we have not only just given an example, we have also effectively emphasized that giving concrete and simple examples is important when introducing theory. To highlight these two kinds of 'messages', LCT makes a distinction between the *focus* of practices (such as knowledge about art) and the *basis* of practices (such as first-hand experience of art). The *basis* of practices is their 'language of legitimation' and the organizing principles underlying that basis are conceptualized as *legitimation codes*.

These organizing principles are manifold. Any set of practices has a diverse range of characteristics, such as their complexity, their context-dependence, their emphasis on specialized knowledge or personal experience, how strongly distinct they are from other practices, whether they point backwards or forwards in time, and so forth. Each of these attributes may take myriad forms. The organizing principles that generate the particular forms taken by a specific set of practices are conceptualized by LCT as different species of 'legitimation codes'. The conceptual framework is structured into a series of 'dimensions' (or sets of concepts) that each explore a distinctive species of legitimation code. There are currently four active dimensions: Specialization, Semantics, Autonomy, and Temporality, centred on exploring

specialization codes, semantic codes, autonomy codes and temporal codes, respectively.[3] Different dimensions do *not* refer to different practices but rather explore different organizing principles underlying practices. The same practices are underpinned by all dimensions. How many and which dimensions are drawn on by empirical research and practice depends on the problem-situation (specific questions concerning a particular object of study). Thus the same practices may be analyzed in terms of, for example, specialization codes and semantic codes, to reveal different aspects of the same phenomenon.

Whichever species of legitimation code are explored, there is usually more than one modality of that code active within a specific context and there are typically struggles over which modalities should be dominant. The balance of power among different modalities of codes within a social field shapes what and who is viewed as having more or less legitimacy and thus affects the different horizons of possibility for actors within that field. Changing codes in a social context can change possibilities. Thus, LCT can be described as a 'sociology of possibility' (Maton 2014: 3): it provides a way of exploring what is possible for whom, when, where and how, who is able to define these possibilities, when, where and how, and how the impossible can be made possible.

Specialization codes

This chapter focuses on Specialization, a dimension which conceives social fields of practice as *knowledge–knower structures* whose organizing principles are conceptualized as *specialization codes* (Maton 2014; see also Martin *et al.*, Chapter 1 of this volume). Specialization begins from the simple premise that every practice is about or oriented towards something and by someone. One can, therefore, analytically distinguish: *epistemic relations* between practices and their object (that part of the world towards which they are oriented); and *social relations* between practices and their subject (who or what is enacting the practices). For knowledge claims, these are realized as: *epistemic relations* between knowledge and its proclaimed objects of study; and *social relations* between knowledge and its authors, actors or subjects. These relations highlight questions of: *what* can be legitimately described as knowledge (epistemic relations); and *who* can claim to be a legitimate knower (social relations).

Each of these relations may be more strongly (+) or weakly (−) emphasized and the two strengths together generate *specialization codes* (ER+/−, SR+/−). As shown in Figure 2.1, these strengths are visualized on the *specialization plane*, a topological space of infinite positions but with four principal modalities:

- *knowledge codes* (ER+, SR−), where possession of specialized knowledge, principles or procedures concerning specific objects of study is emphasized as the basis of achievement, and the attributes of actors are downplayed;
- *knower codes* (ER−, SR+), where specialized knowledge and objects are downplayed and the attributes of actors are emphasized as measures of achievement,

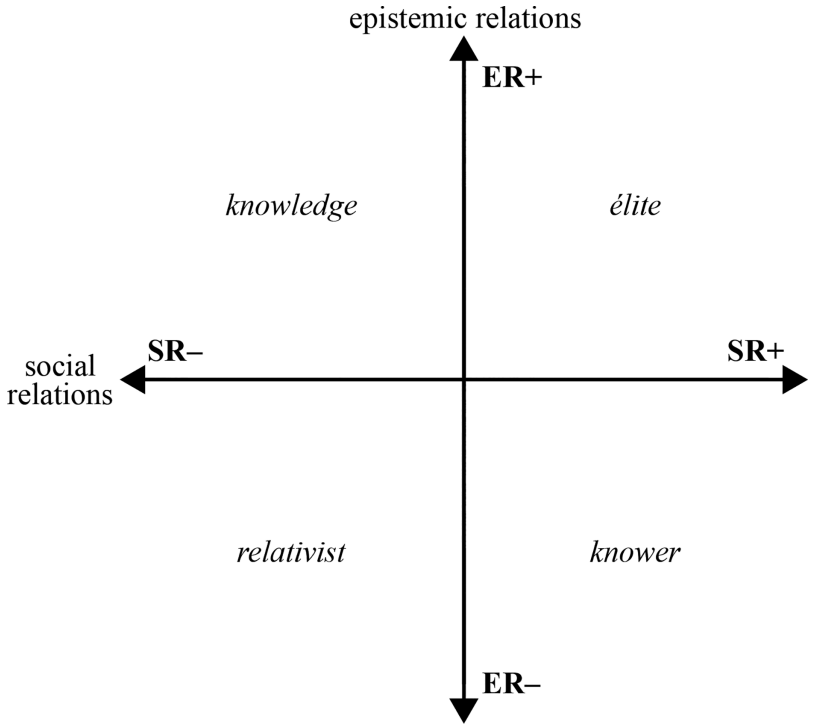


FIGURE 2.1 The specialization plane (Maton 2014: 30)

whether these are viewed as born (e.g. 'natural talent'), cultivated (e.g. 'taste') or social (e.g. feminist standpoint theory);

- *élite codes* (ER+, SR+), where legitimacy is based on both possessing specialist knowledge and being the right kind of knower; and
- *relativist codes* (ER−, SR−), where legitimacy is determined by neither specialist knowledge nor knower attributes – 'anything goes'.

Specialization codes conceptualize one dimension of the measures of achievement embodied by actors' dispositions, contexts and practices. In the four codes listed above, what matters is: 'what you know' (knowledge codes), 'the kind of knower you are' (knower codes), both (élite codes), or neither (relativist codes). A specific code may dominate as the basis of achievement, but may not be transparent, universal or uncontested. Not everyone may recognize and/or be able to realize what is required, there may be more than one code present, and there are likely to be struggles among actors over which code is dominant. One can thus describe degrees of *code clash* and *code match*, such as between: learners' dispositions and pedagogic practices; education policies and subject areas; different approaches within an intellectual field; curriculum and pedagogy of a subject area; and many others. For example, studies of a large-scale policy initiative in Australian schools (Howard

and Maton 2011; Maton and Howard 2016) show how the policy successfully integrated educational technology into subject areas that matched its knower-code intentions but was less successful in subjects characterized by other specialization codes, where code clashes were evident. An example from beyond education is offered by Martin *et al.* (2014), who show how the dominant code underlying 'restorative justice' practices in Australia matches the dispositions of some young people but not those of others, disadvantaging working-class boys.

The dominant code may change, such as between subject areas, classrooms and stages of a curriculum or, for dispositions, through education or over the lifecourse. These *code shifts* effectively change the 'rules of the game'. For example, research into the low uptake of qualifications in music in English schooling (Lamont and Maton 2010) revealed that the curriculum shifted from a knower code at primary school to a knowledge code during the early years of secondary school, and then towards an élite code for formal school qualifications in upper secondary school. Such code shifts can have profound implications, such as rendering previously successful actors unable to continue to succeed or, in this example, reducing the take-up rate among students of a qualification.

Enacting specialization codes in this study

The concepts of specialization codes have been widely enacted to explore a host of different issues across the disciplinary map and at all levels of education, as well as in other social fields, including museums (Carvalho *et al.* 2015) and armed forces (Thomson 2014). Here, our concern is with understanding the experiences of a group of Chinese students at an Australian university. As discussed earlier above, in contrast to the one-sided focus on student attributes that characterized existing studies of this issue, we aimed at a fuller understanding of student experiences that embraced: the educational dispositions brought by students; the educational practices characterizing the educational context within which they are studying; and students' resulting educational practices. These represented the three main foci of the study we shall discuss.

First, three focus groups with 16 Chinese students from across the university explored their educational dispositions. The aim was not to characterize Chinese education itself but rather to explore these students' experiences and expectations of education. Second, the study focused on students undertaking postgraduate online units in the Faculty of Education at the university. To characterize their educational context, eight university teachers were interviewed about curriculum, pedagogy and assessment practices on the units, and their study outlines analysed. Third, seven Chinese students studying different online units were each interviewed through a semester an average of four times, for a total of 41 hours, in their native language (Mandarin) about their experiences on online units.

These three foci involved different methods, forms of data and participants. Moreover, when exploring student dispositions, educational contexts and student practices, the study analysed each factor in terms of its construal of curriculum,

pedagogy and assessment. Thus, the study analyzed an array of different issues. One strength of LCT concepts is that they can be used to analyze such diverse objects of study, allowing different phenomena to be related together. However, this requires being clear as to how specific concepts are empirically realized within each object of study. For example, the empirical forms taken by stronger epistemic relations in student interviews may be different to those taken by stronger epistemic relations in teaching materials and, further, they may appear differently in those materials in terms of its curriculum, forms of pedagogy and assessment practices. A key task in LCT is, therefore, to establish the empirical realizations of concepts within each specific phenomenon and to make this explicit in the form of a 'translation device' that relates concepts to data.[4]

Table 2.1 is the 'specific translation device' developed by Chen (2010) for relating specialization codes to the specific data of the study. Not all translation devices need be as complex (see Maton and Chen 2016). In this case, the table shows, first, that *epistemic relations* are realized as a degree of emphasis on content knowledge (curriculum), teaching of content knowledge (pedagogy) and explicit criteria (assessment); and that *social relations* are realized as a degree of emphasis on learners' personal experiences (curriculum), personal dimensions of learning (pedagogy) and learners' self-evaluation (assessment). Second, the device reveals how *stronger* and *weaker* epistemic relations and *stronger* and *weaker* social relations are realized in curriculum, in pedagogy and in assessment, provides indicators for determining whether data exhibits stronger or weaker relations, and offers quotes from the data as examples of stronger and weaker modalities.

Each section is structured so that it can be read as translating both theory into data and data into theory. Reading from left to right shows how concepts are enacted in this particular object of study; reading from right to left shows how data can be conceptualized in terms of strengths of epistemic relations and strengths of social relations. For example, taking the 'curriculum' row of 'epistemic relations', one can read from the quote in the right-hand column ('The information in the textbook, decided by the teacher, was what a study unit was all about') to indicators that can be identified (content knowledge is being highlighted as the determining form of legitimate knowledge) and thence to its coding (stronger epistemic relations or 'ER+'). The quote thereby illustrates the kinds of data coded as stronger epistemic relations, giving insight into how other examples from the data should be conceptualized. This specific translation device thus enables different realizations of epistemic relations and social relations to be coded so that one can relate the dispositions students brought to the learning context, the nature of that context, and their consequent experiences and practices. We now turn to discuss the findings of the study for each of these in turn.

Educational dispositions of Chinese students

We begin by analyzing how focus group participants in the study described their experiences of education in China. The aim here is not to generate an accurate

TABLE 2.1 A translation device for specialization codes and Chinese students' experiences

	EPISTEMIC RELATIONS (ER)				*SOCIAL RELATIONS (SR)*			
	Manifested as emphasising:		*Indicators of strengths*	*Example quotes from data*	*Manifested as emphasising:*		*Indicators of strengths*	*Example quotes from data*
Curriculum	content knowledge	ER+	Content knowledge is emphasized as determining form of legitimate knowledge	The information in the textbook, decided by the teacher, was what a study unit was all about.	personal experience	SR+	Personal experience and opinions are viewed as legitimate knowledge	[Students] actually come with a whole range of background and experience… what they need is a framework to download that.
		ER−	Content knowledge is downplayed as less important in defining legitimate knowledge	We show them digital repositories that they need to go to in order to access those readings that are relevant to their context.		SR−	Personal experience and opinions are downplayed and distinguished from legitimate knowledge	Online discussion is chaotic, and is like you conduct a survey and everyone tells you their opinions. That's all. It's different from a class.
Pedagogy	teaching content knowledge	ER+	Procedures for learning content knowledge are explicit to learners and emphasized as determining form of pedagogy	[The teacher] extracts the best things from what he or she knows and gives this to you in class, and then offers you instructions on the tasks you need to complete.	personal dimension of learning	SR+	Individual learners' preferences are explicitly emphasized as determining form of pedagogy	So negotiate to learn in a way that suits them…it's constructing your own learning in a way that is helpful for you.
		ER−	Procedures for learning content knowledge are implicit to learners and downplayed as not significantly shaping pedagogy	The teacher only points out the things you need to read. But as to how to think, how to read and understand, it's your own business.		SR−	Individual learners' preferences are downplayed as not significantly shaping pedagogy	Even if your question is brilliant, the teacher still might not answer you because he or she wants to teach something else first.
Assessment	explicit criteria	ER+	Explicit evaluative criteria are emphasized in judging student performances	When a Chinese child paints the moon blue, the teacher will correct the child, saying that the moon shouldn't be blue.	self-evaluation	SR+	Evaluation of legitimacy of student performances resides in beliefs of individual learners	What's valid for you and what's valid for me are two different things, aren't they?
		ER−	Explicit evaluative criteria are less significant in judging student performances	It's not like learning medicine, you've got to get it right or the patient will die. It's not like that. It's more open to interpretation.		SR−	Student performances are judged against shared criteria external to the learner	I am a 'test-taker'. If the teacher doesn't give me a standard, I don't know what to do.

(Chen 2010: 83)

account of Chinese education but rather to reveal the educational dispositions these students brought to the Australian university context. To do so we explore how the students described their prior experiences of curriculum, pedagogy and assessment.

Participants in the study described experiencing the curriculum of what they studied as strongly insulated; for example, Chris stated:[5]

> When I studied in China, my feeling was that the information in the textbook, decided by the teacher, was what the study unit was all about… You gain a wide range of knowledge. Every study unit will touch a little on different issues in that area, and maybe the teacher will highlight a couple of things that are more important. The textbook usually covers everything.
>
> *(interview 4)*

The students felt that learning specific content knowledge was emphasized in this explicit curriculum. Anything beyond the boundary of a study unit, such as other forms of educational knowledge or everyday experiences, was not considered relevant to learning that particular subject content. Emphasis was thus placed on strongly bounded and controlled content knowledge: *stronger epistemic relations* (ER+). In contrast, students rarely considered their lives or everyday experiences beyond educational contexts as relevant to learning, even when prompted. They thus downplayed their personal attributes or characteristics as knowers: *weaker social relations* (SR−).

In terms of pedagogy, the students described their past teachers in China as experts in the content knowledge who possessed the ability to teach that knowledge to students through clear procedures. Such teachers had, according to the students, explicit control over the selection and ordering of content, the rate at which learners accessed this content, and student conduct in classrooms. These practices represent explicit principles of selection, sequencing and pacing of knowledge: *stronger epistemic relations* (ER+). In contrast, students said they were expected to adopt self-effacing roles, such as following the pacing of learning of the class as a whole and only asking questions when sure that doing so would contribute to learning for the whole class. For example, one student described a cardinal rule of classroom behaviour as:

> Don't disturb the class. Even if your question is brilliant, the teacher still might not answer you because he or she wants to teach something else first. Only ask questions if the teacher wants you to. If the teacher wants to carry on with the lesson, listen.
>
> *(Rachael, focus group 3)*

This is to downplay learners as already legitimate knowers: *weaker social relations* (SR−).

Finally, in terms of assessment, students described the basis of achievement in Chinese education as being made very clear to learners. In brief, success was built, they suggested, on effort, concentration and withholding one's own subjective views. Students stated that a significant part of assessment comprised examinations

that required correct, textbook-based answers. To achieve the highest marks, students claimed, one needed to study hard and forego personal opinions that might conflict with standardized answers. The following quote is common of discussion from the focus groups:

> When I was in China, I never thought the teacher was right all the time, but I couldn't argue with them. Neither could I argue against things written in the textbook. If I had done so, they would have told me to follow what the textbook said anyway. And if I had written my answers on exams according to what I thought, not the book, they wouldn't have been standard, right answers. That meant I wouldn't have got the marks. I couldn't do anything about it.
>
> *(Chris, interview 1)*

Such emphasis on learners displaying content knowledge and explicit evaluative criteria again describe knowledge as strongly bounded and controlled: *stronger epistemic relations* (ER+). In contrast, downplaying by students of personal views represents *weaker social relations* (SR−).

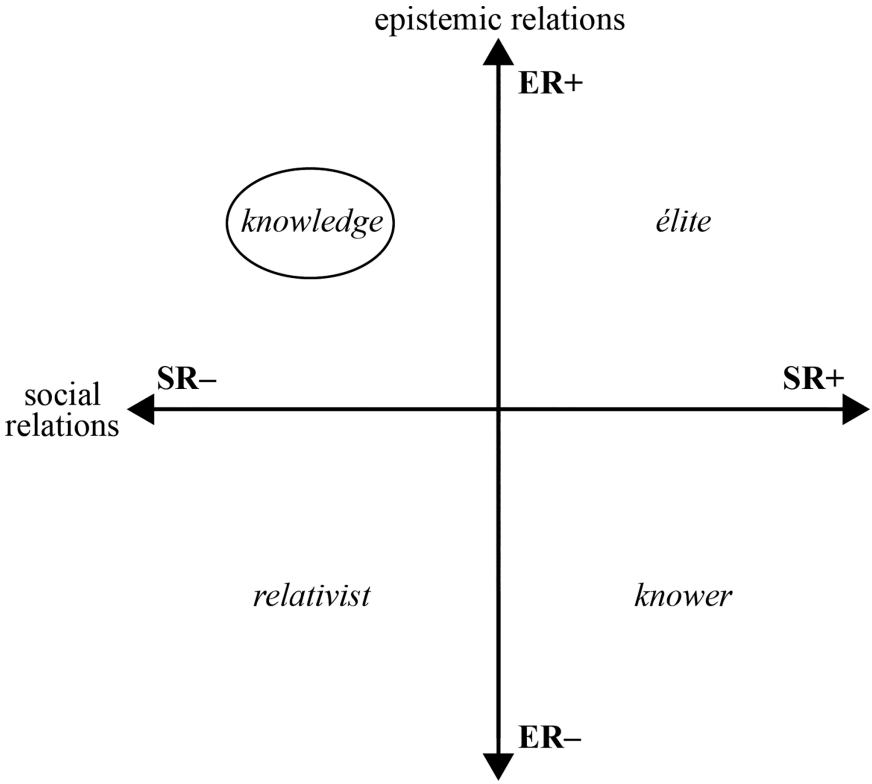


FIGURE 2.2 Educational dispositions of the Chinese students – knowledge code

Figure 2.2 highlights the specialization code of the experiences of education brought by the Chinese students. To reiterate: this is not an analysis of Chinese education but rather of the ways in which the specific Chinese students studying at the Australian university described their experiences. In summary, the students described past experiences of curriculum, pedagogy and assessment as all manifesting stronger epistemic relations and weaker social relations. This represents a *knowledge code* (ER+, SR−), in this case manifested as:

- curriculum that emphasizes content knowledge and downplays personal beliefs;
- pedagogy emphasizing procedures for delivering teachers' specialized knowledge about subject content to all students and which downplay personal or individualized dimensions of learning; and
- assessment with explicit criteria for evaluating learners' understandings of knowledge and that downplay personal views.

Teaching practices in the online units

The teaching practices Chinese students encountered in their online courses at the Australian university stood in stark contrast to their previous experiences of education. When discussing curriculum, teachers at the Australian university blurred boundaries between subject content in the units for which they were responsible and both other subjects and everyday knowledge. Some participant teachers referred to this characteristic as enabling 'authenticity' in learning. For example, Teacher E explained:

> The assignments try to be authentic. Now what I mean by that is we try to situate the assignment in the context in which these people work and live. So if they are a TAFE [vocational college] teacher teaching cabinet-making, then they have to think about how their students are learning that task.[6] If they're a university teacher teaching science, then they have to think about their students learning science … and they have to think about their own learning as well.

Teachers emphasized that the curriculum aimed to accommodate the diverse disciplinary and personal backgrounds of students. One strategy they claimed would enable this involved encouraging students to treat reading materials as optional resources rather than compulsory content of a study unit. Consequently there was little core content knowledge students were required to learn in these units. Instead, students were expected to make their own decisions about the relevance of readings to their own interests and practices beyond the educational context. Thus, teachers downplayed boundaries around and control over legitimate knowledge in

the educational context: *relatively weak epistemic relations* (ER−). In contrast, teachers saw every learner as already possessing a wealth of legitimate knowledge by virtue of their experiences beyond education. One teacher noted negatively of the university in general:

> What we don't often do with our postgraduate students is recognize that they actually come with a whole range of background and experience and baggage and literature, and what they need is a framework to download that.
>
> *(Teacher F)*

The teachers emphasized that they recognized this background and experience and, moreover, considered students as already legitimate knowers: *relatively strong social relations* (SR+). In addition, teachers stressed that any content knowledge included in their units was always subject to each learner's *personal* interpretations and that the aim of the postgraduate programmes was to assist learners in creating their own understanding rather than teaching them new knowledge.

In terms of pedagogy, the teachers espoused 'student-centred' pedagogies characterized by downplaying teacher control over the selection, sequencing and pacing of knowledge. At the same time, they denigrated 'instructivist' pedagogies that emphasized the explicit teaching of knowledge. Teacher B, for example, described how their view of 'instructivist' teaching served as a contrast to their own pedagogy:

> There was very much a temptation to say, 'Okay week 1, read these and we'll have a discussion. Week 2, read these papers and we'll have a quiz. Week 3, read these papers and then your assignment is due'. They'd [other teachers] have a template of 13 weeks or 14 weeks or whatever. For the kinds of learning environments that I create, that's a total anathema. Because if you do that you're moving back into an instructivist kind of mode. So you're saying 'this is what I want you to do this week, and this is what I want you to do the next week'. So it becomes sequential and it's directed by the teacher rather than from the student.

In discussing their relationships with students, teachers often defined themselves as facilitators, most emphasizing that they did not claim to possess expert knowledge of the subject content and thus did not intend to act as a 'guru' or 'sage on the stage'.[7] Instead, some identified their relationships with students as a 'partnership', in which they assumed the role of a 'co-learner' or 'critical friend'. Consequently, the teachers viewed their principal responsibility not as teaching knowledge but rather creating and maintaining an environment that was conducive to learner engagement. In short, the teaching of content knowledge was downplayed: *weaker epistemic relations* (ER−).

Rather than teaching knowledge, the teachers viewed their role as providing minimal guidance and providing online space for discussion among students. They emphasized that it was each student's responsibility to organize their own studies and to make the most of any available support. As one teacher summed up:

> I think you need to guide in some way, provide some form of pathway [but] if students don't want to use your pathway let them go their own path, but at least you've provided them with some assistance.
>
> *(Teacher G)*

For example, the teachers generally believed that, given students were already legitimate knowers, they would most benefit from sharing their personal experiences with other students. Accordingly, they emphasized peer interaction in online discussion that would, they believed, create a learning community among the students. However, student participation in online discussions was often not mandatory in these online units, reflecting the teachers' insistence on student autonomy. This recurrent emphasis on learner choice and self-determined, individual pathways represents *relatively strong social relations* (SR+).

In terms of assessment, teachers used three main forms: what they called 'authentic tasks' that they claimed reflected issues in the real world; projects in which students could choose their own focus; and personal reflections by students. All three methods, teachers argued, required learners to relate educational knowledge to their own real-life experiences. As these experiences could be extremely diverse, assessment downplayed any criteria that might directly compare performances among students. In other words, teachers argued that assessment tasks recognized a wide variety of performances by students as legitimate. As one teacher argued: 'It's not like learning medicine, you've got to get it right [otherwise] the patient will die. It's not like that. It's more open to interpretation' (Teacher G). Explicit evaluative criteria were thus downplayed in judging student work: *relatively weak epistemic relations* (ER−). Instead, teachers valued the ability of students to construct their own personal understanding and to reflect on their own learning; for example:

> What I want to know is how much *you*, the student, can make the connections between *your* beliefs and *your* theory, *your* beliefs and *your* practices and can *you* share that with me and justify it.
>
> *(Teacher C)*

In other words, the student themselves formed the basis of legitimate insight. This is not to say, though, that 'anything goes' – the teachers had a clear sense of the kind of knower they considered legitimate. The ideal learner delineated by teachers was a student who showed enthusiasm about being there and a willingness to explore, take risks and seek help, as well as to participate and share their experiences

in the online discussions. In short, the ideal knower by which the teachers measured student work was independent, self-directed, confident and reflective. The emphasis, therefore, was on specific dispositions of knowers: *relatively strong social relations* (SR+).

As shown in Figure 2.3, the 'student-centred' pedagogy the teachers espoused in interviews and enacted in their units of study embodied weaker epistemic relations and stronger social relations. This is a *knower code* (ER−, SR+), realized in this case as:

- curriculum downplaying content knowledge and emphasizing personal experience;
- pedagogy downplaying teachers delivering subject content or structuring student learning, and emphasizing the need for self-regulating learners to create their own understandings; and
- assessment avoiding explicit evaluative criteria and emphasizing that students should evaluate themselves based on their own criteria.

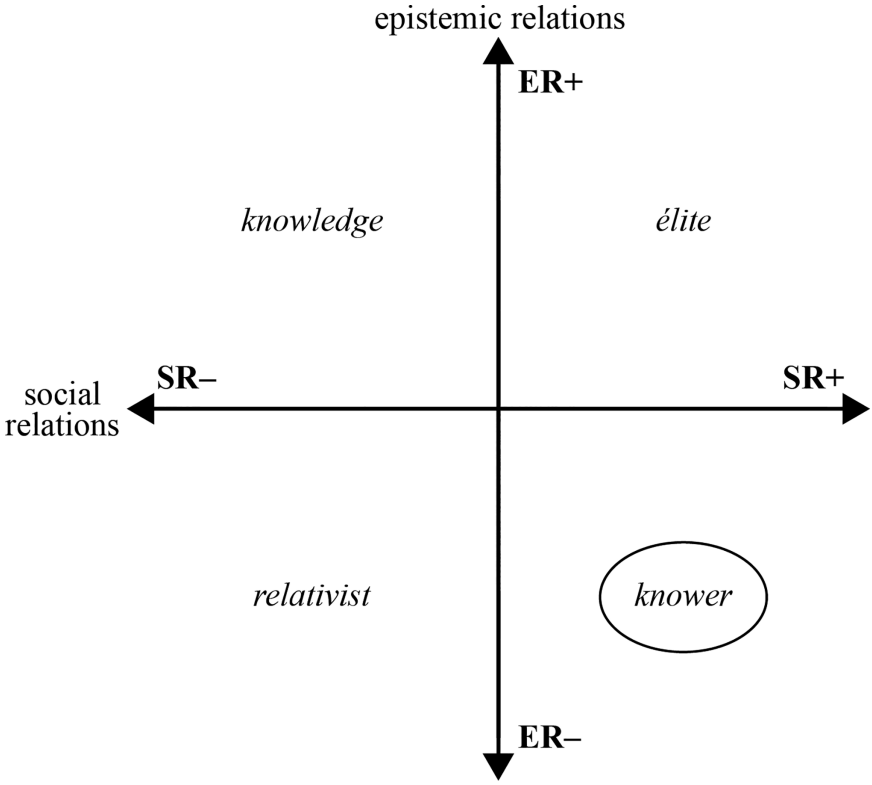


FIGURE 2.3 Teaching context – knower code

There are many kinds of knower code based on the form taken by the ideal knower emphasized as its basis (see Maton 2014: 86–105). In this case, as discussed above, the ideal was a *personalized*, *individualized* and *socializing* knower. In other words, legitimate understanding is constructed by each knower on the basis of their *personal* experiences through highly *individualized* tasks and *socializing* by sharing their perspectives with other students in an online learning community.

Student experiences and practices

Thus far the analysis has focused on the educational dispositions expressed by the Chinese students as embodying a knowledge code and the teaching and learning practices of the educational context as embodying a knower code. This represents a potential 'code clash': the measures of achievement expected by the students are fundamentally different to those demanded by the educational context. They represent, in other words, different 'rules of the game'. However, this is not to say that the Chinese students experienced the educational context as a knower code. As Bourdieu (2000) argues, one must avoid the 'scholastic fallacy' of mistaking analysis conducted with the benefit of conceptual tools for the experience of participants themselves. One must always remember that how actors experience a context is mediated by their dispositions: they see the context through their own codes. We thus now turn to analyze how the students experienced their educational experiences in these units at the Australian university.

Focusing on the case studies of Chinese students reveals that the weaker epistemic relations of the curriculum were not only experienced as weaker epistemic relations but also viewed negatively. For example, the students considered solitary reading as inadequate for helping them learn because they were unsure whether their own understanding and interpretations of the content were correct. One student, for example, summarized the effect of solitary reading as:

> There are still so many things that I'm not sure about. It's not like you ask me something, I can tell you exactly what it is. If you ask me something now, I can only tell you what it is according to my understanding. This is the best I can do, and I don't think this means I've learned well.
>
> *(Vivian, interview 6)*

More generally the form of pedagogy adopted by the teachers was viewed not as enabling but rather as an absence. The space the teachers aimed to provide for already-legitimate knowers to flourish on their own was experienced by these students as a vacuum. Students described how they were provided with reading materials and deadlines for the assessment tasks, but then left alone to learn without guidance by teachers. 'This type of learning is self-study,' one student summarized, 'You read the readings provided for you. Then you think on your own, and then write essays' (Megan, interview 2). This self-study was often described negatively by

students, as teaching without a systematic plan and without a supporting structure. The following response is typical of many by the students:

> I feel that teachers do not teach in online classes. They raise a lot of questions for us to discuss. What do they teach us? They teach us nothing. They ask us to think, but what if I can't think of anything? I can sit there thinking all day and night, not sleeping at all, but I still can't think of anything. So I don't think they are teaching me.
>
> *(Vivian, interview 3)*

Similarly, students expressed considerable concern about a lack of specificity in assessment criteria. Most felt the descriptions of the tasks and requirements were at best 'ambiguous'. One student, for example, argued that students 'are like producers. We produce goods as required. You [teachers] need to give us the standards' (Jennifer, interview 5). The students also often voiced frustration at not being able to obtain clear instructions from their teachers when they approached them for more information.

In short, the students' previous experiences of a knowledge code emphasized the importance of stronger epistemic relations (*ER*+, SR−), realized as explicit content knowledge, explicit instruction and visible assessment criteria based on knowledge. They viewed the weaker epistemic relations offered by the knower-code teaching (*ER*−, SR+) as a loss of legitimacy. Their experience itself was thus characterized by weaker epistemic relations: a lack of knowledge to be learned.

According to the teachers, their 'student-centred' pedagogy was intended to provide the space for students to express themselves as already-legitimate knowers, i.e. a knower code. However, the stronger social relations that underpin the legitimacy of the knower code (ER−, *SR*+) were not recognized as such by the students whose knowledge-code dispositions downplayed social relations (ER+, *SR*−). For example, the students did not view their own experiences as relevant to assignments and those students who did attempt to draw on their own knowledge often expressed belief that their experiences were inadequate. Similarly, the students dismissed online discussions with other students as 'pointless' because their peers were not experts in the content knowledge. They did not consider students as legitimate knowers whose personal experiences were valuable for the assessment task. Accordingly, none of the students felt they were part of a learning community in the online environment. They repeatedly stated that they felt as if they were doing the online units alone; for example, one student said he felt like the only student in his class and so doubted whether he was learning at all (Chris, interview 6).

While the students said they longed for a sense of belonging, they all reported lacking sufficient incentive to participate in online discussions. Here again, the Chinese students focused on the absence of stronger epistemic relations: they described online discussions as 'chaotic' and expressed frustration that the

teachers did not provide conclusive comments at the end of a discussion or verify whether the claims made by other students were legitimate. As one student stated:

> Even if I got a reply from my classmate, it's unlikely that the teacher would post a message afterwards to confirm whether what my classmate said was correct or not. So in this situation… I still don't know whether the answer is correct. I can only rely on my judgement to see if the reply makes sense, or to compare all the replies I get, which is still not definite.
>
> *(Vivian, interview 2)*

In sum, the knowledge-code dispositions (ER+, SR−) of the Chinese students meant that, on the one hand, they were seeking stronger epistemic relations but were disappointed and frustrated by their absence in the knower-code learning environment (ER−, SR+) and, on the other hand, they did not see the stronger social relations of this environment as legitimate. In other words, they recognized its weaker epistemic relations (though not positively) but did not recognize its stronger social relations: they did not view as legitimate using their own personal experiences and sharing these with their peers. The students thus experienced the educational context not as a knower code but rather as a *relativist code* (ER−, SR−): nothing seemed to be the basis of achievement; there seemed to be no 'rules of the game'. As depicted in Figure 2.4, the students perceived a context empty of both legitimate knowledge (weaker epistemic relations) and legitimate knowers (weaker social relations). This relativist code was experienced as a vacuum and, as a result, students reported feeling inferior, insecure, anxious, frustrated, helpless, guilty and depressed (see Chen 2010).

Faced with a perceived lack of 'rules of the game', the students typically continued following their knowledge-code dispositions by adapting practices that had served them well in their previous education in China. Strategies students used to cope with the requirement of using everyday knowledge in their assignments included: ignoring this requirement and preparing assignments as if they were traditional essays; trying to fulfil the requirement by manufacturing superficial links between the content knowledge and their experiences; considering educational knowledge they had previously learned as representing personal experience; or writing essays that 'combined and synthesized', as one student put it (Rita, interview 3), supposedly personal experiences from examples found in the readings. In the online discussions the students reported only reading postings that had attracted feedback from their teachers and said they poured over those remarks intensely for any implications they might have for assessment criteria. The students also tended not to contribute to these discussions themselves. Moreover, despite describing the online units as lacking any clear sense of what was required of them, they continued to state that a successful learner in those units was one who read extensively, conducted a literature review, wrote in an academic style, and demonstrated in their

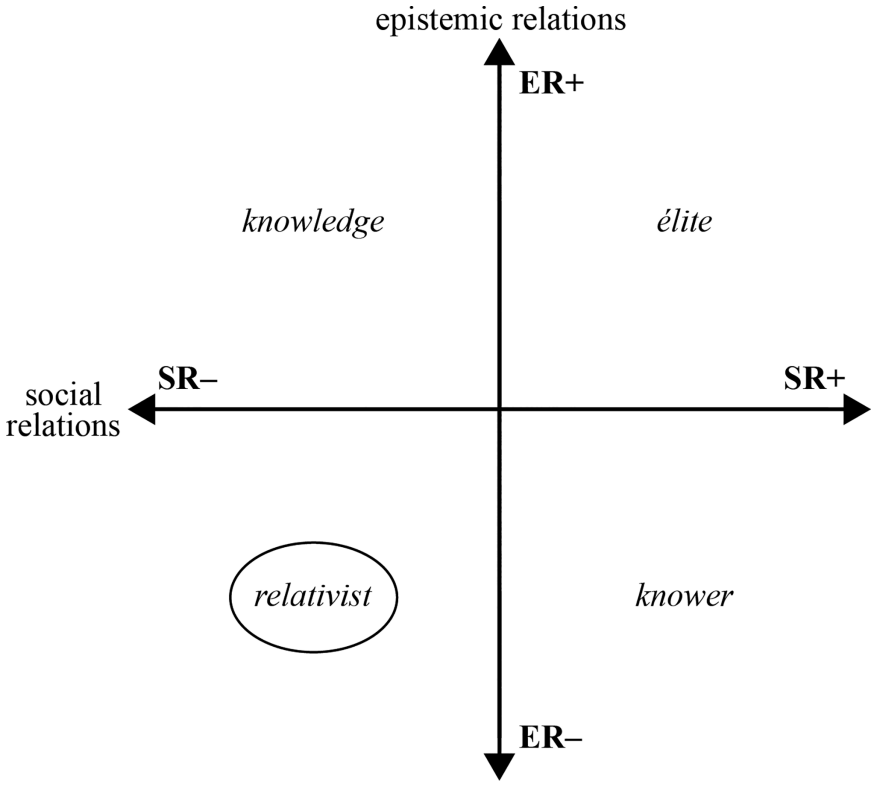


FIGURE 2.4 Student experience of teaching context – a relativist code

assignments knowledge that addressed all the issues raised in the teacher's explanation of the assignment topic. In other words, faced with the experience of a vacuum of legitimacy, the students re-emphasized the basis of achievement as embodying a knowledge code: they continued emphasizing stronger epistemic relations and downplaying social relations.

Though understandable as coping strategies, these practices left the students often feeling disappointed and frustrated. In terms of curriculum, using previously learned educational knowledge as personal experience in their assignments was viewed by students as simply recycling old knowledge. This was, they argued, a waste of both their time and the opportunity of studying overseas. In pedagogy, as mentioned above, not engaging with the online discussions left the students feeling extremely isolated and lonely. In assessment, the desire by teachers for students to negotiate assignments was viewed by the Chinese students as reflecting their own failure at understanding requirements. The coping strategies were thus not fulfilling or empowering.

An invisible knower code

Proponents of 'student-centred learning' approaches often describe such pedagogy as if universally empowering. In contrast, the knower-code practices of the teachers in this context were not empowering for the Chinese students who participated in the study. Indeed, the students felt powerless. As discussed above, the students experienced the teaching context as a relativist code, manifested as lacking both content knowledge and a sense of community. This was experienced as a limbo, an emptiness devoid of direction and clarity – a lack of legitimacy. In response, the students adapted their past knowledge-code practices as coping strategies. The result was they did not gain a different educational experience. Despite being overseas, they effectively underwent a more isolated form of their existing educational experiences from China.

At this point we should make clear what we are and are not arguing here. We are *not* suggesting these findings show studying in Australia to be a negative experience for Chinese students. The research discussed here explored a specific kind of teaching and a particular mode of delivery: 'student-centred' pedagogy in postgraduate units that were taught online. There are a range of forms of pedagogy and a variety of specialization codes active in Australian education, depending on the subject area, the institution, the teachers and a host of other factors. Moreover, the problem for these students was not necessarily the knower code. There are many contexts within which knower codes are appropriate and many different kinds of knower codes (Maton 2014). One aspect of the specific kind of knower code underpinning teaching practices in this case was that it rendered itself invisible to anyone who was not already a particular kind of knower. As discussed earlier above, students could not see what knowledge they should be learning. In addition, the students could not see how the 'student-centred' pedagogy was intended to contribute to their learning or what their teachers expected of them. Although the students may have heard from their teachers or read in the unit outlines a rationale for adopting this pedagogic approach, it remained for them a mystery. They were unable to recognize the required performance in this context. As this suggests, not only was the knowledge invisible but so were the 'rules of the game', the knower code itself.

One reason for this invisibility is a rhetoric-reality gap. The rhetoric, as expressed by teachers in interviews, was that the curriculum, pedagogy and assessment allowed each learner to approach tasks in his or her own way – every kind of knower is equal and every form of engagement is legitimate. If this were the case, it would represent a relativist code: anything goes. However, in reality, teachers based their educational decisions on their image of an ideal knower. That ideal was not made explicit to students, but teacher interviews and analysis of teaching materials showed they considered some forms of learner engagement more appropriate than others. The ideal students were capable of personalized, individualized and socialized learning: they were enthusiastic to explore, take risks, seek help, participate online and share their personal experiences with other students. Teachers expected

students to be independent, self-directed, confident in this form of learning and publicly reflective about themselves. This image of students was assumed by teachers to be universally applicable; they believed that all students are like this when given the opportunity. That these attributes of the ideal knower are not shared by all students was not understood. Put another way, the teachers expected students to have very different dispositions to those expressed by the Chinese students who participated in this study. Moreover, the teachers did not make this expectation explicit, for to do so would be to break a key tenet of student-centred pedagogy by setting rules for how learners should engage in their learning.

In short, the stronger social relations underpinning student-centred pedagogy were hidden. For example, a fundamental principle of this pedagogy is that learning does not (or should not) follow pre-determined stages but rather should follow a learner's individual development. This principle contains a hidden expectation: that learners are capable of and comfortable with externalizing their learning activities so the teacher can provide personalized evaluation – it expects students to make their thoughts and feelings available for assessment. In this study, this expectation was manifested as the need for students to participate in as many activities in the online learning environment as possible, to enable the teachers to engage with them as individual knowers. However, online participation was not compulsory. Students were expected to know without being told that maintaining their visibility in the online environment was crucial to success and that this visibility needed to be of a particularly reflective, self-revelatory kind. Thus, those students who already knew the tacit 'rules of the game' fulfilled the expectations of teachers and those students who were the 'wrong kind of knower' (Maton 2004), including the Chinese students, did not recognize what was tacitly required of them.

Conclusion

Why are some students more successful than others? LCT suggests one reason may be that the legitimation codes characterizing the dispositions of some students match those codes dominating their educational contexts while those of other students clash with their contexts. The study we have discussed enacted the concepts of *specialization codes* to explore the problems experienced by Chinese students in an Australian university. By focusing on relations among codes, the study avoided the one-sided attribution of those experiences to the ways of knowing brought by students and overcame the knowledge-blindness of past research to explore the nature of the curriculum, pedagogy and assessment encountered by those students. The study conjectured that the difficulties experienced by the students resulted from a code clash between their dispositions and those knowledge practices.

By analysing educational outcomes in a relational manner, LCT also reveals that these negative outcomes are not inevitable. The analysis here suggests ways forward that would avoid the code clash. For while dispositions shape the ways actors see and understand their contexts, they may also be analyzed, appreciated and engaged.

This study suggests that if teachers who wish to use knower-code practices make explicit the knower code underpinning their teaching and thus make visible the 'rules of the game', then students with knowledge-code dispositions may be able to recognize what is required of them. Furthermore, if teachers also provide support in engaging with the learning environments in the knower-code way they expect, such as through modelling, then students with dispositions of different codes will be more able to realize the kind of practices that enable achievement. In the case studied here, the pedagogic beliefs of the teachers ruled out making these ideas visible or providing explicit guidance. However, the analysis we have outlined offers a strong case for making clear the 'rules of the game' for students whose dispositions are different to those of the context. It also provides the tools with which to do that.

This chapter has focused on specialization codes, but research could also enact other species of legitimation code (such as semantic codes) to explore further aspects of these organizing principles. As this chapter has done with specialization codes, each set of LCT concepts can be used to analyse: the dispositions actors bring to a context; the social context within which they are situated; the ways in which they perceive and experience that context; and their practices. Each of these phenomena can be coded and related together to help explain the experiences and practices of actors. Moreover, the resulting analysis can then help inform future practices in ways that enable more students to succeed in a greater diversity of contexts. One can, for example, design pedagogic interventions to teach students how to recognize different codes and realize the kinds of practices each code considers valuable (see, for example, Macnaught *et al.* 2013).

Just as significantly, the concepts of specialization codes can be used to explore and inform numerous other aspects of learning and living, including not only curriculum, pedagogy and assessment but also socialization practices, parent-child interactions, organizational structures, and so forth. As we emphasized at the outset of this chapter, the study we have discussed is far from the only way of enacting specialization codes. The concepts can be used to analyze and shape all kinds of social practice, not only in relation to academic discourse, and are compatible with diverse research methods and in conjunction with other approaches, such as SFL. The concepts are not locked into any specific object of study or method and so allow us to explore and relate together a wide range of phenomena. Using LCT one can thus not only address the vexed question of why some students are more successful than others but also reach beyond education to explore the bases of achievement in all avenues of life.

Notes

1 For LCT studies, see http://www.legitimationcodetheory.com.
2 Maton (2005, 2018) articulates relations of LCT concepts with Bourdieu's approach; Maton (2014) extensively relates LCT concepts to Bernstein's concepts.
3 On Specialization and Semantics, see Maton (2013, 2014, 2016a); on Autonomy, see Maton and Howard (2018). For how LCT concepts relate together, see Maton (2016b).

A fifth dimension, 'Density', was outlined in early LCT papers but has yet to be fully articulated – it may become active in the near future.

4 See Maton and Chen (2016) for how to create 'specific translation devices' in qualitative research, and Maton and Howard (2016) for how to develop quantitative instruments to analyze specialization codes.

5 All student names are pseudonyms.

6 'TAFE' is short for 'Technical and Further Education' and refers to tertiary institutions in Australia offering vocational courses in subjects such as hospitality, nursing, hairdressing, carpentry and many others.

7 The expression 'sage on the stage' is often used in literature on student-centred pedagogies to denigrate formal teaching methods (such as lectures) and contrasts with being 'a guide on the side' who facilitates students learning by themselves.

References

Bernstein, B. (1971) *Class, Codes and Control, Vol. I: Theoretical studies towards a sociology of language*, London: Routledge & Kegan Paul.

Bernstein, B. (1977) *Class, Codes and Control, Vol. 3: Towards a theory of educational transmissions* (second edition), London: Routledge & Kegan Paul.

Bernstein, B. (1990) *Class, Codes and Control, Vol. IV: The structuring of pedagogic discourse*, London: Routledge.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique* (revised edition), Oxford: Rowman & Littlefield.

Bourdieu, P. (1996) *The Rules of Art: Genesis and structure of the literary field*, Stanford: Stanford University Press.

Bourdieu, P. (2000) *Pascalian Meditations*, Cambridge: Polity.

Byram, M. (2018) 'Internationalisation in higher education – an internationalist perspective', *On the Horizon*, 26(2): 148–56.

Carvalho, L., Dong, A. and Maton, K. (2015) 'Foregrounding knowledge in e-learning design: An illustration in a museum setting', *Australian Journal of Educational Technology*, 31(3): 328–48.

Chen, R. T.-H. (2010) *Knowledge and Knowers in Online Learning: Investigating the effects of online flexible learning on student sojourners*, unpublished PhD thesis, University of Wollongong, Australia. http://www.legitimationcodetheory.com

Christie, F. (2016) 'Secondary school English literary studies: Cultivating a knower code', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 158–75.

Clifford, V. and Montgomery, C. (2014) 'Challenging conceptions of Western higher education and promoting graduates as global citizens', *Higher Education Quarterly*, 68(1): 28–45.

Henderson, M., Finger, G. and Selwyn, N. (2016) 'What's used and what's useful? Exploring digital technology use(s) among taught postgraduate students', *Active Learning in Higher Education*, 17(3): 235–47.

Hood, S. (2010) *Appraising Research: Evaluation in Academic Writing*, London: Palgrave.

Hood, S. (2016) 'Ethnographies on the move, stories on the rise: Methods in the humanities', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 117–38.

Howard, S. K. and Maton, K. (2011) 'Theorizing knowledge practices: A missing piece of the educational technology puzzle', *Research in Learning Technology*, 19(3): 191–206.

Jonassen, D. H. and Land, S. M. (2012) (eds) *Theoretical Foundations of Learning Environments* (second edition), London: Lawrence Erlbaum.

Kirschner, P. A., Sweller, J. and Clark, R. E. (2006) 'Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching', *Educational Psychologist*, 41(2): 75–86.

Lamont, A. and Maton, K. (2010) 'Unpopular music: Beliefs and behaviours towards music in education', in R. Wright (ed.) *Sociology and Music Education*, London: Ashgate, 63–80.

Leask, B. (2015) *Internationalizing the Curriculum*, London: Routledge.

Leedham, M. (2015) *Chinese Students' Writing in English: Implications from a corpus-driven study*, Abingdon: Routledge.

Macnaught, L., Maton, K., Martin, J. R. and Matruglio, E. (2013) 'Jointly constructing semantic waves: Implications for teacher training', *Linguistics and Education*, 24(1): 50–63.

Martin, J. R., Zappavigna, M. and Dwyer, P. (2013) 'Users in uses of language: Embodied identity in Youth Justice Conferencing', *Text and Talk*, 33(4–5): 467–96).

Martin, J. R., Zappavigna, M. and Dwyer, P. (2014) 'Beyond redemption: Choice and consequence in Youth Justice Conferencing', in F. Yan and J. J. Webster (eds) *Developing Systemic Functional Linguistics: Theory and application*, London: Equinox, 18–47.

Maton, K. (2005) 'A question of autonomy: Bourdieu's field approach and policy in higher education', *Journal of Education Policy*, 20(6): 687–704.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Maton, K. (2016a) 'Legitimation Code Theory: Building knowledge about knowledge-building', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 1–24.

Maton, K. (2016b) 'Starting points: Resources and architectural glossary', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 233–43.

Maton K. (2018) 'Thinking like Bourdieu: Completing the mental revolution with Legitimation Code Theory', in J. Albright, D. Hartman and J. Widin (eds) *Bourdieu's Field Theory and the Social Sciences*, London: Palgrave Macmillan, 249–68.

Maton, K. and Chen, R. T.-H. (2016) 'LCT in qualitative research: Creating a translation device for studying constructivist pedagogy', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory,* London: Routledge, 27–48.

Maton, K. and Doran, Y. J. (2017) 'SFL and code theory', in T. Bartlett and G. O'Grady (eds) *The Routledge Systemic Functional Linguistic Handbook*, London: Routledge.

Maton, K. and Howard, S. K. (2016) 'LCT in mixed-methods research: Evolving an instrument for quantitative data', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 49–71.

Maton, K. and Howard, S. K. (2018) 'Taking autonomy tours: A key to integrative knowledge-building'*, LCT Centre Occasional Paper 1* (June): 1–35.

Maton, K., Hood, S. and Shay, S. (eds) (2016a) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge.

Maton, K., Martin, J. R. and Matruglio, E. (2016b) 'LCT and systemic functional linguistics: Enacting complementary theories for explanatory power', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 93–113.

Muijs, D. and Reynolds, D. (2018) *Effective Teaching: Evidence and Practice*, Los Angeles: Sage.
Ryan, J. (2013) 'Listening to "other" intellectual traditions. Learning in transcultural spaces', in J. Ryan (ed.) *Cross-Cultural Teaching and Learning for Home and International Students*, London: Routledge, 279–89.
Smith, P. J., Coldwell, J., Smith, S. N. and Murphy, K. L. (2005) 'Learning through computer-mediated communication: A comparison of Australian and Chinese heritage students', *Innovations in Education and Teaching International*, 42(2): 123–34.
Thomson, E. A. (2014) *Battling with Words: A study of language, diversity and social inclusion in the Australian Department of Defence*, Canberra: Australian Government.
Tobias, S. and Duffy, T. M. (eds) (2009) *Constructivist Instruction: Success or failure?*, Abingdon: Routledge.
Vidal Lizama, M. (2017) 'Knowledge in your classroom: A model of analysis for specialisation codes in classroom discourse', *Onomázein*, March: 149–78.
Zhao, N. and McDougall, D. (2008) 'Cultural influences on Chinese students' asynchronous online learning in a Canadian university', *Journal of Distance Education*, 22(2): 59–80.

3

SEMANTIC WAVES

Context, complexity and academic discourse

Karl Maton

Introduction

Almost everyone in education shares a desire for knowledge that builds over time.[1] Scholars typically aim to generate ideas that retain value beyond the specificities of their original objects of study. Teachers wish their pedagogic practice to have effects beyond the initial conditions of learning so that students can build on previous understandings and transfer what they learn into future contexts. Policymakers proclaim that education must prepare students for living and working in fast-changing societies by providing the capacity to build knowledge throughout their lives. In short, cumulative knowledge-building in research, teaching and learning are at the heart of education. Conversely, debates over research and policy regularly express concern over what can be termed 'segmentalism' – when knowledge is so strongly tied to its context that it is only meaningful within that context. In research, segmentalism occurs where findings remain locked into an object of study and so fail to build knowledge; in teaching, segmentalism is where students learn highly segmented knowledges or skills. However, while almost everyone concerned with education shares the same desires, the question of how to actually achieve cumulative knowledge-building and avoid segmentalism is less clear.

This problem forms the starting point for a series of ongoing research projects bringing together Legitimation Code Theory (LCT) and systemic functional linguistics (SFL) to explore academic discourse. In this chapter I introduce some of the ideas from LCT being enacted in these projects and that have both provoked new SFL concepts that grapple with context and complexity (Chapters 4–5) and complemented SFL analyses into all manner of issues (e.g. Chapters 6–8). I begin by briefly highlighting key obstacles in education research to overcoming segmentalism: knowledge-blindness, which obscures the issue of knowledge-building itself, and typological theorizing, which cannot capture empirical practices nor embrace

change over time. In short, I argue that to understand the basis of knowledge-building we need to see the forms taken by knowledge practices in ways that are not themselves segmental, homogenizing and static.

Second, I introduce LCT as a means of conceptualizing knowledge practices that reveals their organizing principles, embraces diversity and allows us to see change over time. Specifically, I focus on concepts from the Semantics dimension, defining *semantic gravity* (exploring context-dependence) and *semantic density* (exploring complexity), and how they combine to conceptualize organizing principles underlying practices as *semantic codes*. Given the history of dialogue between SFL and the ideas of Basil Bernstein (see Chapter 1, this volume), I then briefly explicate how these concepts extend the framework inherited from Bernstein.

Third, I demonstrate how these LCT concepts are being used to explore the bases of knowledge-building and achievement in education, drawing on studies of student assessments and teaching practice. I illustrate how research is showing that high-achieving student work is typically characterized by *semantic waves* or recurrent shifts in context-dependence and complexity that weave together different forms of knowledge. This work is providing a basis for teaching more learners how to succeed at knowledge-building in their studies. I then reveal how semantic waves also offer a means for overcoming segmentalism in classrooms. Research shows that teaching practice is often characterized by a repeated pattern of unpacking abstract and complex academic discourse into context-dependent and simpler meanings. This raises the question of how this segmented knowledge can be transformed to become the relatively decontextualized and complex knowledge students must demonstrate in educational assessments to show their mastery of academic discourse. Using brief examples from History and Biology lessons I illustrate how semantic waves offer a potential means of traversing this gap in classroom practice. Lastly, I discuss the variety of forms taken by semantic waves and discuss how LCT concepts themselves enable the cumulative building of knowledge in research and practice.

Knowledge-blindness and segmental typologies

Knowledge-blindness

Much research into education is characterized by 'knowledge-blindness': knowledge as an object of study is obscured. This condition results at least partly from how psychology and sociology have influenced Anglophone educational research in recent decades (Maton 2014b: 3–8). On the one hand, psychologically-informed approaches typically construe 'knowledge' as mental processes and states of consciousness that reside within learners. 'Knowledge' is understood as ways of knowing. Accordingly, empirical research tends to explore how those ways of thinking change by studying generic processes of learning in which the nature of what is being learned is not a central concern. On the other hand, approaches informed by sociology and cultural studies typically construe 'knowledge' as reflecting power

relations among social categories of knowers (Maton and Moore 2010). The concern of research is to unmask the social power underpinning knowledge, to reveal the knowers whose interests it serves or diminishes, where the form taken by that knowledge is considered arbitrary.

Educational research has thus typically backgrounded knowledge as an object in favour of foregrounding the study of ways of knowing and knowers. What is being learned and how it shapes these processes of learning and power relations have been largely obscured. Such knowledge-blindness thus proceeds as if the nature of what is taught and learned has little relevance. Accordingly, debates over teaching have oscillated between pedagogies that are generalized across the curriculum, and knowledge-building has been typically understood generically, as accumulation of content or ill-defined skills such as 'critical thinking'. How the forms taken by academic discourse may enable or constrain cumulative teaching and learning remains relatively under-researched.

Segmental typologies

Highlighting knowledge-blindness is not to say there exist no models of knowledge. A host of thinkers, including Bourdieu, Foucault and Piaget, have distinguished everyday understandings from academic discourse and there exist numerous attempts to characterize different forms of academic discourse. For example, Biglan (1973a, 1973b) typologized disciplines into hard/soft, pure/applied, and life/non-life; Kolb (1981) offered categories of abstract/concrete and active/reflective; and Becher (1994) combined these typologies to describe the cultural and cognitive styles of researchers as disciplinary 'tribes'. Such distinctions are legion: context-independent/context-dependent; practical/theoretical; conceptual/contextual; declarative/procedural; knowledge about/knowledge of; and many more.

These models can begin to bring knowledge into view. However, in order to understand knowledge-building, one must not only see knowledge but also conceptualize changes in the forms taken by knowledge in ways amenable to empirical research. While overcoming knowledge-blindness, typologies of knowledge embody a second obstacle to doing so: segmental theorizing. Different typologies may expand or contract, overlap or integrate the types of knowledge they delineate, but nonetheless offer a series of strongly-bounded types into which relatively few empirical practices neatly fit and which struggle to capture change within or between types.

These problems are often mentioned when such models are proposed and debated. Proponents of a typology temper their advocacy by admitting, for example, that it 'cannot do justice to the complexity and variation of inquiry processes and knowledge structures in various disciplines' (Kolb 1981: 245). Critics of a typology focus on difficulties placing empirical practices into types, identify missing kinds of knowledge, and argue for further categories. Such caveats and criticisms highlight the problem but misunderstand its nature. The issue is not whether a typology offers sufficient categories to embrace the variegated and changing nature of knowledge

practices but rather that typologies cannot by themselves do so. Rather than a new typology, we need a different kind of model to augment typologies. This is soon evident to rigorous researchers: knowledge typologies make perfect sense until you attempt to analyze the real world. Usually examples offered by authors to illustrate types are sufficiently broad-brushed – often entire subject areas – to make intuitive sense. Accordingly, such typologies can be useful for thinking about knowledge practices in general. However, when engaged in analysis of complex, diverse and changing practices such as classroom pedagogy, these models prove impossible to enact. Rarely does empirical data fit neatly into the boxes of a typology – little in real-world contexts is clearly 'pure' or 'applied', 'hard' or 'soft', 'declarative' or 'procedural', and so on. Moreover, processes that unfold through time cannot be traced through typologies. Everything inside each type is homogenized and there is no way of accounting for processes of movement between types.

These limitations hold for Bernstein's model of 'discourses' and 'knowledge structures' (2000). As discussed in Chapter 1 (this volume), Bernstein's model inspired a renewed focus in SFL on knowledge in the early 2000s (Christie and Martin 2007; Christie and Maton 2011). However, problems arose when SFL scholars and educators attempted to enact the model to analyze and shape real-world practices. Few practices fitted into its dichotomies; most combined characteristics of 'hierarchical' and 'horizontal' knowledge structures; and change over time eluded the model. Bernstein himself highlighted that, at this stage of conceptual development, understanding of the principles underlying such dichotomous forms is 'very weak' in its 'generating power' (2000: 124). As I argue elsewhere (Maton 2013, 2014a, 2014b), Bernstein's approach suggests that the answer is not to abandon typologies but rather to additionally capture the organizing principles that generate the knowledge practices they delineate. Moreover, such concepts must enable research to determine difference, variation and similarity, and to explore change over time. This is an ongoing concern of LCT, to which I now turn.

Legitimation Code Theory: Semantics

Legitimation Code Theory is a sociological framework for researching and informing practice. Against knowledge-blindness, LCT construes knowledge as both socially produced and real, in the sense of having effects (Maton and Moore 2010), and so explores the effects of different forms taken by knowledge practices. Against segmental typologizing, LCT analyses these forms in terms of their underlying organizing principles. Chapter 2 (this volume) introduces how LCT construes practices as 'languages of legitimation' that embody 'messages' as to what should be legitimate, whose organizing principles are analyzed as 'legitimation codes'. The conceptual framework is structured into a series of 'dimensions' (or sets of concepts) that each explore a distinctive species of legitimation code. In this chapter I focus on the dimension of Semantics which conceives social fields of practice as *semantic structures* whose organizing principles are conceptualized as *semantic codes* that comprise *semantic gravity* and *semantic density*. I begin by defining these concepts.

Semantic gravity (SG) refers to the degree to which meaning relates to its context and may be stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less meaning is dependent on its context. For example, the meaning of the name for a specific plant in Biology or a specific event in History embodies stronger semantic gravity than that for a species of plant or a kind of historical event, which in turn embodies stronger semantic gravity than processes such as photosynthesis or theories of historical causation. Semantic gravity thus traces a continuum of strengths with infinite capacity for gradation. One can also dynamize this continuum to analyze change over time in terms of: *weakening* semantic gravity (SG↓), such as moving from the local particulars of a specific case towards generalizations; and *strengthening* semantic gravity (SG↑), such as moving from generalized ideas towards concrete and delimited cases.

Semantic density (SD) refers to the degree of condensation of meaning within practices, whether symbols, terms, concepts, phrases, expressions, gestures, clothing, etc. Semantic density may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic density (SD+), the more meanings are condensed within practices; the weaker the semantic density (SD−), the fewer meanings are condensed. Put another way, semantic density conceptualizes complexity: the stronger the semantic density, the more complex the practices. The strength of semantic density is not intrinsic to a practice but rather relates to the *semantic structure* within which it is located (and thus can change). For example, the term 'gold' commonly denotes a bright yellow, shiny and malleable metal used in coinage, jewellery, dentistry and electronics. However, within the discipline of Chemistry it is related to an atomic number, atomic weight, electron configuration and much more. Many of these meanings involve relations to other meanings as part of compositional structures, taxonomies and explanatory processes; for example, its atomic number represents the number of protons found in the nucleus of an atom, identifies it as a chemical element and situates it within the periodic table. Thus, 'gold' in Chemistry is located within a complex semantic structure that imbues the term with a greater range of epistemological meanings.[2] Another way of conceiving semantic density is in terms of 'relationality': the more relations established with other meanings, the stronger the semantic density (Maton and Doran 2017a, 2017b).

Semantic density traces a continuum of strengths, with infinite capacity for gradation. This continuum can be dynamized to describe *strengthening* semantic density (SD↑), such as moving from a term, symbol or practice condensing a small number of meanings towards one implicating a greater range of meanings. For example, bringing together places, periods, customs, beliefs, etc. as 'Mycenaean Greece' in History, or relating cell structures, proteins, pigments, etc. of a leaf to define 'photosynthesis' in Biology. Conversely, one can describe *weakening* semantic density (SD↓), such as moving from a highly condensed symbol to one involving fewer meanings. For example, unpacking technical concepts into simpler terms typically

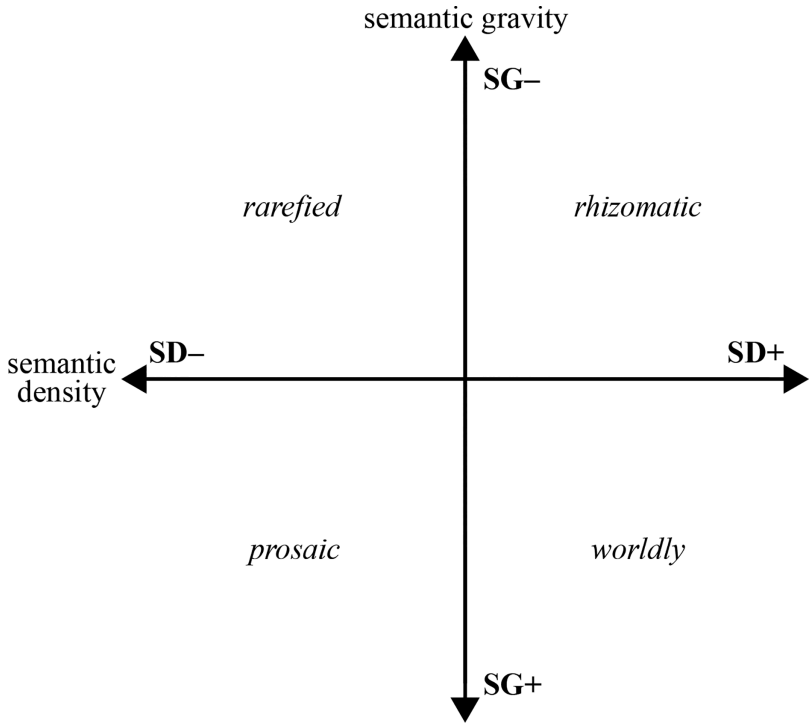


FIGURE 3.1 The semantic plane (Maton 2016: 16)

enacts a limited number of their meanings: the semantic density of the knowledge being expressed is weaker.

As will become clear, the examples given above for relative strengths of semantic gravity and semantic density are neither definitional nor definitive. The forms taken empirically by different strengths of semantic gravity and semantic density are different in each object of study and for each form of data. Accordingly, research develops 'translation devices' that translate between each of these concepts and different objects of study.[3] While these devices may involve types, 'semantic gravity' and 'semantic density' are not themselves types. *All* practices are characterized by *both* semantic gravity *and* semantic density; what differs are their strengths. These strengths may vary independently to generate *semantic codes* (SG+/−, SD+/−).

As shown in Figure 3.1, the continua of strengths of semantic gravity and semantic density can be visualized as axes of the *semantic plane* with four principal modalities:

- *rhizomatic codes* (SG−, SD+), where the basis of achievement comprises relatively context-independent and complex stances;
- *prosaic codes* (SG+, SD−), where legitimacy accrues to relatively context-dependent and simpler stances;

- *rarefied codes* (SG−, SD−), where legitimacy is based on relatively context-independent stances that are relatively simpler; and
- *worldly codes* (SG+, SD+), where legitimacy is accorded to relatively context-dependent stances that are relatively complex.

Beyond typologies: Semantic codes

Given the focus of this volume and the potential for confusion, it is worth emphasizing that the LCT dimension of Semantics is neither derived from nor directly related to 'discourse semantics' from SFL. Research may enact these two sets of concepts for complementary analyses (see Chapter 1, this volume), but they are from different frameworks. LCT concepts are entirely sociological. 'Semantic gravity' was first introduced at a Bernstein conference in 2007 and published in a collection of papers from that conference (Maton 2008, 2009); similarly, 'semantic density' was first presented at a Bernstein conference in 2008 and published in its accompanying collection (Maton 2011a).

As discussed in Maton (2009, 2011b, 2013), 'semantic gravity' and 'semantic density' originate from conceptualizing ideas left untheorized by Bernstein's framework in order to meet the demands of empirical research. Studies using other dimensions of LCT had been increasingly highlighting issues of context-dependence and complexity as significant for understanding their objects of study. Turning to Bernstein's theory for help revealed a need for conceptual development to address these issues. Context-dependence is tacit in his early work distinguishing 'elaborated codes', which 'orient their users towards universalistic meanings' and 'are less tied to a given or local structure', from 'restricted codes' that 'orientate, sensitize, their users to particularistic meanings' and 'are more tied to a local social structure' (1971: 176). Context-dependence also resurfaced obliquely in Bernstein's later distinction between segmented 'horizontal knowledge structures' and integrating, generalizing and abstracting 'hierarchical knowledge structures' (2000). Both models also hinted at the issue of condensation, albeit in different ways: the earlier distinction (1971) foregrounds 'condensed symbols' in terms of whether understandings are explicated or shared among actors and left unarticulated; and 'knowledge structures' (2000) raise questions of how ideas are interrelated in ways enabling more or less complexity of meaning.

Though touched upon by Bernstein's framework, the understanding of context-dependence and complexity remained at best tacit, entangled and descriptive. Theoretical development was needed to enable empirical research into real-world problems. Moreover, any newly developed concepts needed to be of a particular kind. Both Bernstein's early and later models offer dichotomous types (elaborated/restricted; hierarchical/horizontal). As noted earlier above, Bernstein described such types as 'very weak' in their 'generating power' (2000: 124). What was required was to explore the organizing principles underlying practices. That is what 'semantic gravity' and 'semantic density' have provided.

One example of the greater power these LCT concepts offer is their capacity to avoid a deep-seated dichotomy in educational thinking. Debates over

education have long been dominated by a recurring opposition between 'theoretical' and 'practical' forms of knowledge. These types are given a variety of names, including 'academic'/'everyday', 'uncommon sense'/'common sense', and 'vertical'/'horizontal'. The concepts of semantic codes reveal the false dichotomy underlying such models. These oppositions can be reconceptualized as representing *rhizomatic codes* (SG−, SD+) and *prosaic codes* (SG+, SD−), respectively. Put simply, each pair contrasts context-independent and complex knowledge practices with context-dependent and simpler knowledge practices. Using Figure 3.1, they only show the top-right and bottom-left quadrants of the plane. Crucially, this opposition excludes the possibility of the other quadrants: *rarefied codes* (SG−, SD−) that are context-independent but condense few meanings, such as jargon; and *worldly codes* (SG+, SD+) that are context-dependent but complex, such as professional and vocational knowledge. Semantic codes thereby allow us to see what has been hidden by dominant ways of thinking about education.

This may seem abstruse but limits on what Bourdieu (1991) called 'the space of possibles' can have serious real-world consequences. If public discourse does not distinguish between *rhizomatic codes* (SG−, SD+) and *rarefied codes* (SG−, SD−), in other words if the top half of Figure 3.1 is seen as all the same, ignoring differences in their complexity, then meaningful ideas (SD+) may become equated with meaningless claims (SD−), academic discourse (SD+) may be equated with jargon (SD−), and insight (SD+) and bullshit (SD−) viewed as equally valid. The presidential campaign of Trump and referendum campaign for Brexit offer salutory lessons here. Similarly, if *prosaic codes* (SG+, SD−) are the only form of context-dependent ideas, and so *worldly codes* (SG+, SD+) are obscured, then the possibility is denied of context-dependent practices being complex. This allows vocational education to be viewed as no more than everyday practices or as simplistic, 'dumbed-down' forms of academic discourse. Innumerable examples in public policy discourse in countries such as Australia demonstrate how the complexity (SD+) of vocational knowledge is frequently obscured.

Capturing change: Semantic profiles

Semantic codes go further than revealing additional kinds of knowledge practices – they offer a different means of theorizing that moves beyond the limitations of typologies. The semantic plane (Figure 3.1) represents a potentially infinite number of relational positions, avoiding homogenizing and strongly bounded categories. The concepts thus enable research to conceptualize differences and movements not only between but also within forms of knowledge practices. One can analyze strengthening and weakening of semantic gravity or semantic density (SG↑↓, SD↑↓) both between semantic codes (between quadrants of Figure 3.1) and within semantic codes (inside a quadrant of Figure 3.1).

This capacity to explore change is enhanced by tracing the strengths of semantic gravity and semantic density of practices over time to reveal a *semantic profile* and an associated *semantic range* between their highest and lowest strengths. Figure 3.2

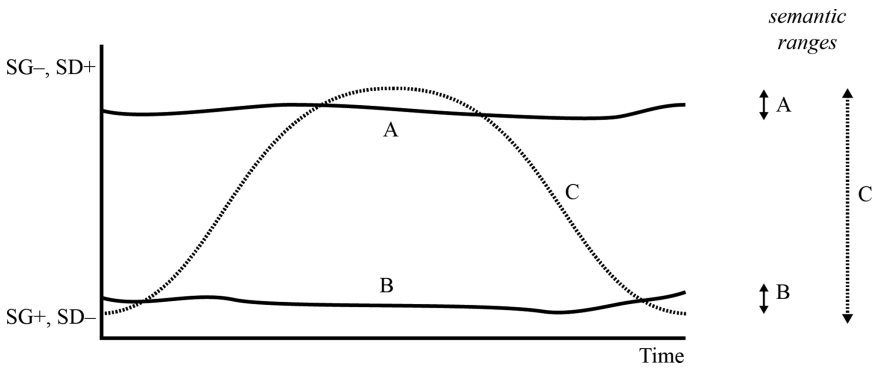


FIGURE 3.2 Three illustrative semantic profiles (Maton 2014b: 143)

portrays relative strengths on the *y*-axis, and time (such as the unfolding of classroom practice, curriculum or text) on the *x*-axis, and represents three illustrative profiles: a high *semantic flatline* (A), a low *semantic flatline* (B), and a *semantic wave* (C). Figure 3.2 also shows their respective *semantic ranges*: the flatlines 'A' and 'B' have much lower semantic ranges than the wave 'C'.

Semantic profiling can be as simple or as sophisticated as the problem demands. To introduce these ideas I shall present profiles that are relatively simple in two main ways. First, the profiles portrayed in this chapter combine semantic gravity and semantic density as a single line, with their strengths moving together inversely. This need not be the case: the two strengths may change independently and do not always move together. One may thus trace separate profiles for semantic gravity and semantic density. This reveals, among other things, where both are relatively strong or both are relatively weak, and so embraces all four semantic codes. Second, the profiles included here are intended to *heuristically* impart a sense of different kinds of movement between forms of knowledge. However, studies using these concepts are developing sophisticated instruments for calibrating profiles with precision. These 'translation devices' provide means of distinguishing different degrees of strength of semantic gravity and of semantic density (e.g. Maton and Doran 2017a, 2017b). Using these translation devices, profiles can be drawn with precision, down to the individual word, image, body movement or sound.

Nonetheless, the examples in this chapter offer a starting point for illustrating how semantic profiling reorients thinking about knowledge-building. By dynamizing analysis, it shifts the focus from types of knowledge to how knowledge changes over time. Crucially, it is also underpinning a growing body of studies into intellectual practices, curriculum, pedagogy and assessment. This has been a constant thread of concept development in LCT: concepts emerge from and for empirical research, and continue to evolve in close engagement with real-world data. Accordingly, I now illustrate their value through discussing examples from several research studies. For brevity, I confine my discussion to one conjecture emerging from research: the significance of 'semantic waves'.

Semantic waves in student work

A growing range of studies are exploring the bases of achievement in education by analysing the semantic profiles of student assessments. This research suggests that knowledge practices expressing *semantic waves* – recurrent strengthening and weakening of context-dependence and complexity – is rewarded across subject areas and levels of education as evidence of knowledge-building. For contrast, I shall briefly consider examples of the humanities in schooling and 'critical thinking' in higher education.

A compulsory unit of secondary school English for students taking the Higher School Certificate in New South Wales, Australia, requires students to explore abstract notions such as 'the journey' and 'belonging' in relation to diverse texts (Maton 2014b: 106–24). Between 2005 and 2008, students were asked to draw on three texts to answer the question: 'To what extent has studying the concept of imaginative journeys expanded your understanding of yourself, of individuals and of the world?' (Board of Studies 2006: 11). Figure 3.3 represents the semantic profiles of two essays. The high-achieving essay (the dashed line in Figure 3.3) was included in official syllabus documents as an exemplary model. This essay begins and ends by drawing on complex literary meanings (stronger semantic density) to bring together its examples in relation to a generalizing and abstract idea (weaker semantic gravity); for example, the essay begins:

> The journey, especially in the imaginative sense, is a process by which the traveller encounters a series of challenges, tangents and serendipitous discoveries to arrive finally, at a destination and/or transformation.
>
> *(Board of Studies 2006: 102)*

From this relatively high start, the essay moves down the semantic scale to describe simply the concrete particularities of each example, such as its author and main focus. It then quickly shifts upwards to more generalized and complex

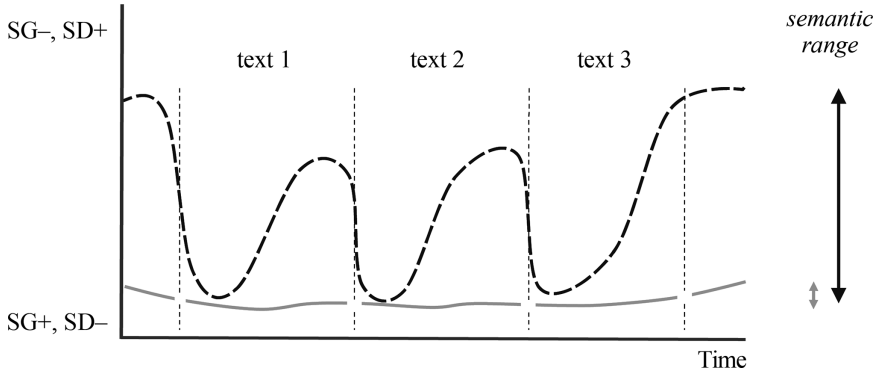


FIGURE 3.3 Semantic profiles of two student essays in school English

'literary' ideas, such as the notion of 'imaginative journeys'. For example, discussion of a text begins:

> *On Giants' Shoulders* depicts the individual lives and achievements of 12 scientists as a collective imaginative journey over the last 2,500 years. In portraying their separate profiles as one story in a chronological line up, Bragg delineates the concept of a cumulative and ongoing journey, reflected in his thesis that science is 'an extended kind of continuous investigation'.
>
> *(Board of Studies 2006: 103)*

This movement is repeated throughout the essay, tracing a series of semantic waves across its three texts (see Figure 3.3). The essay then ends even higher up the semantic scale by bringing together the more context-independent and complex meanings expressed in response to the three texts to express relatively context-independent and complex knowledge:

> I personally have learned the importance of individuals interlinking with others to achieve a greater end, and influencing or inspiring others, as inherent in the concept of scientists standing on 'giants' shoulders'.
>
> *(Board of Studies 2006: 103)*

In contrast, the low-achieving essay traces a relatively low semantic flatline.[4] Here the knowledge expressed comprises the student's immediate responses to a specific text in relation to his or her everyday life (stronger semantic gravity) and couched in non-technical, non-literary discourse (weaker semantic density). For example, discussing the novel *Ender's Game*, the student writes:

> It wasn't hard at all to imagine battle school as a real place because I was familiar with several scientific objects which surrounded us. For example, the 'Desk' sounds very familiar to a lap top computer.

The essay never moves away from expressing very concrete and simple meanings limited in space and time: it remains firmly rooted near the bottom of the semantic scale (see Figure 3.3). Even when concluding the essay, the essay does not integrate meanings; discussions of each of the three texts are kept separate: 'I took on three wonderful journeys'.

In summary, the low-achieving essay exhibits a low flatline, while the high-achieving essay traces a series of waves that weave together different forms of knowledge. The flatline embodies simpler knowledge that remains locked into the context of the individual student's personal response to a specific text at the time of reading. It does not connect with academic discourse, which would enable multiple relations with a complex constellation of meanings. It does not move beyond the limited context of a single reader with a single text. The resulting knowledge is thus highly segmental. As the broken line of Figure 3.3 depicts, there is no semantic flow

between discussions of texts. In contrast, the high-achieving essay involves building knowledge: the personal response of the student is connected to the complex constellations of academic discourse and developed into generalizations that reach beyond the limited context of the student reading a text at a particular moment in time. In short, achievement here involves demonstrating the capacity to build knowledge by connecting personal experience with academic discourse and moving beyond a specific context. This knowledge-building exhibits semantic waves.

Significantly, this profile resonates with findings of studies of other disciplines and levels of education. Szenes *et al.* (2015), for example, analyze 'critical reflection' assignments in Business and in Social Work at university. Figure 3.4 portrays an example of a high-achieving 'reflective journal' from a unit in Business. The journal comprises three principal stages. The first stage, in which the student discusses their beliefs and values ('Excavation' in Figure 3.4), is characterized by a rapid series of deep semantic waves as the journal shifts quickly between decontextualized, theoretical ideas of cultural values (such as 'individualism') and straightforward, concrete examples from the student's cultural context said to embody those values (such as the Australian cricketer Sir Donald Bradman). In the second stage, the student relates their own behaviour during teamwork with other students to these values ('Reflection' in Figure 3.4). Here semantic waves are milder: discussion of behaviour involves generalizations rather than descriptions of instances, and theoretical ideas are more context-dependent and simplified as their meanings are limited to those concerning the behaviour. In the final stage ('Transformation'), the student provides a list of generalized skills for successful participation in future teamwork situations that are claimed to embody the concept of 'intercultural competence', tracing a flatline midway between theory and empirical description.

Analysis of 'critical reflection' essays from Social Work highlight similarities and differences to the semantic profiles of Business. The profile of Figure 3.4 is repeated

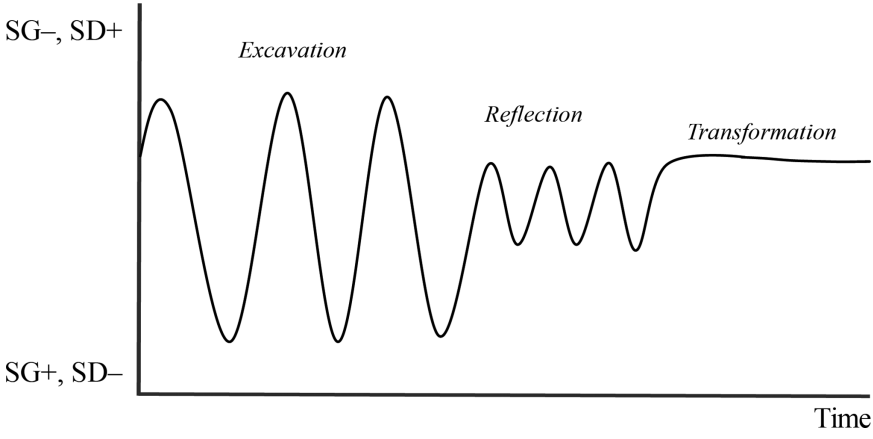


FIGURE 3.4 Semantic profile of a 'critical reflection' journal in undergraduate Business (adapted from Szenes *et al.* 2015)

in high-achieving Social Work essays but with an additional prior stage tracing a low flatline as students recount a 'critical incident' simply and concretely (Szenes *et al*. 2015). As Figures 3.3 and 3.4 suggest, the form taken by semantic waves can differ between subject areas (English/Business), kinds of assignment (essay/critical reflection journal) and level of education (school/university). I return to these differences, further below. Here, I shall highlight what is shared: semantic waves that weave together different forms of knowledge to demonstrate knowledge-building. This general finding is echoed in studies of curriculum, textbooks and student assessment across the disciplinary map, including Engineering (Wolff and Luckett 2013), English (Christie 2016), Design (Shay and Steyn 2016), History (Martin *et al*. 2010; Matruglio *et al*. 2013), Marketing (Arbee *et al*. 2014), and Physics (Georgiou 2016). Moreover, studies of intellectual practices are suggesting that semantic waves are also crucial to knowledge-building in research (Maton 2014b: 125–47; Hood 2016).

Semantic waves in classroom practice

While semantic waves may characterize achievement in education, the ability to wave is unevenly distributed across society. Major studies of student dispositions have yet to be conducted with semantic codes, but findings from research that used Bernstein's concepts are highly suggestive. For example, re-analysis of Holland's study of students (1981) suggests that students from social classes have different semantic coding orientations (Maton 2014b: 204–5). In other words, students come to education with dispositions that encompass different semantic ranges. Similarly, Hasan's major study of caregiver-child interactions (2009) highlights differences in the ability to move between concrete, simpler meanings and abstract, generalized and complex meanings. Among the questions such 'semantic variation' raises for education are whether classroom practices help model semantic waving and weaving to all students and, if not, how they can do so. These issues have been broached in major studies that bring together LCT and SFL as complementary frameworks to explore teaching and learning practices in History and Science lessons from all years of secondary schooling.[5]

One semantic profile we frequently found in these studies is depicted in Figure 3.5: a series of downshifts from context-independent and complex ideas (SG−, SD+) towards simpler and more concrete understandings, often including examples from everyday life (SG+, SD−). The practices associated with this profile typically involved teachers repeatedly unpacking and exemplifying meanings from written sources. For example, when reading together through a text or source, teachers often explained complex ideas and technical words to students using simpler, more everyday language and examples, and then returned to the text, finding more points to unpack and discuss. This traces a series of downshifts or 'down escalators'. However, rarely, if ever, did teachers move back up into academic discourse by repacking meanings and examples into more technical terms. Thus, teaching practice here models movements downwards but not back upwards from non-technicalized,

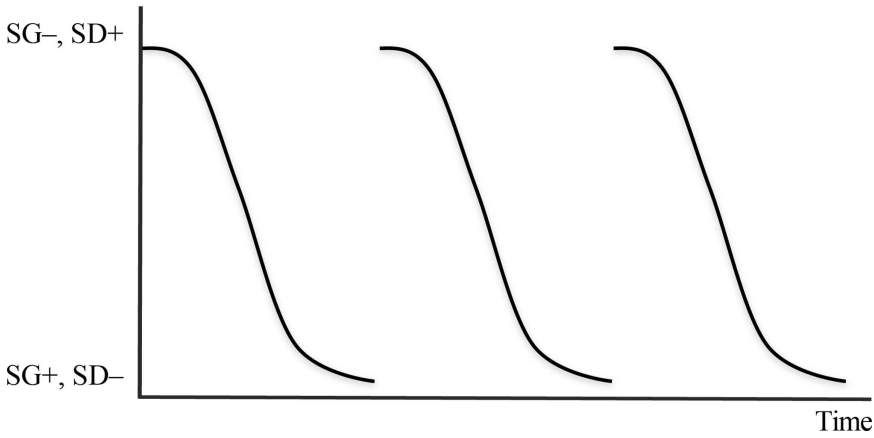


FIGURE 3.5 A 'down escalator' profile

concrete and often segmented knowledge towards more complex, technicalized knowledge that is plugged into the constellations of meanings constituting academic discourse. This represents a problem for overcoming segmentalism: knowledge characterized solely by stronger semantic gravity and weaker semantic density may be too tied to specific contexts and too disconnected from other meanings to either build upon previous knowledge or be built upon in the future.

This was not, however, the only semantic profile we discovered in classroom practice. Though less common, the study found teaching that also modelled upshifts and so created semantic waves in the academic discourse being expressed. Moreover, these semantic waves also model how meanings may be transformed through semantically weaving together different forms of knowledge. To illustrate these shifts I shall explicate a single semantic wave in two brief examples from Biology and History.[6]

Examples of semantic waves

The first example is from a Year 11 Biology classroom in which the topic of discussion is 'biological lines of defence', focusing on the 'cilia':

Teacher Okay [student name], what are the 'cilia'. What was it? No? [Student name] do you know what cilia is? No? Someone must know what they are . . .

Student Hairs

Student The little hairs?

Teacher The little hairs. And basically, they beat in an upward motion from inside your body out through to your nose. [Teacher waves arms upwards]. So, they beat up and they take the pathogens away with them. And, guys, I don't know if I've ever told you this, but when you smoke cigarettes,

> the tar actually causes your cilia to, because it's so heavy, to drop, and so your cilia don't work properly after that because they're too heavy, they've dropped, so they can't beat the pathogens out of your body! So that's one reason that smoking's bad as well. Okay! Alright, write this down under description!

Figure 3.6 portrays the semantic profile of this classroom interaction. It begins with the teacher introducing 'cilia', an abstract scientific term that condenses a wide range of meanings within Biology (see Martin 2013). The context of the Science classroom, the teacher's request for a definition, and the unfamiliarity of the word announce its relatively high position on the semantic scale ('*concept*' in Figure 3.6). With contributions from students, the teacher then unpacks some of the meanings condensed within the term using previously learned concepts ('pathogens'), everyday language ('the little hairs') and body language (waving her arms). With the effects of smoking, she also provides a concrete example from everyday life. Locating the 'cilia' in the body and setting limits to its functions strengthens semantic gravity; unpacking the term by outlining a small number of its meanings represents weaker semantic density. As shown by Figure 3.6 ('*unpacking*'), this moves the knowledge being expressed down the semantic scale towards more grounded and less complex meanings (SG+, SD−).

I should emphasize that to view the unpacking of academic discourse as weakening its semantic density is *not* to negatively evaluate such activity. Translating a technical term into common sense knowledge reduces its range of meanings, but that is the teacher's purpose here: to provide a point of entry for students into those complex meanings. This represents a potential starting point for the teacher and students to progressively strengthen its semantic density through elaborating, extending and refining additional meanings, such as locating the term within systems of composition, taxonomies and processes. The 'down escalator' profile discussed

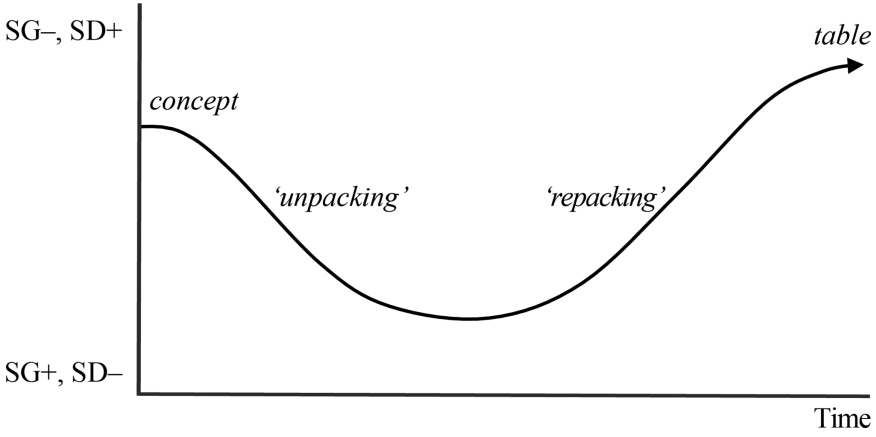


FIGURE 3.6 Example of a semantic wave in Biology teaching

TABLE 3.1 Example of a semantic wave in Biology teaching

cilia	Hair-like projections from cells lining the air passages	Move with a wavelike motion to move pathogens from the lungs until they can be swallowed into the acid of the stomach

earlier eschews this possibility by returning to the start of the sequence and commencing a new round of unpacking. However, in this example the teacher engages in 'repacking' knowledge into the term.

The excerpt ends with the teacher telling the students to 'write this down under description'. At this point the teacher writes on the board what is shown here as Table 3.1: 'cilia', a brief definition and a description of a function they serve in the body. This is more than a summary of the unpacking; it begins to repack the term 'cilia' by bringing together meanings without specific contexts such as smoking. In other words, it begins moving the knowledge being expressed back up the semantic scale – '*repacking*' in Figure 3.6. This achieves a semantic wave. Indeed, the upshift reaches beyond the level of the term 'cilia' because this definition forms part of a larger table (reproduced here as Table 3.2) that the teacher and students are working through together to learn about biological lines of defence. This table reveals a greater range of relations within which the term 'cilia' is embedded, including biological processes and causal explanations (for example, 'cilia' form part of the workings of 'chemical barriers'). Thus, in Figure 3.6 '*table*' is shown higher than '*concept*' because it embodies more generalized and complex knowledge. As the table shows, the semantic wave thus forms part of a longer sequence in which teaching and learning builds on previously discussed ideas that are also taken forward into the future.

It should be emphasized that the example from Biology is only one form of semantic wave. To illustrate this diversity, the second example is from a Year 11 History classroom in which a take-home assignment on 'the influence of Greek and Egyptian cultures in the Roman Empire' is being discussed. The question includes terms from the academic discourse of History characterized by weaker semantic gravity and stronger semantic density: 'Greek culture', 'Egyptian culture' and 'Roman Empire' embrace a range of meanings concerning time periods, locations, practices, beliefs, etc. Moreover, the question condenses more than the sum of its terms: explicating 'influence' requires understanding historical processes of causation. The knowledge evoked by the question thereby sits relatively high up the semantic scale.

The teacher begins the activity by highlighting the difficulty of the question, indicating the knowledge being discussed is relatively high on the semantic scale:

Teacher This is a little bit hard: 'The influence of Greek and Egyptian cultures.' What does that mean? What would the influence of Greek and Egyptian cultures mean, okay? No idea, right?

TABLE 3.2 Biology teacher's table entry for 'cilia'

Line of defence	*Description*	*What it does*
skin	Skin continuously grows by new cells being produced from below. Cells fit tightly together to form a protective layer covered by dead cells.	When unbroken skin prevents the entry of pathogens. Pores in the skin secrete substances that kill microbes. Skin constantly (lakes off carrying microbes away. It is a difficult environment for a pathogen to grow (no water).
mucous membrane	Cells lining the respiratory tract and openings of the urinary and reproductive systems that secrete a protective layer of mucous.	
cilia	Hair-like projections from cells lining the air passages	Move with a wavelike motion to move pathogens from the lungs until it can be swallowed into the acid of the stomach
chemical barriers	Acid in the stomach, alkali in the small intestine, the enzyme lysozyme in the tears.	Stomach acid destroys pathogens including those that are carried to the throat by cilia and then swallowed. Alkali destroys add resistant pathogens. Lysozyme dissolves the cell membranes of bacteria.
other body secretions	Secretions from sweat glads and oily secretions from glands in hair follicles.	Contain chemicals that destroy bacteria and fungi.

Figure 3.7 thus depicts the profile as beginning relatively high ('*question*'). The teacher then moves the knowledge being expressed down the semantic scale in stages ('*unpacking*' in Figure 3.7) by providing a series of examples of 'influence':

Teacher What it means is, if we started to look at all the things in Pompeii and Herculaneum, what objects may be showing Greek design? Or Egyptian design? Or Greek mythology? Or Egyptian mythology? Or what building techniques like columns? Are there Greek columns? Do, you know, are the themes of their artwork reflecting it?

With the examples of 'objects' that 'may be showing Greek design', 'Egyptian design', 'Greek mythology' and 'Egyptian mythology', the knowledge expressed

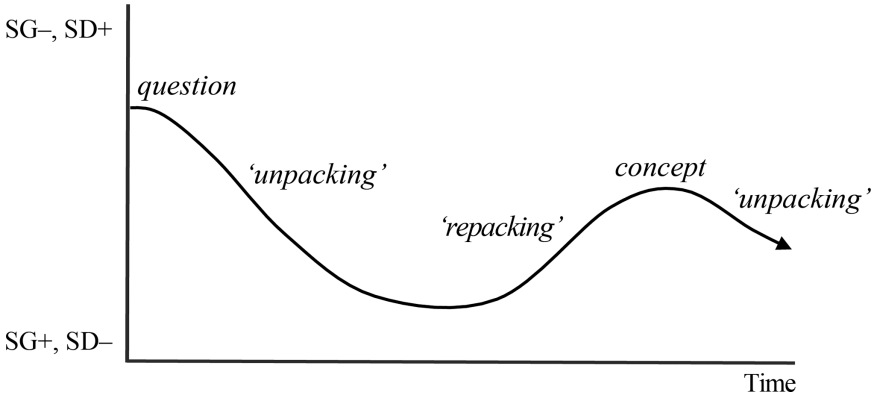


FIGURE 3.7 Example of a semantic wave in History teaching

by the teacher begins to move down the semantic scale by specifying and unpacking meanings from the wide-ranging, abstract terms of the question, a move continued by the more specific and concrete example of 'building techniques' and 'columns', which is in turn exemplified by 'Greek columns'. The teacher also grounds the question in the historical period (through examples of prior events in history) and the current discussion of the question in the context of previous lessons:

Teacher So, it's saying… remember when we started, we said that Pompeii had originally been settled by Greeks? Okay? And if we look at where Italy is, it's not that far from Egypt at this time, umm, we've, we've had, umm… Cleopatra has been killed by the time the volcano erupts, she and Mark Antony are dead and Egypt is part of the Roman Empire.

Thus far, the teacher has downshifted the knowledge being expressed. However, rather than return to the question and repeating this procedure (in the manner of 'down escalators'), she moves back up the semantic scale:

Teacher So there would be massive amounts of trade going on, and umm, you know people visiting their diplomats you know or their, their, ambassadors… like their envoys and things like that all going back and forth across the countries. So, ideas. When you get trade in ideas – you wouldn't have heard this word before – we call it 'aesthetic trade'. Have you heard of it? Yeah.
Student You told us before.
Teacher Ohh! Told you before great, *excellent*! You remember aesthetic trade!

This discussion weakens semantic gravity by discussing recurrent events (trade and diplomatic visits) rather than specific events, and strengthens semantic density

by 'packing up' various activities being conducted between countries into 'trade in ideas' and then into the technical term 'aesthetic trade' (see '*repacking*' to '*concept*' in Figure 3.7). Though this does not return to the heights embodied by the question, this upshift almost completes a semantic wave to explain one key aspect of 'influence'.

As with the Biology example, a semantic profile is typically part of a bigger picture, set within preceding and subsequent practices. In this example, the knowledge being expressed shifts down the scale again: the teacher provides examples of the concept of 'aesthetic trade' and emphasizes how 'hard' questions can be 'unpacked' in this way:

Teacher So that's what that one is. It looks hard, but all you've gotta do is have a look and think what things are there. Let me give you a big clue some of them are massive. [Teacher sings…] Laah-la-lah-la- la-la-la-la-lahh, la-lah

Student Theatres

Student La-lahh

Teacher Theatres. Okay, theatres are a Greek design. The Greeks invented the theatre, and then the Romans take the idea because they like it too. So, some of them are very obvious.

The teacher thus transforms academic discourse into everyday discourse and then back again, weaving together different forms of knowledge to explain a key aspect of the knowledge students are being asked for by the question. In particular, the passage illustrates how the teacher modelled not only downshifting but also upshifting from simpler, contextualized meanings towards more complex, decontextualized meanings.

Waves upon waves

Though specifying and 'unpacking', generalizing and 'repacking' may be valuable pedagogic strategies, the principal point of the preceding examples is not to identify exemplary practices. There are many other ways to move up and down the semantic scale. Rather, the point is to illustrate how the knowledge being expressed embodies semantic waves. While I have illustrated waves at a micro-level of short passages of practice, semantic profiles can be traced at any level: an individual exchange, a phase of activity, a lesson, a unit of study, a course, a subject curriculum, an entire educational career, and so on. Which level is useful for an analysis depends on the problem-situation. Bringing levels together may also help provide insights into knowledge-building: as one moves from micro through meso to macro levels, profiles may reveal waves within waves. For example, a recent major study is analyzing whole units of study – 4–6 hours of lesson time – in Science and History in Years 7, 8 and 9.[7] The preceding examples each lasted one or two minutes of lesson time; Figure 3.8 portrays the semantic profile of four lessons that total six hours of lesson

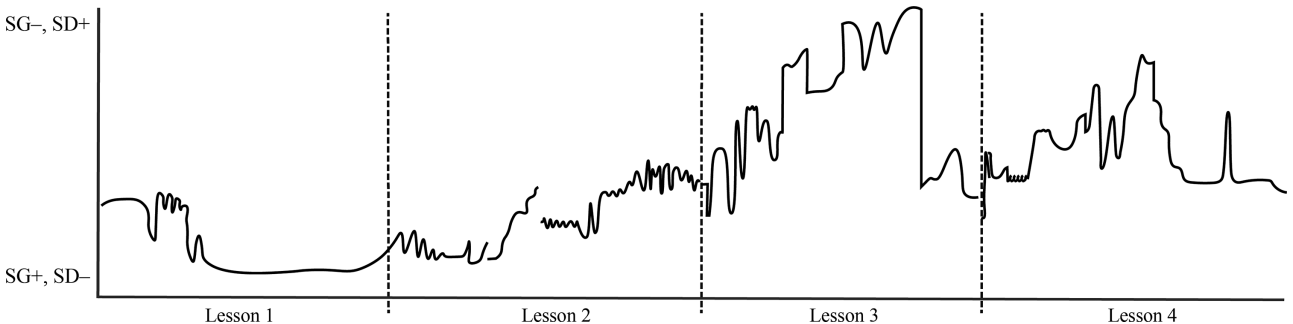


FIGURE 3.8 Profile of six hours of Year 7 Science lessons at Lauda School

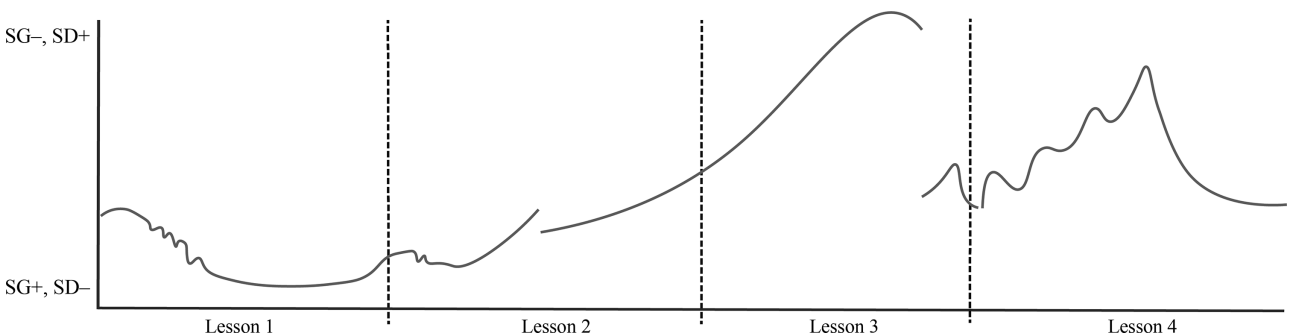


FIGURE 3.9 Trendline for Year 7 Lauda School Science lessons

time. This unit of study is from Year 7 Science, on the causes of Earth's seasons. We can also move between levels. One could zoom into a specific passage in Figure 3.8 and analyze semantic shifts in greater detail. This would reveal, for example, that the semantic waves generated by this teacher at the start of lesson 2 involves smaller waves as the knowledge being expressed moved upwards and downwards – waves within waves. Conversely, one could take a broader-brushed view: Figure 3.9 portrays the trend line for these lessons, revealing a giant cresting wave over the first three lessons, from which a new wave begins that builds on one aspect of the knowledge built up thus far. Space precludes discussing this analysis in greater detail here; the point is that micro-waves are not the only level of analysis for semantic profiling. One can also analyze macro-waves and relations between the different levels, to help reveal how clauses, phases, lessons and beyond each contribute to knowledge-building. Indeed, ongoing studies of longer timeframes are suggesting that overcoming segmentalism involves a fractal pattern of waves within waves (or waves upon waves).

Teaching semantic waves

If semantic waves are a key to knowledge-building and achievement in education, and if the ability to wave is not equally shared among learners of different backgrounds, then teaching students how to master semantic waves is an urgent task. Accordingly a growing number of educators are embedding these ideas into curriculum, pedagogy and assessment. Some examples of ongoing practice include:

- academic development programmes in numerous universities across South Africa and teacher training courses in Australia, Denmark and South Africa are empowering university lecturers and future schoolteachers, respectively, with LCT tools for shaping their curriculum design and teaching practice;
- individual teachers in subjects as diverse as chemistry, jazz music, engineering and ballet are using semantic waves to teach students how to succeed;
- a new engineering faculty created by private 'Multiversity' provider STADIO is being created that uses LCT to shape all aspects of practice, from curriculum to the building design;
- curriculum in subjects from a Diploma in Youth Work in Australia to English for Academic Purposes programmes in China are being structured to ensure knowledge is sequenced in waves that progressively extend the semantic range of students; and
- students in Australia, the UK, Poland, Mexico, the USA and many other countries are being taught to use semantic profiles to analyze what their assignments are asking and to support their writing.

Valuably, a growing number of these innovative practices are being written up for publication, enabling insights into how students can be supported to achieve semantic waves, including in History (Macnaught *et al.* 2013), Chemistry (Blackie

2014), Political Science (Clarence 2016), English for Academic Purposes (Kirk 2017), and Biology (Mouton and Archer 2019). These practices are revealing both the widespread applicability of semantic profiles for empowering teachers and students across the institutional and disciplinary maps of education and the manifold diversity of semantic waves. They are generating not one-size-fits-all pedagogies, but rather bespoke means for knowledge-building that attend to the specificities of the practices at hand. I now turn to consider this diversity.

Different semantic waves

Semantic waves can take many forms. As mentioned above, studies are revealing the diverse nature of semantic waves generated by a series of features, including range, directional shifts, entry and exit points, flow, and threshold.

First, in terms of *semantic range*, though the limited nature of flatlines may be problematic, it is not a simple case of 'the higher the better'. For example, research into undergraduate physics (Georgiou *et al.* 2014) reveals that students may reach too high up the semantic scale in their assessed work, using concepts, principles, equations or laws that are overly generalizing or which condense more meanings than appropriate to their assignment. This 'Icarus effect' suggests one facet of being inducted into a subject area is learning the semantic range appropriate to addressing different kinds of problem-situations.

Second, though both upward and downward shifts are required for cumulative knowledge-building, the directions of *semantic shifts* may play different roles across academic subjects. This chapter has emphasized the significance of upshifts for classroom practices because of their relative neglect. However, research into professional education (e.g. Shay and Steyn 2016) suggests that downshifts may be crucial in teaching and learning appropriate ways to select, recontextualize and enact abstract and complex knowledge within concrete and specific cases of professional practice. Where the key is application of knowledge in specific contexts, downshifting may be crucial.

Third, semantic waves do not always look like the examples discussed in this chapter (all of which started and ended high). They may begin and end at other points on the semantic scale. For example, starting from concrete and simpler meanings may offer students a more engaging way in and out of the central focus of an activity. Similarly, practically-oriented subjects, such as vocational education, often begin and end with concrete examples and simpler meanings, creating bell-shaped waves. Ongoing research is thus exploring the role of different *entry points* and *exit points* in research publications, lessons, student assignments, etc.

Fourth, while the classroom examples exhibited relatively strong *semantic flow* or connectedness between consecutive points, this is not always the case. Knowledge expressed in practices may involve disconnected shifts up and down, such as unexplained jumps between theories and data or concepts and examples, or minimally linked moves that create vertiginous shifts in the context-dependence and complexity of meanings. This can offer insights into, for example, problems experienced in

successfully integrating theory and examples by students in assignments, by teachers in their teaching practice, and by research in relating concepts to data.

Last, the *semantic threshold,* or extent to which accuracy matters, may vary. Ongoing research suggests that the degree of this threshold differs across subject areas and through stages of education. For example, the definition of the function of 'cilia' offered by the teacher earlier in this chapter is not entirely correct: it too closely relates the respiratory system to the gastro-intestinal system. At this stage of the curriculum, however, it is within the bounds of semantic threshold: too much accuracy, entailing considerably more knowledge, could become confusing for students at this point. Further research may show that such simplified definitions are later elaborated and clarified as students progress through the curriculum, raising the semantic threshold.

In addition, the nature of the threshold may change. This chapter has discussed only epistemic-semantic gravity and epistemic-semantic density, where the knowledge comprises formal definitions and empirical descriptions. Here, semantic threshold concerns epistemological accuracy. However, there are other forms, such as axiological-semantic gravity and axiological-semantic density based on affective, aesthetic, ethical, political or moral stances (Maton, 2014b: 153–70). In these cases, having the right political or moral attitude may be crucial. For example, in educational research the notion of 'student-centred learning' is condensed with political connotations (Maton 2014b: 148–70) and analyses of History lessons reveal the moral meanings condensed within such terms as 'colonialism', 'nationalism' and 'imperialism' (Martin *et al.* 2010). In effect, this is to bring together Semantics with Specialization (see Chapter 2, this volume): epistemological forms concern epistemic relations and axiological forms concern social relations. Space precludes discussing this issue further here; the point is that there are more forms that semantic profiles can take, not only in terms of their shape but also in terms of what kinds of knowledge are involved.

Conclusion

Almost everyone in education shares a desire for cumulative knowledge-building, but this requires tools that can explore the organizing principles of knowledge practices. This chapter has introduced and exemplified concepts from the LCT dimension of Semantics. It has only touched the surface of how Semantics can help access academic discourse: the dimension includes more concepts and they can be used in more ways than have been discussed here. However, it does illustrate how Semantics can shed light on cumulative knowledge-building. Specifically, the chapter focused on the conjecture that semantic waves represent a key to cumulative development by enabling the recontextualization of knowledge through time and space. This also highlights that what may be powerful is not one form of knowledge, such as 'theoretical' or 'practical' knowledge, but rather how different forms are related and changed. In short, power resides in *semantic waves* that *weave* together and transform knowledges.

I have, however, emphasized that there is much more to be discovered. As discussed earlier above, semantic waves may take many forms – more research is required into the specific semantic profiles of different subject areas and stages of curriculum. Moreover, the concept of semantic threshold offers the salutary lesson that semantic waves may be a necessary but not sufficient condition for success, that 'getting it right' (whether epistemologically or axiologically) may be crucial. This also highlights the significance of working with subject specialists, and that building knowledge requires mastering both its form and its content. It is why, for example, pedagogic interventions enacting LCT are conducted collaboratively with subject-specialist teachers (e.g. Macnaught *et al*. 2013). Other issues for research include exploring the semantic codes of actors. As shown by the essays discussed earlier above, not all students recognize that semantic waves are a crucial aspect of assignments and/or realize such a profile in their written assessments. More generally, not everyone is equally capable of enacting the semantic codes required for achievement. As illustrated in Chapter 2 of this volume, practice is the meeting of two sets of codes: those defining the context and those characterizing actors' dispositions. More research is required into coding the dispositions that students bring to contexts by virtue of their past experiences, to reveal who is predisposed to succeed or fail and to suggest ways forward to achieve greater social justice in education. Different groups of knowers may require different ways of teaching them how to achieve the semantic profiles necessary for success.

Our understanding of semantic profiles is still at an early stage. However, this is not the final chapter: it develops ideas for further development; it contributes to a wider work-in-progress by a diverse range of scholars in LCT. Moreover, as this body of work is showing, the ideas outlined here provide a basis for exploring these issues further. Turning the tools of Semantics upon themselves helps explain this productivity: the concepts embrace an extensive semantic range, from abstract, generalizing, highly condensed and complex meanings as part of the wider sociological framework of LCT, to concrete, specific and simpler meanings in practical applications. As a growing number of studies illustrate, they can be enacted within research into a wide array of problem-situations. The concepts thereby enable analyses of an expanding range of apparently different phenomena to be brought together, highlighting their underlying uniformities and differences. As a whole, research practice in LCT thus itself embodies semantic waves to build knowledge about knowledge-building.

Notes

1 This paper builds on ideas presented in Maton (2013, 2014a).

2 There is more than one kind of semantic density. Here (and throughout this chapter) I discuss *epistemic–semantic density* based on the *epistemological condensation* of formal definitions and empirical descriptions (Maton and Doran 2017a, 2017b). It is worth noting that practices with weaker epistemic-semantic density may exhibit stronger *axiological-semantic density* based on *axiological condensation* of affective, aesthetic, ethical, political or moral stances (Maton 2014b: 153–70). In other words, this is not a deficit model of, for example, everyday understandings.

3 See Maton and Chen (2016) on how to develop 'specific translation devices' for a particular study; Chapter 2 (this volume) offers an example of a specific translation device for specialization codes; and Maton and Doran (2017a, 2017b) offer examples of 'generic translation devices' (capturing very general phenomena) for relating 'epistemic-semantic density' to English discourse.
4 This essay was collected for a major study discussed in Christie and Derewianka (2010).
5 Two major studies are the 'DISKS' project and the 'PEAK' project (see further below).
6 I draw here from the 'DISKS' project – Australian Research Council Discovery Project, DP0988123, Chief Investigators: Peter Freebody. J. R. Martin and Karl Maton.
7 I draw here on analyses from the 'PEAK' project – Australian Research Council Discovery Project, DP130100481, Chief Investigators: Karl Maton, J. R. Martin, Len Unsworth and Sarah K. Howard.

References

Arbee, A., Hugo, W. and Thomson, C. (2014) 'Epistemological access in Marketing – a demonstration of the use of Legitimation Code Theory in higher education', *Journal of Education*, 59: 39–63.

Becher, T. (1994) 'The significance of disciplinary differences', *Studies in Higher Education*, 19(2): 151–61.

Bernstein, B. (1971) *Class, Codes and Control* (Vol. I), London: Routledge & Kegan Paul.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique* (revised edition), Oxford: Rowman & Littlefield.

Biglan, A. (1973a) 'The characteristics of subject matter in different academic areas', *Journal of Applied Psychology*, 53(3): 195–203.

Biglan, A. (1973b) 'Relationships between subject matter characteristics and the structure and output of university departments', *Journal of Applied Psychology*, 53(3): 204–13.

Blackie, M. (2014) 'Creating semantic waves: Using Legitimation Code Theory as a tool to aid the teaching of chemistry', *Chemistry Education Research and Practice*, 15: 462–9.

Board of Studies, New South Wales (2006) *Higher School Certificate Examination 2005, English, Paper 1 – Area of Study: Student answers*, Sydney: Board of Studies.

Bourdieu, P. (1991) 'The peculiar history of scientific reason', *Sociological Forum*, 6(1): 3–26.

Christie, F. (2016) 'Secondary school English literary studies: Cultivating a knower code', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 158–75.

Christie, F. and Derewianka, B. (2010) *School Discourse: Learning to write across the years of schooling*, London: Continuum.

Christie, F. and Martin, J. R. (2007) (eds) *Language, Knowledge and Pedagogy: Functional linguistic and sociological perspectives*, London: Continuum.

Christie, F. and Maton, K. (2011) (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum.

Clarence, S. (2016) 'Exploring the nature of disciplinary teaching and learning using Legitimation Code Theory Semantics', *Teaching in Higher Education*, 21(2): 123–37.

Georgiou, H. (2016) 'Putting physics knowledge in the hot seat: The semantics of student understandings of thermodynamics', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 176–92.

Georgiou, H., Maton, K. and Sharma, M. (2014) 'Recovering knowledge for physics education research: Exploring the "Icarus effect" in student work', *Canadian Journal of Science, Mathematics, and Technology Education*, 14(3): 252–68.

Hasan, R. (2009) *Semantic Variation: Meaning in society and in sociolinguistics*, London: Equinox.
Holland, J. (1981) 'Social class and changes in the orientations to meanings', *Sociology*, 15(1): 1–18.
Hood, S. (2016) 'Ethnographies on the move, stories on the rise: Methods in the humanities', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 117–37.
Kirk, S. (2017) 'Waves of reflection: Seeing knowledge(s) in academic writing', in J. Kemp (ed.) *EAP in a Rapidly Changing Landscape*, Reading: Garnet.
Kolb, D. A. (1981) 'Learning styles and disciplinary differences', in A. Chickering (ed.) *The Modern American College*, San Francisco: Jossey-Bass, 232–55.
Macnaught, L., Maton, K., Martin, J. R. and Matruglio, E. (2013) 'Jointly constructing semantic waves: Implications for teacher training', *Linguistics and Education*, 24(1): 50–63.
Martin, J. R. (2013) 'Embedded literacy: Knowledge as meaning', *Linguistics and Education*, 24(1): 23–37.
Martin, J. R., Maton, K. and Matruglio, E. (2010) 'Historical cosmologies: Epistemology and axiology in Australian secondary school history discourse', *Revista Signos*, 43(74): 433–63.
Maton, K. (2008) 'Gravité sémantique et Apprentissage segmenté', in P. Vitale and D. Frandji (eds) *Enjeux Sociaux, Savoirs, Langage, Pedagogie*, Rennes: University of Rennes Press, 151–68.
Maton, K. (2009) 'Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building', *British Journal of Sociology of Education*, 30(1): 43–57.
Maton, K. (2011a) 'Knowledge-building: Analysing the cumulative development of ideas', in G. Ivinson, B. Davies and J. Fitz (eds) *Knowledge and Identity*, London: Routledge, 23–38.
Maton, K. (2011b) 'Theories and things: The semantics of disciplinarity', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 62–84.
Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.
Maton, K. (2014a) 'Building powerful knowledge: The significance of semantic waves', in B. Barrett and E. Rata (eds) *Knowledge and the Future of the Curriculum: International studies in social realism*, London: Palgrave Macmillan, 181–97.
Maton, K. (2014b) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.
Maton, K. and Chen, R. T.-H. (2016) 'LCT in qualitative research: Creating a translation device for studying constructivist pedagogy', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 27–48.
Maton, K. and Doran, Y. J. (2017a) 'Semantic density: A translation device for revealing complexity of knowledge practices in discourse, part 1 – wording', *Onomázein Special Issue*, March: 46–76.
Maton, K. and Doran, Y. J. (2017b) 'Condensation: A translation device for revealing complexity of knowledge practices in discourse, part 2 – clausing and sequencing', *Onomázein Special Issue*, March: 77–110.
Maton, K. and Moore, R. (2010) (eds) *Social Realism, Knowledge and the Sociology of Education: Coalitions of the mind*, London: Continuum.
Matruglio, E., Maton, K., and Martin, J. R. (2013) 'Time travel: The role of temporality in enabling semantic waves in secondary school teaching', *Linguistics and Education*, 24(1): 38–49.

Mouton, M. and Archer, E. (2019) 'Legitimation code theory to facilitate transition from high school to first-year biology', *Journal of Biological Education*, 53(1): 2–20.

Shay, S. and Steyn, D. (2016) 'Enabling knowledge progression in vocational curricula: Design as a case study', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 136–57.

Szenes, E., Tilakaratna, N. and Maton, K. (2015) 'The knowledge practices of critical thinking', in M. Davies and R. Barnett (eds) *The Palgrave Handbook of Critical Thinking in Higher Education*, London: Palgrave Macmillan, 573–91.

Wolff, K. and Luckett, K. (2013) 'Integrating multidisciplinary engineering knowledge', *Teaching in Higher Education*, 18(1): 78–92.

PART II

Systemic functional linguistics: Responses to LCT

4

REVISITING MODE

Context in/dependency in Ancient History classroom discourse

J. R. Martin and Erika Matruglio

Dialogue[1]

Over the past decade dialogue between systemic functional linguistics (SFL) and Legitimation Code Theory (LCT) about the nature of knowledge (Christie and Martin 2007; Christie and Maton 2011) has rekindled interest among the linguists involved in the register variable field (e.g. Martin 2007; Martin *et al.* 2010). More recently, as part of an interdisciplinary project focusing on knowledge-building in secondary school History and Science lessons (Freebody *et al.* 2008; Martin and Maton 2013), Maton's work on 'semantic gravity' (2013) has rekindled interest in mode. For Maton, one way of introducing the concept of 'semantic gravity' is to draw on work by Bernstein (2000), who highlighted the relation between knowledge practices and their social and symbolic context, with differences in context-dependence forming a key part of the description:

> One can thus conceptualize practices in terms of the degree to which meaning relates to its context. This *semantic gravity* may be relatively stronger or weaker along a continuum. When semantic gravity is stronger, meaning is more closely related to its social or symbolic context of acquisition or use; when it is weaker, meaning is less dependent on its context. One can also describe processes of *strengthening* semantic gravity, such as moving from abstract or generalized ideas towards concrete and delimited cases, and *weakening* semantic gravity, such as moving from the concrete particulars of a specific case towards generalizations and abstractions whose meanings are less dependent on that context.
>
> *(Maton 2014: 110; original emphases)*

Maton goes on to illustrate different strengths of semantic gravity with respect to the development of key concepts in Bernstein's thinking, as empirical features

of pedagogic discourse are generalized and abstracted along a scale involving: hierarchy, sequencing rules, criteria; visible and invisible pedagogies; classification and framing; pedagogic codes; and ultimately his pedagogic device.

Bernstein and Maton's use of the notion of 'context-dependence' naturally invites a response from functional linguists who have theorized comparable terminology for some decades. Hasan (1973) explores the linguistic meaning of the term in relation to Bernstein's characterization of elaborated and restricted codes; and Hasan (2001) elaborates this discussion, particularly in relation to work by Cloran (1994, 1995, 1999a, 1999b, 2000). As these discussions reveal, dialogue around the sociological and linguistic meaning of the term exemplifies both the fruits and perils of interdisciplinary dialogue in general – as points of contact and inspiration potentially give rise to misunderstanding and confusion. In this chapter we shall take this dialogue as an opportunity to raise questions about the use/s of the term 'contextual dependency' in a functional model of language,[2] and then return to the question of the complementarity of linguistic and sociological perspectives.

Contextual dependency

In SFL a narrow perspective on contextual dependency arises from work on cohesion (Halliday and Hasan 1976; Martin 1992), with respect to what Halliday and Hasan term reference in particular. In this work the concept of exophoric reference is deployed,[3] whereby the identity of people, places and things presumed in discourse is recoverable from the shared sensible environment of a text. For example, in a request like *Could you pass **the salt**?*, spoken at the dinner table, the definite article *the* marks the identity of the salt participant as recoverable from the shared visual field of diners, and it would be odd to say *There's **some salt** in front of you. Could you pass it to me?* (unless the salt was an **un**shared visible experience). This narrow reading of context dependency has been shown to be a significant sociolinguistic variable in studies of semantic variation by Hawkins (1977) in relation to Bernstein's code theory, by Rochester and Martin (1977) in relation to schizophrenic discourse, and by Martin (1983) in relation to the development of storytelling by primary school children – since speakers, depending on their social background, mental well-being and age, appear to make different assumptions about what can and cannot be treated as recoverable from the material (i.e. physical and biological environment) of an utterance.

In general, however, SFL linguists have preferred a wider reading of the term contextual dependency. Hasan (1973: 284) characterizes context-dependent language as language 'that does not encapsulate explicitly all the features of the relevant immediate situation in which the verbal interaction is embedded'; context-independent language has the opposite meaning, since 'correct decoding of the message is a simple function of one's understanding of the language, requiring no extra-linguistic sources of knowledge'. No examples are given, but this characterization might be taken to include exophoric reference, among other variables. Hasan goes on to point out that context dependency is best seen as a cline, not a categorical opposition.

Alongside variation according to speaker identity (users of language), SFL linguists have been concerned with variation in contextual dependency according to language function (uses of language). For Martin (e.g. 1984a, 1984b, 1992) and others (e.g. Hasan 1985), the register[4] variable at risk here is mode,[5] which is concerned in broad terms with the role language is playing in a given social interaction – where role is understood, at least in part, to refer to how much work language is doing (whether language is ancillary to or constitutive[6] of what is going on; Hasan 1985: 58). Cloran (1999a: 37, 2000: 176) models this type of mode variation as a scale, with ancillary and constitutive as poles. Along the scale various types of discourse are arranged in terms of degree of contextual dependency – action, commentary, observation, reflection, report, account, plan/prediction, conjecture, recount and generalization. Cloran (1999a, 2000) makes no reference to Martin (1984a: 26–7) or (1992: 517–18), where comparable SFL mode scales are earlier proposed – with language in action and language as reflection as poles and ancillary, monitoring, reconstructing, generalizing, reviewing and theorizing[7] along the cline (Martin 1992: 518). Critically, in both models, many factors are taken into account in addition to exophoric reference.

Cloran, for example, focuses carefully on what she calls the central entity (CE) of a message, alongside its event orientation (EO). The CE is usually[8] the grammatical Subject of a clause, while the EO is normally grammaticalized as tense choice in its Finite function (Cloran is describing English realizations here). Related messages which share the same CE and EO values are treated as rhetorical units (RUs) by Cloran, which units Cloran (1999b: 199) classifies as outlined in Figure 4.1 below. As the table and attendant discussion reveal, several semantic parameters are at stake here alongside exophoric reference, including: the person of the CE, whether the CE involves generic or specific reference, the speech function of a message (goods and services or information), and the habitual or tensed temporality and modality of the EO. Our point here is not to expound the details of Cloran's model, but simply to establish that her model of the role language is playing in the social process takes us far beyond a narrow reading of mode and contextual dependency based on exophoric reference.

Similarly, Martin (1984a[9]) implicates a wide range of semantic variables scaling discourse along his action/reflection cline – including tense, person, exophoric/endophoric or generic reference, choices for Theme and abstract lexical items (and he gestures towards consideration of grammatical metaphor, which is more fully elaborated in Martin 1992). Martin's characterization of mode depends on his model of field as a set of activity sequences oriented to some global institutional purpose, including the taxonomies of participants involved in these sequences and their configuration with processes as steps in a sequence. His action/reflection mode scale then has to do with the role language is playing in realizing activity sequences – as accompanying other modalities of communication and behaviour, or monitoring them in commentary, reconstructing them, generalizing them, theorizing them and so on. Once again our brief here is not to present Martin's (1992: 508–23) interpretation of mode in detail, but simply to indicate the extent to which

<table>
<tr><th>EVENT ORIENTATION</th><th>HABITUAL</th><th colspan="2">REALIS</th><th colspan="3">IRREALIS</th></tr>
<tr><th>CENTRAL ENTITY</th><th></th><th>CONCURRENT</th><th>PRIOR</th><th>GOODS/ SERVICES EXCHANGE</th><th colspan="2">INFORMATION EXCHANGE</th></tr>
<tr><td>Within material situational setting (MSS)</td><td rowspan="2">Reflection</td><td rowspan="3">Commentary</td><td rowspan="6">Recount</td><td rowspan="2">Action</td><td>FORECAST</td><td>HYPOTHETICAL</td></tr>
<tr><td>• interactant</td><td>Plan/ Prediction</td><td rowspan="4">Conjecture</td></tr>
<tr><td>• other person/ object</td><td>Observation</td><td></td><td>Prediction</td></tr>
<tr><td>Not within MSS</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>• person/object</td><td>Account</td><td>Report</td><td></td><td>Prediction</td></tr>
<tr><td>Class</td><td colspan="2">Generalisation</td><td colspan="3"></td></tr>
</table>

FIGURE 4.1 Cloran's (1999b) classes of rhetorical unit (RU)

contextual dependency in SFL theories of context involves far more than questions about whether the information presumed by a presuming phoric item (e.g. *he, it; this, there; one, do, so*) is recoverable from the shared sensible material environment of an utterance (although this is of course part of the picture).

The scope of Martin and Cloran's perspectives invite a reconsideration of the notion of contextual dependency in SFL and its relation to the concept of 'semantic gravity' in LCT. We will pursue this here from a metafunctional perspective, working through textual, interpersonal and ideational perspectives on context dependency – drawing on examples from interdisciplinary work on the teaching of Ancient History in Australian secondary schools referred to above.

Contextual dependency: A metafunctional perspective

As is well known, SFL generally adopts a tri-nocular perspective on meaning, with ideational meaning construing reality, interpersonal meaning enacting social relations and textual meaning organising these construals and enactments into waves of information flow. We shall start with textual meaning, since this is where so many discussions of context dependency in SFL begin – before moving on to a consideration of potential interpersonal and ideational interpretations of the term.

Textual meaning

SFL linguists adopting a tri-nocular perspective on metafunctions (cf. Fawcett's 2008 Cardiff model, which proposes eight strands of meaning) have proposed two different understandings of textual meaning. Halliday's grammatical perspective (e.g. 1973: 141) positions the whole of cohesion (Halliday and Hasan's 1976 reference, substitution, ellipsis, conjunction and lexical cohesion) alongside THEME and INFORMATION systems, as textual (the 'grammar and glue' model). Martin (e.g. 1992; Martin and Rose 2003) recontextualizes cohesion as a supervening stratum called discourse semantics, with its own metafunctional organisation. Martin's model will be assumed here, positioning as it does IDENTIFICATION and PERIODICITY as textual resources, APPRAISAL and NEGOTIATION as interpersonal resources and IDEATION and CONJUNCTION as ideational ones.

The narrow reading of contextual dependency as exophoric reference noted above can be illustrated from the following phase of NSW Year 11 Ancient History classroom discourse. The teacher is moving around the class, checking on progress students are making filling in a close passage – the relevant section of which is as follows (with spaces for missing words underlined):

> *[Text 1]*
>
> … Pompei was renowned for ___ . Garum was made from ___ and the city of Pompei must have ___ . To make garum ___ was needed. …

For this exercise the teacher and students are drawing information from a photocopied handout from a textbook (Bradley 2005: 89–95), from which the teacher reads aloud. The relevant information (garum, fish guts, smelled and salt) is retrieved from the following section of the handout:

[Text 2]

> Pompei was renowned for its garum, a fish sauce which was one of the main condiments used for flavouring Roman cuisine. … There were various flavours depending on the type and quality of the fish used and its method of preparation. Apparently the valuable red mullet made the best garum… Garum was a potent mix, made from 'the guts of fish and other parts that would normally be considered refuse' [22] probably gills, intestines and blood, and the smell must have pervaded Pompei… A product indispensable to the production of garum was salt…
>
> *('Social structure, economy and politics', p. 93)*

As highlighted in bold below, the teacher refers exophorically to the close passage exercise itself, to the handout, and to herself and the students (material read aloud from the handout is in caps below, material read aloud from the close passage exercises is in small caps and information retrieved for the close passage is underlined):

[Text 3]

T GARUM WAS A POTENT MIX, MADE FROM THE GUTS blab-blab-blab… okay, ALTHOUGH IT WAS POPULAR WITH MOST, SOME LIKE SENECA HATED ITS FOUL SMELL. THE FOLLOWING QUOTE GIVES US A MORE DETAILED DESCRIPTION OF ITS MANUFACTURE. No, then then **it** says ENTRAILS blab… was mixed has been… reduced to OVER A PERIOD OF SIX WEEKS dah dah dah dah dah dah, okay, a PRODUCT, and then **I**'ll bet **the next one** is <u>salt</u>. So what is the word **there**? So **you** need to get something to put in **there**.

S Garum was made from <u>red mullet</u> and the city of pompei must have…

T … must have …

S <u>Smelt</u>.

T Maybe that's **it**.

S [laughs] <u>Smelt</u> [spoken whilst laughing]

T <u>Smelt</u> makes a lot of sense because they said **here**, um, AND THE SMELL MUST HAVE PROVOKED, yeah, but, um that doesn't mean anything, but, THE SMELL MUST HAVE PERVADED POMPEII. So Pompeii must have smelt. Excellent deducting.

S Thank-**you**.

T Yeah, very good.

S Salt [student in the background says].
T Salt. **The next one**'s salt. **We** know that much.
[teacher moves to another group]

A range of information presuming resources are deployed exophorically in Text 3, including pronouns (*I, we, you, it*), locative adverbs (*there, here*), specific deixis (*the*), comparison (*next*) and nominal substitution (*one*) – as outlined in Table 4.1.

The general point here as far as contextual dependency is concerned is that the classroom discourse examined here would be impossible to follow without an awareness of the interlocutors involved (teacher and students), and access to the two texts they are working with (the handout and close passage). Understanding the Ancient History content would not be enough. To understand, either you had to be there, or the material setting would have to be reconstructed for you (as we have attempted above).

The choice of exophoric reference to persons and things in the sensible environment of a text as opposed to endophoric (cataphoric or anaphoric) reference to the surrounding co-text is of course sensitive to the choice of specific vs generic reference (Martin 1992; Martin and Rose 2003). With generic reference to whole classes of people, places and things, where lexicalized, no information is presumed; if you understand the meaning of the nouns and subclassifiers involved you understand the meaning of the text. Text 2 above, for example, refers generically to *garum, Roman cuisine, fish, gills, intestines, blood* and *salt*. With generic reference of this kind, you don't have to be anywhere – you just have to know the language of the field; and so there is no contextual dependency of the kind effected by exophoric reference involved.

Turning from IDENTIFICATION to PERIODICITY (Martin and Rose 2003), a broad interpretation of contextual dependency might consider the pattern of choices made for Theme and New, and the extent to which a text scaffolds its information flow with predictive layers of higher level Theme and consolidating layers of higher level New (the depth of its hierarchy of periodicity in other words). As far as choices for Theme and New are concerned, exophoric reference, ellipsis and substitution have already been considered; all examples of exophora from the classroom discourse considered above functioned as either Theme or New, arguably strengthening its

TABLE 4.1 Exophoric reference in Text 3

information presumed	*exophoric reference to 'material' setting*
teacher and students	*I, you, thank-you, we* (pronominal)
textbook handout	*it, here* (locative)
close passage	*it, it* (pronominal); *the next one, the next one* (specific determiner, comparative, substitute); *there, there* (locative)

contextual dependency. Another factor affecting contextual dependency would be the ratio of exophoric and non-exophoric Theme and New choices in a text.

As far as higher order periodicity is concerned, the more planned and edited a text is, the more likely it is to have higher level Themes and News and the more it might be considered to be self-organizing (as opposed to unfolding in relation to and thus dependent upon non-verbal activity in which language plays a part – e.g. the teacher's movement from one group of students to another in the lesson introduced above). So a broad interpretation of contextual dependency would have to take this dimension of textual meaning into account. Context-independent organization of this kind can be illustrated from the handout referred to above. There a quote is introduced as *The following quote gives a more detailed description of its manufacture*, a Hyper-theme characteristic of written planned edited academic discourse (here involving cataphoric endophoric reference – *the following quote*):

> *[Text 4]*
>
> Garum was a potent mix, made from 'the guts of fish and other parts that would normally be considered refuse' probably gills, intestines and blood, and the smell must have pervaded Pompei. Although it was popular with most, some, like Seneca, hated its foul smell. The following quote gives a more detailed description of its manufacture.
>
> > The entrails of sprats or sardines, the parts that could not be used for salting were mixed with finely chopped portions of fish and with roe and eggs and then […] pounded crushed and stirred. The mixture was left in the sun or warm room and […] beaten into a homogenous pulp until it fermented. When this liquamen, as it was called, had been much reduced over a period of six weeks by evaporation, it was placed in a basket with perforated bottom through which the residue filtered slowly into a receptacle. The end product decanted into jars was the famous garum: the dregs left over were also regarded as edible and […] known as allec.

As we can see, even restricting ourselves to a consideration of textual meaning, both a narrow and broad interpretation of contextual dependency is possible, the former restricted to exophoric reference and the latter taking periodicity (and possibly its interaction with identification) into account.

Interpersonal meaning

In SFL theory, the standard association of metafunctions with register variables positions textual meaning as composing mode, interpersonal meaning as enacting tenor and ideational meaning as construing field. So a relatively narrow reading of contextual dependency would be restricted to a consideration of textual meaning and mode, however those terms are understood (and there is considerable variation

in SFL as outlined above). That said, it needs to be kept in mind that the function of textual meaning is in fact to weave interpersonal and ideational meaning together as discourse in relation to the information flow afforded by one channel of communication or another (speaking, writing, signing, phoning, texting, tweeting, emailing, posting, etc.); so we might expect interpersonal and ideational meaning to be in some sense implicated by considerations of mode. However the correlation of metafunctions with register variables resolves itself or not in SFL theory, we need to acknowledge here that moving to considerations of interpersonal meaning considerably broadens our interpretation of contextual dependency (towards the broader vision involved in both Cloran's and Martin's work on mode, as noted above).

As a first step we can simply note the significance of PERSON in relation to the exophoric reference illustrated above. Arguably, first and second person exophoric reference involves an even more immediate contextual dependency than third person reference to interlocutors. And just as we further considered exophoric reference in relation to periodicity above, here we can consider person reference in relation to modal responsibility (e.g. choice of Subject and Finite in English; see Martin 1992, Chapter 6 for discussion). All of the first and second person reference in the classroom discourse discussed above, Text 3, encoded the nub of the argument, as realized through English's Subject function (except for the *you* in *thank-you*, which is in any case lexicalized, and so not relevant to consideration of modal responsibility) – arguably strengthening contextual dependency. So another factor affecting contextual dependency would be the ratio of first/second person Subjects to third person ones in a text.

Once we bring modal responsibility into the picture, we can turn naturally to verbal deixis – realized in the Finite function where the terms of an argument are proposed (as TENSE or MODALITY). Choices for primary tense are the most relevant to contextual dependency (past, present or future):

past	Garum was made from red mullet…
present	We know that much.
future	I'll bet…[10]

Of these, the use of primary present tense which positions events or states as co-occurring with the moment of speaking is arguably more context dependent than primary past and future tenses which displace events and states from the here and now. Choices for modality of course take this dimension of time out of the picture:

modality	So Pompei must have smelt.

Since modality does not ground modal responsibility temporally in the here and now of dialogue, it can arguably be treated as reducing contextual dependency. Modality does however involve subjective[11] assessments of probability, usuality, inclination, obligation and ability on the part of speakers (in declaratives) and listeners (in interrogatives), and so is in a sense interpersonally dependent on the moment of speaking.

As is well known, the English primary tense system is sensitive to process type, with material and behavioural processes preferring present in present (present continuous) tense for ongoing events at the moment of speaking,[12] and mental and relational processes[13] preferring simple present tense:

behavioural process	the students are laughing
mental process	we know that much

With material and behavioural processes, simple present tense in English refers to habitually recurring events, not specific ones (e.g. *the students laugh a lot in History class*). The choice of simple present or present in present tense is thus an important variable as far as contextual dependency is concerned. Although habitual recurring events can be associated with specific participants (e.g. *John laughs all the time in History class*), they tend to be associated with generic ones (i.e. *the students laugh a lot in History class*), further weakening contextual dependency. As far as mental and relational processes are concerned, the meaning of simple present tense is conditioned by their configuration with specific or generic participants (*we know the answer* vs *top students think a lot*) and associated material and behavioural processes in the same phase of discourse (*the students laugh a lot in History but think a lot too*).

These considerations of modality and primary tense are of course not available in non-finite clauses, which are thus positioned in discourse as non-arguable (e.g. the imperfective s*inging beautifully* and perfective *to look at the assignment* dependent clauses below). In the first example the teacher directly negotiates the student's presence on the stage, not whether she was singing; in the second, she directly negotiates her request, not whether the student looks or not:

T You were on stage, **singing beautifully**.
T I asked you **to look at the assignment**.

Both the imperfective and perfective alternatives (the *–ing* and *to* forms respectively) reduce context dependency by elevating the propositions they involve from the to and fro of dialogue; the terms for negotiation, as might be realized through a Finite function, are missing.

Beyond this we need to keep in mind that hypotactically dependent clauses, whether finite or non-finite, defer negotiability to the clause they are dependent on.

T We all applauded **after you sang so beautifully**.
T I came in early **to look at the assignment**.

And embedded clauses, whether finite or non-finite, similarly defer negotiability[14] to the ranking clause they are embedded in.

T I loved the song [[**you sang so beautifully**]].
T It frightened me [[**to look at the assignment**]].

Embedded non-finite clauses are arguably even less context dependent from the perspective of interpersonal meaning, since they are doubly removed from negotiability. The teacher's question below directly negotiates whether she heard the student singing or not (*Did I hear…*), not whether the student was singing or not (cf. *Were you singing in assembly? – Yes, I was*.). This makes it possible for the student to answer *Probably*, about something she can't be sure of (i.e. whether the teacher heard her), as opposed to *Yes* about something she knows (i.e. whether she was singing or not).

T Did I hear [[**you singing in assembly**]]?
S Probably.
T It was beautiful.
S Thank you.
T Really good.

Similarly, the teacher's question to Cynthia below makes whether she had an opportunity to look at the assignment or not arguable (allowing, however improbably, *Well I had a chance, but decided not to*.); she thereby sidesteps a somewhat more accusatory query about whether Cynthia did her homework or not (cf. *Did you look at the assignment? – Yes I did*.).

T Cynthia, did you get a chance [[**to look at the assignment]]**?
S Yes I did.

Readers familiar with Romance languages[15] will no doubt be wondering about what their grammarians term 'subjunctive mood' by now. While subjunctive is not a productive choice of verb inflection in English anymore, the 'irrealis' environments where a 'Romance' subjunctive might be deployed are commonplace and relevant to an interpersonal perspective on contextual dependency. Such environments would include hypotactically dependent conditional clauses and projected proposals (bold below):

conditional *T* **If you couldn't find an answer**, get someone to help you.
proposal *T* Could you tell her **to go and get my box**?

In the conditional example above, the teacher displaces the student's ability to find an answer from the here and now by construing it as a supposition; in the proposal example, the teacher displaces her proposal that a student get the box by formulating a more indirect request, projecting her proposal with a question as to whether the student wants her classmate to go or not. In either case, the clause in bold is not only not directly negotiable (not directly arguable as discussed above), but is further removed from the here and now as either a 'modalized' proposition with an 'if' about it (condition) or a modulated proposal about potential action (projection).

From a discourse semantic perspective all these interpersonal examples of degrees of context dependency highlight the system of NEGOTIATION (Martin 1992; Martin and Rose 2003) whereby interlocutors enact exchange structures that arbitrate the sharing of propositions and proposals (i.e. knowledge and action moves). This brings dialogue into the picture, which in turn gives rise to questions about whether interlocutors can see and hear one another or not in face-to-face or print or electronically mediated exchanges. So one might argue that spoken dialogue is more contextually dependent than printed monologue, and position phoning, skyping, chat rooms, texting, emailing, posting and snail-mailing along a scale in between (for discussion of this dimension of mode see Martin 1992).

We also need to keep in mind that propositions and proposals are not just negotiating 'facts' about the world but also negotiating feelings. This makes APPRAISAL another crucial dimension of the discussion (Martin and White 2005). As outlined in Figure 4.2, affect is positioned at the heart of attitudinal meaning in this system, with judgement interpreted as feelings institutionalized to shape behaviour and appreciation interpreted as feelings institutionalized to position values. Ontogenetically speaking, affect is the kind of feeling we are born with, and through which we interact with carers from the very beginning of life (Painter 2003). Significant in this regard is the fact that affect is the only feeling we can enact physically as well as verbally (Martin and Zappavigna 2013) – through facial expression and concomitant paralinguistic features (voice quality, gesture, etc.). Accordingly we can inscribe affect in an image of a person, but judgement and appreciation can only be pictorially invoked.

From the perspective of contextual dependency these factors suggest that affect is more inherently involved in the negotiation of feeling in face-to-face interaction, and negotiated paralinguistically even when other kinds of feeling are verbally inscribed. Reasoning along these lines we can treat the negotiation of affect (inscribed as *love*) in the following example as engaging teacher and student more

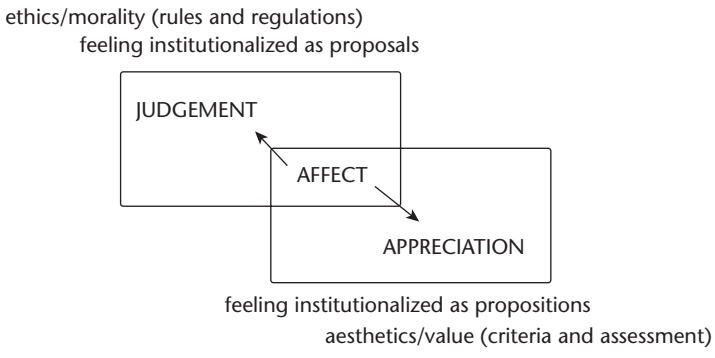


FIGURE 4.2 The centrality of attitudinal affect

directly in the interaction than the negotiation of appreciation in Text 5 (inscribed as *top, brilliant, lovely, top*).

T … Right, anybody want to, do you want to keep going or… No. Next one. Who wants to read?
S I'm sure Jessica would **love** to.
S No. ((inaudible))
S I'll read.
T Thank-you.

[Text 5]

WHAT WAS THE FIRST VISIBLE EVIDENCE OF THE ERUPTION OF MOUNT VESUVIUS TO THOSE AT MISENUM – don't do it now. WHAT EVIDENCE OF THE ERUPTION WAS OCCURRING AT STABIAE. ACCORDING TO SOURCE ONE HOW DOES PLINY'S UNCLE DIE? Okay now we only require you to write down how he died. I would like you to say, "Source one tells us that he died because of or from" because it's to get you used to doing that in the HSC. If you… if a question asks for a source in your HSC, if you don't refer to it you can never access the **top** band of marks – never ever ever ever ever ever in your life. Doesn't matter if your answer was absolutely **brilliant**, said things that we haven't even discovered yet, which I get all the time in the HSC, all this **lovely** history I didn't know but somebody knows about it, um, you won't ever access the **top** marks. So just get practice. It doesn't require you for this assignment but I'd like you to. Just say "Source one tells us…" just to get used to it.

To sum up, what is at stake as far as an interpersonal perspective on contextual dependency is concerned is the degree of negotiability of modal responsibility (the nub and terms of an argument), however a language in fact grammaticalizes arguability (cf. Quiroz 2008 comparing Spanish and English systems), and the kind of attitude being negotiated (with affect more immediately engaging than judgement or appreciation).

Ideational meaning

It might seem at first blush that ideational meaning is the constant on which variation in contextual dependency, whether from a textual or interpersonal perspective, depends. From the perspective of field, however, we can consider whether activity sequences unfold in discourse in the sequence in which they are generalized as constitutive of one or another field. To make garum, for example, you needed to get hold of the appropriate seafood, mix it up, let it ferment, reduce the mixture and then filter the residue into a receptacle – as outlined in Text 4

above. This sequence, and its steps, can, however, be realized more or less iconically. In English, various conjunctive resources might be deployed to re-arrange the sequence:

> **Before** the liquamen is filtered, it is reduced for six weeks by evaporation; **prior to that** it was beaten into a homogenous pulp…

Texts which unfold in some kind of matching relation to the activity sequence they construe can be contrasted with texts that organize themselves, independently of field time. Text 6 for example, outlined below, is a factorial exposition (Martin and Rose 2008) in which the causes of its poor conservation are scaffolded not in the sequence in which they occurred but in the order in which the writer wishes to present them (*to begin, a second problem, in addition, finally*) and consolidated in a high level macro-new (*as a result of these factors*).

> *[Text 6]*
>
> While Pompeii is one of the most studied of the world's archaeological sites, it has been plagued with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.
>
> **To begin**, much of the restoration work on Pompeii has been done by local firms with no specialized knowledge of restoration techniques. …
>
> **A second problem** is the incursion of uncontrolled weeds which have hastened the decay of the ruins. …
>
> **In addition**, Pompeii's position as an international tourist attraction brings half a million visitors each year. …
>
> **Finally**, there seems to be no overall management plan for the site. Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. …
>
> **As a result of these factors**, the description of Pompeii as a victim of state neglect and indifference and an archaeological catastrophe of the first order is an apt one. Its ongoing destruction since its discovery in the 1590s has arguably resulted in a greater disaster than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

From the point of view of sequencing, texts with internal scaffolding of this kind are at the opposite end of a contextual dependency scale from those unfolding in step with field time.

Beyond these permutations, an activity sequence as a whole can be realized not as a discourse semantic sequence of events, but named as a figure[16] involving entities, occurrence and setting:

> Wealthy families manufactured garum in Pompei.

And semantic configurations such as these may be themselves construed grammatically as nominal groups (*the production of garum, its manufacture*), rather than clauses. So from an ideational perspective we can use the degree of iconicity between what is going on in a field and its construal in discourse as a further measure of contextual dependency, with more iconic realizations more context dependent than less iconic ones.

The main linguistic resource used to rework ideational iconicity in discourse is grammatical metaphor (Halliday 1985, 1998, 2004, 2008; Halliday and Martin 1993; Simon-Vandenbergen *et al.* 2003; Zhu 2008), which can be most usefully interpreted in terms of stratal tension – the degree of congruence in the mapping of discourse semantics in lexicogrammar. We have already seen an example of grammatical metaphor with respect to interpersonal meaning, when the teacher coded a proposal she might have coded congruently as *Go and get my box*. (command realized as imperative) as the less direct polar interrogative *Do you wanna go and get my box?* (command as polar interrogative).

congruent proposal *T* Go and get my box?
incongruent proposal *T* **Do you wanna** go and get my box**?**

With experiential meaning the congruent realization of a semantic figure would be a clause, with entities realized as participants, occurrences as processes and setting as circumstances. An analysis of the discourse semantics and lexicogrammar of *Wealthy families manufactured garum in Pompei*. is presented below.

discourse semantics	entity	occurrence	entity	setting
	Wealthy families	*manufactured*	*garum*	*in Pompei*
lexicogrammar	Participant	Process	Participant	Circumstance

But figures can be realized metaphorically as participants (*Wealthy families controlled* ***the manufacture of garum*** *in Pompei.)* or in circumstances (*Some families became wealthy* ***through the manufacture of garum****.)* if they are coded as nominal groups:

discourse semantics	entity	occurrence	[figure]	setting
	Wealthy families	*controlled*	***the manufacture of garum***	*in Pompei*
lexicogrammar	Participant	Process	Participant	Circumstance

discourse semantics	entity	occurrence	quality	[figure]
	Some families	*became*	*wealthy*	*through* ***the manufacture of garum***
lexicogrammar	Participant	Process	Participant	Circumstance

These congruent and metaphorical alternatives are outlined in Figure 4.3. As far as experiential meaning is concerned, the more metaphorical the realization the

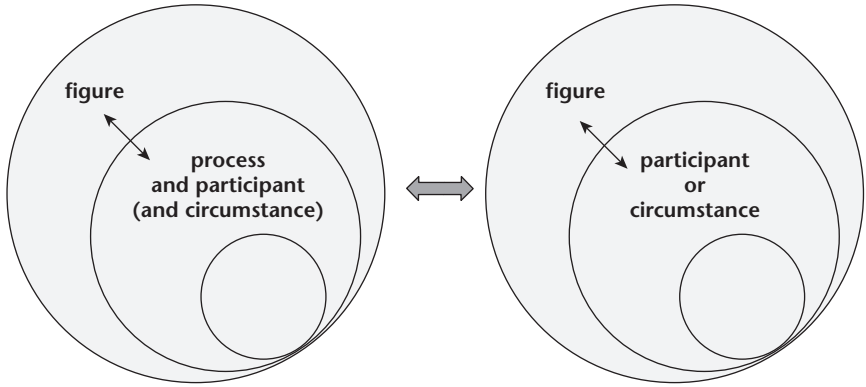


FIGURE 4.3 Congruent and metaphorical realizations of a figure

less iconic the mapping of figures as participant, process and circumstance, and so arguably the less context dependent the discourse.

Realizing figures as circumstances brings logical meaning into the picture, since in effect a sequence of figures is being realized as a single clause (*Some families became wealthy through the manufacture of garum*) instead of as a clause complex (*Some families manufactured garum and thereby became wealthy*). Recoding along these lines the sequence involved in making garum might be realized as a clause complex consisting of five interdependent clauses:

1	Wealthy families acquired the appropriate seafood,
x 2	mixed it up,
x 3	let it ferment,
x 4	reduced the mixture
x 5	and then filtered the residue into a receptacle.

Alternatively pairs of clauses in this sequence could be telescoped as clauses in which the logical relations between figures are coded as Processes (*precedes, is followed, leading to*) or Participants (*the result*):

> The acquisition of appropriate seafood **precedes** the mixing process which **is followed** by fermentation and evaporation, **leading to** a filtration process **the result** of which is the production of garum.

Taking into account the logical relation realized as circumstance example analyzed above (i.e. *Some families became wealthy* ***through the manufacture of garum***), the possibilities for recoding sequences as clauses are outlined in Figure 4.4. Since logical metaphor entails experiential metaphor, the more logical metaphor a text has, the less context dependent as far as iconicity is concerned. Logical metaphor involving 'cause in the clause' is a critical resource

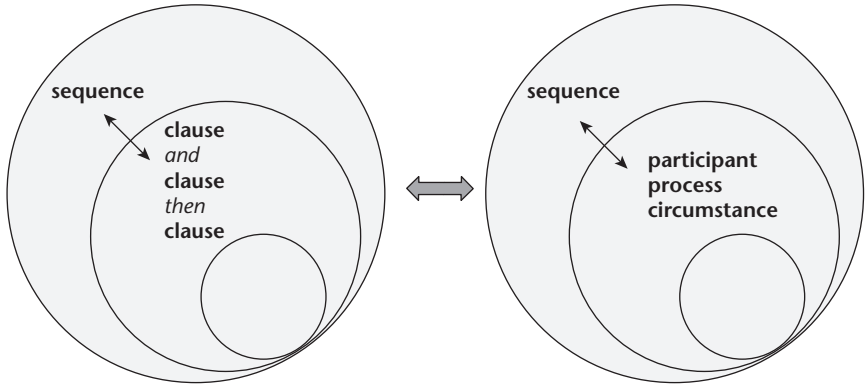


FIGURE 4.4 Congruent and metaphorical realizations of a sequence

for packaging up causes and effect in history discourse and finely nuancing the causal relation between them. The concluding sentence of Text 5, for example, sums up an argument to the effect that human neglect has had more to do with the destruction of Pompei than Mt Vesuvius, a conclusion carefully tempered as *arguably* so.

> Its ongoing destruction since its discovery in the 1590s
> **has** arguably **resulted in**
> a greater disaster than its initial destruction by the eruption of Mt Vesuvius …

It may be helpful at this point to set up a scale of iconicity as far as the realization of semantic sequences in grammar is concerned,[17] beginning with cohesive conjunction between sentences, and continuing with paratactic and hypotactic interdependency between clauses within a sentence (1–3 below); then, with one figure in the sequence nominalized (the eruption of Mt Vesuvius), cause can be realized as through a circumstance (4) or a causative verbal group complex (5); finally, with both figures in the sequence nominalized, cause can be realized as a process (6) or participant (7). The crucial break in iconicity is between 3 and 4, with ideational contextual dependency arguably decreasing from 4 through 7.

1 Mt Vesuvius erupted. **Therefore** Pompei was destroyed.
2 Mt Vesuvius erupted, **so** Pompei was destroyed.
3 **Because** Mt Vesuvius erupted, Pompei was destroyed.
4 **Because of** Mt Vesuvius's eruption, Pompei was destroyed.
5 Mt Vesuvius's eruption **led to** Pompei being destroyed.
6 Mt Vesuvius's eruption **caused** Pompei's destruction.
7 Mt Vesuvius's eruption was **the cause of** Pompei's destruction.

This scale can be supplemented with comparable grading focusing on internal conjunctive relations (Halliday and Hasan 1976; Martin 1992) where the logic

has to do with argumentation in discourse rather than the construal of cause and effect relations in field. Internal conjunction is arguably less context dependent than external conjunction because propositions and proposals are being related rhetorically rather than in terms of a material sequence of events in a field. High stakes academic writing depends on the incongruent realizations in 4 through 7 below to provide a reasoned scholarly interpretation of physical, biological or social reality.

> 1 Historians carefully study primary sources such as Pliny and Seneca and observe artifacts, frescoes and relevant archaeological sites. **Accordingly** they conclude that wealthy families manufactured highly valued garum in Pompei.
> 2 Historians carefully study primary sources such as Pliny and Seneca and observe artifacts, frescoes and relevant archaeological sites, and **thus** conclude that wealthy families manufactured highly valued garum in Pompei.
> 3 **By** carefully studying primary sources such as Pliny and Seneca and observing artifacts, frescoes and relevant archaeological sites, historians conclude that wealthy families manufactured highly valued garum in Pompei.
> 4 **Through** the careful study of primary sources such as Pliny and Seneca and observation of artifacts, frescoes and relevant archaeological sites, historians conclude that wealthy families manufactured highly valued garum in Pompei.
> 5 Careful study of primary sources such as Pliny and Seneca and observation of artifacts, frescoes and relevant archaeological sites, **permits** historians to conclude that wealthy families manufactured highly valued garum in Pompei.
> 6 Careful study of primary sources such as Pliny and Seneca and observation of artifacts, frescoes and relevant archaeological sites **argues for** the manufacture of highly valued garum by wealthy families in Pompei.
> 7 Careful study of primary sources such as Pliny and Seneca and observation of artifacts, frescoes and relevant archaeological **provides the evidence for** the manufacture of highly valued garum by wealthy families in Pompei.

It is interesting to note that in the phase of teaching drawn on for examples here, almost all[18] examples of ideational metaphor are in the handout, not the teacher's talk. This reflects the general predisposition teachers share to 'unpack' more contextually independent written language into more contextually dependent spoken language – undoing ideational grammatical metaphor as they do so. This predilection for more context dependent talk which does not shunt verbally back to more context-independent discourse arguably denies students the opportunity to hear teachers model how more abstract formulations add specialized meaning that cannot be formulated in more common sense spoken terms. The implications of this unpacking syndrome, which in effect ongoingly strands students in common sense instead of building academic knowledge, are explored in Martin and Maton (2013).

Contextual dependency across metafunctions

In summary then, although contextual dependency is regularly interpreted in the first instance as a question of textual meaning and mode, interpersonal and ideational perspectives are also possible. From the perspective of textual meaning, the key variable is **implicitness** – to what extent does a text depend on exophoric reference, substitution or ellipsis (to its material situation setting to use Hasan's term; e.g. Hasan and Butt 2011) and in addition scaffold its composition with layers of high-level periodicity. From the perspective of interpersonal meaning the key variable is **negotiability** – to what extent is a proposition or proposal arguable, and if arguable, to what extent does arguability depend on the moment of speaking (in terms of temporality or modality) and the nature of the attitude involved (affect vs judgement or appreciation). From the perspective of ideational meaning the key variable is **iconicity** – to what extent are semantic relations realized as congruent configurations of process, participant and circumstance which unfold in discourse in the sequence in which they occur in the field. Grammatical metaphor, as we have illustrated, is a powerful resource for composing high-level Theme and New,[19] for adjusting negotiability (as 'direct' vs 'indirect' speech acts) and scrambling iconicity (as everyday vs heavily 'nominalized' discourse).

Taken together, implicitness, negotiability and iconicity might be grouped together in SFL under the cover term **presence**. This avoids confusing SFL and LCT by deploying Maton's term 'semantic gravity' in two incommensurable theories. It also helps move SFL beyond the contradictory discussions of context-independent language in a supervenient model which privileges context as a stratum of meaning (Martin 2013b) – a problem introduced long ago by Hasan (1973: 284): 'Given the principle that every natural use of language occurs in some context, the term 'context independent', paraphrased literally as "not having anything to do with context", would have to be treated, from the SFL point of view today, as a contradiction in terms'.

The range of meanings which have been proposed here for the term presence means care must be taken to clarify what variables are being considered whenever the term is used. The range of variables considered will of course depend on the problem being addressed. For example, students who don't gain control of this resource in secondary school experience their access to context-independent discourse as severely impaired. And without control of context-independent discourse they will not be able to access the subject specific knowledge enabled by this discourse in textbooks, handouts or on the web and they will not be able to demonstrate control of this knowledge for assessment purposes (Martin and Maton 2013). An educational issue of this kind implicates at least a broad textual and ideational perspective on presence, so that many of the relevant variables can be brought into play. Cloran's focus on pre-school mother/child discourse in the home, on the other hand, arguably more strongly implicates textual and interpersonal perspectives, as reflected in her work on rhetorical units (Figure 4.1 above).

Context dependency and semantic gravity

As noted earlier above, SFL/LCT dialogue around the question of knowledge-building in secondary school prompted the re-appraisal of work on contextual dependency in SFL undertaken here. This naturally raises a question as to the nature of the complementarity between the functional linguistic and sociological perspectives. This of course depends on which variables a linguist selects as a measure of contextual dependency to focus on a problem in a particular episode of action research, and variables might of course be selected to illuminate, from a linguistic perspective, the kinds of variation the sociologist is focusing upon. With this in mind, let's consider Maton's recent characterization of semantic gravity.

> *Semantic gravity* (SG) refers to the degree to which meaning relates to its context. Semantic gravity may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less dependent meaning is on its context. All meanings relate to a context of some kind; semantic gravity conceptualizes how much they depend on that context to make sense. How strengths of semantic gravity are realized empirically depends on the specific object of study (Maton in press a). Nonetheless, to give a simple example: the meaning of the name for a specific plant in Biology or a specific event in History embodies stronger semantic gravity than that for a species of plant or a kind of historical event, which in turn embodies stronger semantic gravity than processes such as photosynthesis or theories of historical causation. Semantic gravity thus traces a continuum of strengths, with infinite capacity for gradation. Moreover, by dynamizing this continuum to analyse change over time, one can also describe processes of: *weakening* semantic gravity (SG↓), such as moving from the concrete particulars of a specific case towards generalizations and abstractions whose meanings are less dependent on that context; and *strengthening* semantic gravity (SG↑), such as moving from abstract or general ideas towards concrete and delimited cases.
>
> *(Maton 2013: 11)*

As we can see from Maton's examples, semantic gravity addresses a range of variation overlapping with but not precisely coextensive with the range considered in this paper. Martin (2013), for example, considers a Physical Geography textbook which includes a photo of a specific mulga tree, accompanied by a report, a factorial explanation and a conditional explanation which make generalizations about the species mulga tree, and an image implicating information about the plant's photosynthesis. The move from the photo to the verbal text is a move from specific to generic reference (even though the photo is intended to be viewed as representative of the species); and the move from generic reference to the concept of photosynthesis would certainly implicate grammatical metaphor (since photosynthesis is a

nominalized technical term for a process whereby plants convert light energy into chemical energy). From an SFL perspective these shifts in contextual dependency enable the construal of technical biological understandings of the world – specialized understandings which would be modelled with respect to the register variable field, not mode. Similarly, with respect to Maton's examples of Bernstein's shifts in semantic gravity reviewed earlier above (i.e. hierarchy, sequencing rules, criteria → visible and invisible pedagogies → classification and framing etc.), we can see that contextual dependency, measured in terms of implicitness (i.e. generic reference) and iconicity (i.e. grammatical metaphor) is involved; but the degree of technicality as far as Bernstein's interpretation of pedagogic discourse is concerned deepens considerably as semantic gravity weakens. So it would seem that Maton's concept of semantic gravity involves what SFL would model as concerns of both contextual dependency (mode) and technicality (field), with grammatical metaphor playing a critical role as an 'anti-gravity' machine.

That said, Maton views semantic gravity as generally working in tandem with his concept of semantic density, a term which addresses condensation of meaning. Together the strengths of semantic gravity and semantic density give a range of different 'semantic codes', which offer insight into the organizing principles of practices. For Maton semantic gravity is just one facet of these semantic codes. For example, in analyzing classroom discourse, Maton (2013) explores changes in the strengths of both semantic gravity and semantic density, charting 'semantic waves' in the knowledge being construed – i.e. moves between contextualized, simpler meanings and decontextualized, condensed meanings.

From an SFL perspective, this orientation to knowledge building highlights the functions that context-independent language has evolved for. Textually speaking, less presence affords **explicitness** – the composition of a self-contextualizing discourse that stores knowledge, transcending time and space. Interpersonally speaking, less presence affords **factuality** – the authoritative positioning of knowledge as beyond supposition. Ideationally speaking, less presence affords **abstraction** – the construal of uncommon sense classifications and explanations of physical, biological and semiotic realms of being. The tri-nocular SFL perspective on presence developed to this point in the paper is outlined in Table 4.2.

Taken together, the affordances of 'anti-gravity' (i.e. low presence) enable academic and professional discourse – ultimately as resources for organizing people (via bureaucracy) and managing the environment (via technology). Their immense power is most visible in the bloodbaths of struggle for control by one people over

TABLE 4.2 A metafunctional perspective on context dependency (presence)

metafunction	*type of presence*	*function of 'anti-gravity'*
textual	implicitness	explicitness
interpersonal	negotiability	factuality
ideational	iconicity	abstraction

another and the devastation of our environment driven by neo-liberal capitalist consumption. In times of peace and prosperity the social and material significance of explicitness, factuality and abstraction is less visible – but ever present in an aspirational world. As the limits of our natural resources necessarily shift our aspirations from luxury to survival, of our ability to shunt back and forth as needed along the clines of implicitness, negotiability and iconicity proposed above will have an increasingly important complex of roles to play.

At its most productive, interdisciplinarity encourages disciplines to interrogate their knowledge structure, and adjust and expand it as required. SFL and Bernsteinian sociology have impacted on one another in these terms many times over the course of cooperative research since Halliday and Bernstein's initial collaborations in Britain in the 1960s (Martin 2011). Maton's concepts of semantic gravity, semantic density and semantic waves have certainly sparked a renewed interest in SFL are far as research into field and mode is concerned – prompting, as noted above, the reappraisal of SFL's concept of contextual dependency in this paper. One question this reappraisal has perhaps raised for future LCT research has to do with negotiability – is there a third variable, working in tandem with semantic gravity and semantic density, adjudicating the arguability of propositions about the world as part of the production, recontextualization and reproduction of knowledge? As far as SFL is concerned, the main challenge that lies ahead is that of finding replicable ways of measuring, in linguistic terms sensitive to Maton's concern with knowledge-building, language which strengthens and weakens semantic gravity and semantic density as discourse unfolds – so that waves of knowledge building can be systematized in a more carefully articulated teaching practice.

Notes

1 This paper is a revised version of Martin and Matruglio (2013).
2 See Cloran (1999a) for a discussion of comparable notions in other theories.
3 Exophoric substitution and ellipsis is also possible (e.g. *Can't do it!),* eliding the Subject *I* (exophoric to the speaker) and substituting *do* for a more specific Process (exophoric to what the speaker is trying to do) – both recoverable from the shared sensory environment of the utterance; for an in depth discussion of types of exophoric reference see Hasan (1984).
4 Halliday, Hasan (e.g. Halliday and Hasan 1985) and others treat mode, along with field and tenor, as dimensions of context, realized through register variation in language; this terminology complicates the discussion at this point in the paper, so Martin's (1992) framework, with field, tenor and mode as dimensions of register (outside of but realized through language), is preferred here (thus avoiding the term context as a cover term for field, tenor and mode).
5 As Hasan (1999: 281–2), Bowcher (2010) and Hasan and Butt (2011) make clear, the ancillary/constitutive scale has become, for them, a matter of field, not mode. Compare Cloran (1999b: 199) who notes that Hasan (1985: 58) earlier proposes this scale as a dimension of mode.
6 Rephrased in terms of multimodal discourse analysis, the variation in question here has to do with how much work is being done by language and how much by other modalities of communication (including behaviour).
7 Martin (1984a: 27) uses the terms language in action, commentary, reconstruction and construction along his action/reflection scale.

8 Cloran (e.g. 1995) does allow for CE Existents in existential clauses (e.g. *There's a fly on the ceiling*.) and EO circumstantiation (e.g. *Come here right **now***.).
9 Martin's (1984a) monologue/dialogue 'feedback' scale will be set aside at this point, to simplify the discussion.
10 *I'll bet* is actually functioning as a subjectively explicit modality of probability here (cf. *I'll bet the next one is salt*/*The next one is probably salt*).
11 As Halliday (1994) outlines, grammatical metaphor can be deployed to reformulate these explicitly subjective assessments as more objective, thereby reducing context dependency as far as arguability is concerned (cf. *I'll bet the next one is salt*, *The next one would be salt*, *The next one's probably salt*, *It's probable that the next one is salt*…; further steps might reconstrue the interpersonal modality as experiential 'statistics': *The next one has every chance of being salt*, *There's a statistically significant probability of the next one being salt*…).
12 We also have to allow here for the use of simple present tense across process types in commentary mode (e.g. play-by-play coverage of sporting events, fashion shows, ceremonies and performances of various kinds), where it seems to be preferred for sequences of punctiliar completed action (e.g. *Xavi chips the ball to Iniesta, who heads the ball to Torres, who kicks for goal*); see Matruglio *et al*. (2013) for discussion.
13 Verbal processes are more variable in this regard (cf. *then it says*…/*are you asking whether*…).
14 Finite dependent and embedded clauses are restricted to a 'default' declarative mood; and their terms, whether realizing temporality or modality, are conditioned by the terms of the clauses they depend on or are embedded in (cf. *We all applauded after you sang so beautifully*/**after you are singing so beautifully*/**after you might sing so beautifully*).
15 Romance grammarians' 'conditional mood' is also relevant to a discussion of context dependency and negotiability in Romance and comparable languages, realizing as it does a range of meanings comparable to modality in English.
16 Halliday and Matthiessen (1999) propose a rank scale for ideation with sequences made up of figures and figures made up of elements; their term figure has been adopted here, with elements specified for this paper as entities, occurrences, qualities, settings and relations.
17 The scales provided here are based on Halliday's study of the language of physical science, which is most easily accessible in Halliday and Martin (1993: 66); see also Halliday (1998, 2004).
18 A few 'dead' metaphors are used, involving technical terms (e.g. *aesthetic trade, pyroclastic flow*); of the rare metaphors involving stratal tension, some are immediately unpacked (e.g. *Where is the difference? What would be different?*).
19 Consider, for example, the experiential metaphor in the hyper-Theme noted in Text 4 above: *The following quote gives a more detailed description of its **manufacture***.

References

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique* (revised edition), Oxford: Rowman & Littlefield.

Bowcher, W. (2010) 'The history and theoretical development of context of situation in Systemic Functional Linguistics', *Annual Review of Functional Linguistics*, 2: 64–93.

Bradley, P (2005) *Cities of Vesuvius: Pompeii and Herculaneum*, Melbourne: Cambridge.

Christie, F. and Martin, J. R. (eds) (2007) *Language, Knowledge and Pedagogy: Functional linguistic and sociological perspectives*, London: Continuum.

Christie, F and Maton, K. (eds) (2011) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum.

Cloran, C. (1994) 'Rhetorical units and decontextualisation: An enquiry into some relations of context, meaning and grammar', Unpublished PhD thesis, Nottingham: School of English Studies, Nottingham University.

Cloran, C. (1995) 'Defining and relating text segments: Subject and Theme in discourse', in R. Hasan and P. H. Fries (eds) *On Subject and Theme: A discourse functional perspective*, Amsterdam and Philadelphia: John Benjamins, 361–404.

Cloran, C. (1999a) 'Contexts for learning', in F. Christie (ed.) *Pedagogy and the Shaping of Consciousness: Linguistic and social processes*, London: Cassell, 31–6.

Cloran, C. (1999b) 'Context, material situation and text', in M. Ghadessy (ed.) *Text and Context in Functional Linguistics*, Amsterdam: John Benjamins, 177–217.

Cloran, C. (2000) 'Socio-semantic variation: Different wordings, different meanings', in L. Unsworth (ed.) *Researching Language in Schools and Communities: Functional linguistic perspectives*, London: Cassell, 152–83.

Fawcett, R. (2008) *Invitation to Systemic Functional Linguistics through the Cardiff Grammar*, London: Equinox.

Freebody, P., Martin, J. R., and Maton, K. (2008) 'Talk, text and knowledge in cumulative, integrative learning: A response to "intellectual challenge"', *Australian Journal of Language and Literacy*, 31: 188–201.

Halliday, M. A. K. (1973) *Explorations in the Functions of Language*, London: Edward Arnold.

Halliday, M. A. K. (1985) *Spoken and Written Language*, Geelong, Vic.: Deakin University Press.

Halliday, M. A. K. (1994) *An Introduction to Functional Grammar*, London: Edward Arnold.

Halliday, M. A. K. (1998) 'Things and relations: Regrammaticising experience as technical knowledge', in J. R. Martin and R. Veel (eds) *Reading Science: Critical and functional perspectives on discourses of science*, London, New York: Routledge, 185–235.

Halliday, M. A. K. (2004) *The Language of Science*, London: Continuum.

Halliday, M. A. K. (2008) *Complementarities in Language*, Beijing: Commercial Press.

Halliday, M. A. K. and Hasan, R. (1976) *Cohesion in English*, London: Longman.

Halliday, M. A. K. and Hasan, R. (1985) *Language, Context, and Text: Aspects of language in a social-semiotic perspective*, Geelong, Vic.: Deakin University Press.

Halliday, M. A. K. and Martin, J. R. (1993) *Writing Science: Literacy and discursive power*, London: Falmer.

Halliday, M. A. K. and Matthiessen, C. M. I. M. (1999) *Construing Experience through Meaning: A language-based approach to cognition*, London: Cassell.

Hasan, R. (1973) 'Code, register and social dialect' in B. Bernstein, *Class, Codes and Control 2: Applied studies towards a sociology of language*, London: Routledge & Kegan Paul, 253–92.

Hasan, R. (1984) 'Ways of saying, ways of meaning', in R. Fawcett, M. A. K. Halliday, S. M. Lamb and A. Makkai (eds) *The Semiotics of Culture and Language* (Vol. 1), London: Pinter, 105–62.

Hasan, R. (1985) 'The structure of a text', in M. A. K. Halliday and R. Hasan (eds) *Language, Context, and Text: Aspects of language in a social-semiotic perspective*, *Geelong*, Vic.: Deakin University Press, 52–69.

Hasan, R (1999) 'Speaking with reference to context', in M. Ghadessy (ed.) *Text and Context in Functional Linguistics*, Amsterdam: John Benjamins, 219–328.

Hasan, R. (2001) 'The ontogenesis of decontextualised language: Some achievements of classification and framing', in A. Morais, H. Baillie and B. Thomas (eds) *Towards a sociology of pedagogy: The contribution of Basil Bernstein to research*, London: Peter Lang, 47–79.

Hasan, R, and Butt, D. (2011) 'Forms of discourse, forms of knowledge: Reading Bernstein', in J. J. Webster (ed.) *Language and Education: Learning and teaching in society: The collected works of Ruqaiya Hasan* (Vol. 3), London: Equinox, 99–165.

Hawkins, P. (1977) *Social Class, the Nominal Group and Verbal Strategies*, London: Routledge & Kegan Paul.

Martin, J. R. (1983) 'The development of register', in J. Fine and R. O. Freedle (eds) *Developmental Issues in Discourse*, Norwood, N. J.: Ablex, 1–40.

Martin, J. R. (1984a) 'Language, register and genre' in F. Christie (ed.) *Children Writing: Reader*, Geelong, Vic.: Deakin University Press, 21–9.

Martin, J. R. (1984b) 'Systemic functional linguistics and an understanding of written text', in B. Bartlett and J. Carr (eds) *1984 Language in Education Workshop: A report of proceedings*, Brisbane: Centre for Research and Learning in Literacy, Brisbane CAE, 22–40.

Martin, J. R. (1992) *English Text: System and structure*, Amsterdam: John Benjamins.

Martin, J. R. (2007) 'Genre and field: Social processes and knowledge structures in systemic functional semiotics', in L. Barbara and T. Berber Sardinha (eds) *Proceedings of the 33rd International Systemic Functional Congress*, São Paulo: PUCSP, 1–35.

Martin, J. R. (2011) 'Bridging troubled waters: Interdisciplinarity and what makes it stick', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 35–61.

Martin, J. R. (2013b) 'Modelling context: Matter as meaning', in C. Gouveia and M. Alexandre (eds) *Languages, Metalanguages, Modalities, Cultures: Functional and socio-discursive perspectives*, Lisbon: BonD and ILTEC, 10–64.

Martin, J. R. and Maton, K. (eds) (2013) 'Cumulative knowledge-building in secondary schooling', *Linguistics and Education*, 24(1): 1–75.

Martin, J. R. and Matruglio, E. (2013) 'Revisiting mode: Context in/dependency in Ancient History classroom discourse', in H. Guowen, Z. Delu and Y. Xinzhang (eds) *Studies in Functional Linguistics and Discourse Analysis*, Beijing: Higher Education Press, 72–95.

Martin, J. R. and Rose, D. (2003) *Working with Discourse: Meaning beyond the clause*, London: Continuum.

Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.

Martin, J. R. and White, P. R. R. (2005) *The Language of Evaluation: Appraisal in English*, London: Palgrave.

Martin, J. R. and Zappavigna, M. (2013) 'Users in uses of language: Embodied identity in Youth Justice Conferencing', *Text and Talk*, 33(4/5): 467–96.

Martin, J. R., Maton, K. and Matruglio, E. (2010) 'Historical cosmologies: Epistemology and axiology in Australian secondary school history', *Revista Signos*, 43(74): 433–63.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Matruglio, E., Maton, K. and Martin, J. R. (2013) 'Time travel: The role of temporality in semantic waves in secondary school teaching', *Linguistics and Education*, 24(1): 38–49.

Painter, C. (2003) 'Developing attitude: An ontogenetic perspective on APPRAISAL', *Text*, 23(2): 183–210.

Quiroz, B. (2008) 'Towards a systemic profile of the Spanish MOOD', *Linguistics and the Human Sciences*, 4(1): 31–65.

Rochester, S. R. and Martin, J. R. (1977) 'The art of referring: The speaker's use of noun phrases to instruct the listener', in R. Freedle (ed.) *Discourse Comprehension and Production*, Norwood, N. J.: Ablex, 245–69.

Simon-Vandenbergen, A.-M., Taverniers, M. and Ravelli, L. J. (eds) (2003) *Grammatical Metaphor: Systemic and functional perspectives*, Amsterdam: John Benjamins.

Zhu, Y. (2008) 'Nominalisation, verbalisation and grammatical metaphor', in J. Webster (ed.) *Meaning in Context: Strategies for implementing intelligent applications of language studies*, London: Continuum, 297–308.

5

REVISITING FIELD

Specialized knowledge in secondary school science and humanities discourse

J. R. Martin

Dialogue[1]

Over the past decade dialogue between systemic functional linguistics (SFL) and Legitimation Code Theory (LCT) about the nature of knowledge (documented in Christie and Martin 2007; Christie and Maton 2011; Maton *et al.* 2016) has renewed interest among the linguists involved in the register variable field (e.g. Martin 2007; Martin *et al.* 2010). More recently, as part of interdisciplinary projects focusing on knowledge-building in secondary school History and Science lessons (see Martin *et al.*, Chapter 1, this volume), Maton's work on 'semantic density' (Maton 2011, 2014) has rekindled interest in the construal of specialized knowledge in uncommon sense discourse. For Maton, semantic density (SD):

> refers to the degree of condensation of meaning within sociocultural practices (symbols, terms, concepts, phrases, expressions, gestures, clothing, etc). Semantic density may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic density (SD+), the more meanings are condensed within practices; the weaker the semantic density (SD−), the less meanings are condensed.
>
> *(Maton 2014: 129)*

And critically, as we will explore below, the meanings involved 'may be from formal definitions, empirical descriptions or feelings, political sensibilities, taste, values, morals, affiliations, and so forth' (Maton 2013: 11).

Maton's concern with condensation of meaning (see also Maton and Doran 2017a, 2017b) naturally invites a response from functional linguists in relation to their work on technicality and the distillation of meaning in academic and professional discourses of various kinds. Key references on this work include Rose *et al.*

(1992), Halliday and Martin (1993), Christie and Martin (1997), Martin and Veel (1998), Halliday (2004), Wignell (2007) and Martin (2012). Much of this work explored aspects of Martin's (e.g. 1992) model of field, with field characterized as a set of activity sequences oriented to some global institutional purpose, alongside the taxonomies of participants involved in these sequences (organized by both classification and composition). One important variable in this work was the degree of technicality deployed in a particular field, with technicality explored as a process of distillation – a process whereby meaning is both condensed and reconstituted in lexis construing uncommon sense knowledge of the world.

Field

In SFL meanings are explored from several different perspectives. These include the level of abstraction at which analysis is undertaken (i.e. phonology/graphology, lexicogrammar, discourse semantics, register and genre in Martin and Rose 2007, 2008) and the type of meaning involved (i.e. ideational, interpersonal, textual). In the Martinian register of SFL adopted here, context is modelled as register and genre, which are treated as abstract levels of meaning. A schematic outline of these complementary perspectives is presented as Figure 5.1.

As introduced above, Martin (e.g. 1992) treats field as involving a set of activity sequences which work together to enact one or other walks of life (in the home, at work, at prayer, at play, etc.). Each field additionally involves specialized taxonomies of the people, places and things involved in these activities, organized by classification (type and sub-type relations) and composition (whole and part relations). These people, places and things, whether abstract or concrete, may in addition be graded in relation to one another in arrays (e.g. numerical systems, the periodic table of chemical elements, professional ranks such as Field marshal, General,

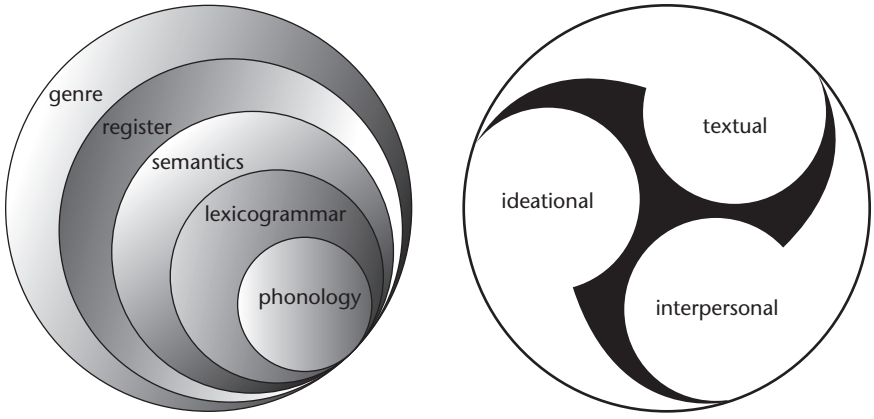


FIGURE 5.1 The intersection of stratification and metafunction in SFL

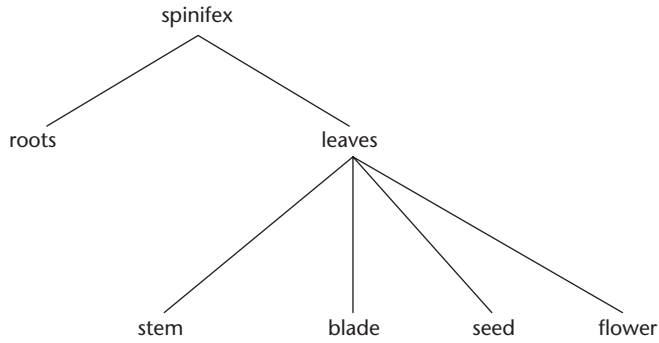


FIGURE 5.2 Composition of a spinifex bush

Lieutenant general, Major general, etc., or measurement scales such as inch, foot, yard, chain, furlong, mile).

In the penultimate chapter of Martin and Rose (2008) a multimodal text concerning mulga trees from a secondary school Geography textbook (Scott and Robinson 1993) is analyzed. In this textbook words and pictures cooperate to build knowledge of Australian desert environments and their fauna and flora (touched upon in Martin 2013a). Two pages further on the textbook moves from discussion of mulga plains to spinifex plains. The main bush found there is commonly referred to as spinifex (although botanically it is Triodia species, not Spinifex species), and even more commonly as hummock grass (because of its mound-like shape when young) or porcupine grass (because of its sharp pointed blades). Compositionally speaking we can distinguish the plant's roots (very deep), stem (full of resin), blades (curled), flowers and seeds (as sketched out in Figure 5.2).

The desert environments this species inhabits, the spinifex plains, are construed in the textbook through classification (using their flora and fauna, fertility and rainfall as criteria) – as desert ranges and rocky outcrops, plains or rivers, and if plains, then as mulga plains, spinifex plains or saltbush and blue bush plains. By intersecting this classification of arid lands with a classification of the living things found there, we arrive at a geographic perspective on the kind of thing spinifex is, as outlined in Figure 5.3 below (where square brackets mean 'or' and curly brackets 'and'). The crucial point I am making in Figures 5.2 and 5.3 here is that from the perspective of the field of physical geography, simply recognizing a spinifex bush, as a visitor to central Australia or in a photograph, is not enough; in addition, its uncommon sense composition and uncommon sense classification are central to its meaning in this field.

Beyond this the spinifex bush is involved in a number of activity sequences which are fundamental to its survival in its desert environment (for the explanation genres mounting these sequences, see Unsworth 1997a, 1997b, 1997c; Veel 1992). There are processes of transpiration and photosynthesis to consider, including the spinifex bush's adaption for these in its desert environment (the fact that each blade

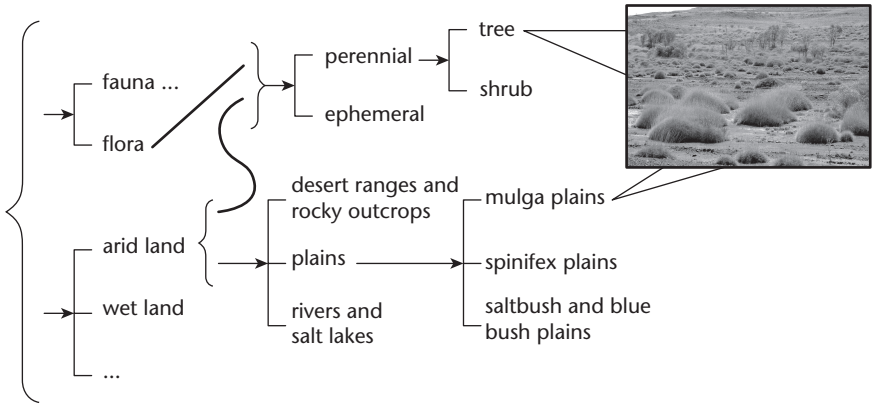


FIGURE 5.3 Physical geography classification of spinifex bush (flora x environment)[2]

of this grass has its own root which penetrates three or more meters into the soil for example, or the curled leaves which curtail water loss but are annoyingly painful for the humans who run into them). And turning from day time to life time, we can consider its life cycle – moving from its generation as a young hummock, to a mature clump (hollowing out with a dead centre as its grows outwards and thereby creating a favourite sleeping spot for kangaroos), to its loss of foliage when it burns intensely in fire, to its regeneration from its roots (or fire-induced germination from seeds). An outline of this cycle is presented as Figure 5.4.

From the perspective of Legitimation Code Theory (LCT) the strength of the 'semantic density' of the entity spinifex (the number of meanings condensed by the term), as understood in physical geography, includes its 'valeur' in the composition and classification taxonomies exemplified above, alongside the role it plays in any sequences in which it is involved (see Maton 2014; Maton and Doran 2017a, 2017b). There is thus much more to the meaning of the term than a simple definition affords (Halliday and Martin 1993; Martin 1989; Wignell *et al.* 1990) – relatively strong semantic density (conceived in terms of the number of semantic relations in play) is involved as well.

Horizontal discourse

Bernstein distinguishes 'horizontal discourse' from 'vertical discourse'. He characterizes a horizontal discourse as entailing:

> a set of strategies which are local, segmentally organized, context specific and dependent, for maximizing encounters with persons and habitats . . . This form has a group of well-known features: it is likely to be oral, local, context dependent and specific, tacit, multi-layered and contradictory across but not within contexts. *(2000: 157)*

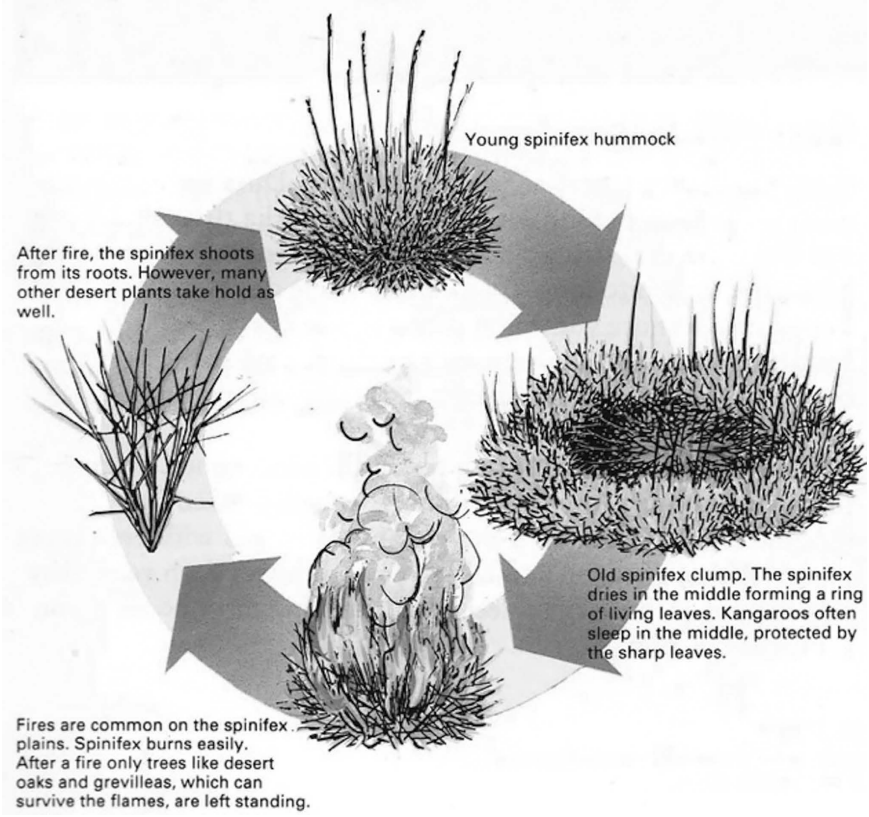


FIGURE 5.4 Life cycle of the spinifex (Scott and Robinson 1993: 25)

In terms of Martin's typology of common sense and uncommon sense fields (1992: 539), this type of discourse typically involves oral transmission – combining ostensive definition of entities in the sensuous environment (by naming while pointing to them) with joint participation in activity sequences (where elders play a guiding role until satisfactory performance is developed); this kind of learning by 'doing with' in the home before schooling is well documented in the SFL language development studies, by Halliday (e.g. 1975, 2003) and by Painter (e.g. 1984, 1999, 2003).

Everyday reality (common sense fields)

As far as the entities of everyday life are concerned, the well-known children's song 'Head, shoulders, knees and toes' provides an exemplary illustration of the nature of common sense fields. One version of the lyrics, among many local variations, is provided as Text 1 below. As the song is sung, participants touch the relevant body part with both hands, speeding up the singing of the verses until their gestures can't

keep up. The verses canvas the relevant parts of a pre-school child's body as far as domestic needs are concerned, building up as they do a common sense part-whole (compositional) taxonomy of body parts.

[Text 1]

Head and shoulders knees and toes
Knees and toes
Head and shoulders knees and toes
Knees and toes
And eyes and ears
And mouth and nose
Head and shoulders knees and toes
Knees and toes
Feet and tummies arms and chins
Arms and chins
Feet and tummies arms and chins
Arms and chins
And eyes and ears
And mouth and shins
Feet and tummies arms and chins
Arms and chins[3]

Composition taxonomies of this kind are relevant to various domestic activities including washing, dressing, eating and so on and can be drawn on as required when learning with an adult guide or more capable peer. The children's picture book *Sunshine* (1981) images one sequence of this kind (Figure 5.5), as a young girl gets herself ready for school – now doing on her own what for several years her parents had to help her with (with tying shoe laces or buckling shoes as perhaps the penultimate stage in contemporary western versions of this particular developmental process, followed later on, for males at least, with learning to tie a tie).

Extended reality (specialized fields)

Ostensive definition and learning by 'doing with' also characterize a range of fields that Martin (1992: 542) characterizes as specialized (cf. Halliday and Martin 1993; White 1998). These involve what we might think of as the extended reality of trades, crafts, hobbies, sports and recreational activities. These fields typically involve more elaborated taxonomies than everyday ones, and activity sequences with more tiers of action.

By way of illustrating a more elaborated taxonomy, consider the nomenclature for muscles in body building. In this specialized field, what in everyday discourse we simply refer to as an arm has to be broken down into its musculature. We have biceps, triceps and forearms to consider. For biceps we have to further consider the

FIGURE 5.5 Getting dressed (Omerod 1981)

Brachialis and Biceps Brachii muscle groups, further dividing Biceps Brachii into long head and short head muscles; and triceps (Triceps Brachii) are divided into long head, lateral head and media head muscles. These taxonomic relations are outlined below (I won't pursue the musculature of forearms here).

biceps
    Brachialis
    Biceps Brachii
        long head, short head

triceps (Triceps Brachii)
    long head, lateral head, medial head

This elaborated nomenclature, alongside taxonomies for what are colloquially referred to as pecs, traps, delts, lats, quads, abs and so on is fundamental to body building in relation to weight training and the body shape that training is designed to produce. As with everyday discourse, the entities named are part of sensuous experience – both felt and observed during training and posed in competition. Making visible each muscle group is essential in this field.

By way of illustrating multi-tiered activity, let's consider tennis. In this sport activity sequencing involves a match, with each match typically involving one, three or five sets, with each set involving six or more games (with a maximum of 13 games if a tie-break game is played at six all), with each game involving four or more points (except for a tie-break set which involves a minimum of seven points), with each point involving

one or more shots. Shots can be divided into serve, groundstroke, volley and overhead, the latter three of which can be cross-classified as forehand or backhand. Groundstrokes can be further divided into drive, half-volley, drop shot and lob, all of which can be cross-classified as played flat or with spin, and if with spin, then as slice or top-spin.

shot:
serve, groundstroke, volley, overhead
[forehand/backhand (except serve)]

groundstroke:
[flat/spin: topspin/slice]
drive, half-volley, drop shot, lob

Keeping this classification in mind, each shot can be broken down into a further tier of sequencing. A serve for example involves preparation, stroke and follow through; and the preparation can be broken down into taking position, grip (for both ball and racquet) and concentration, with the stroke itself involving the ball toss and coincident swing consummated in hitting the ball. Without pushing through to the finer points of how exactly to make contact with the ball (elevation, racquet angle and trajectory, ball toss position, body torque, etc.) we have established seven tiers of activity (i.e. match, set, game, point, shot, stroke, hit), many more tiers than need to be managed in everyday sequences – which is why coaching rather than uninformed parenting is required to train a player well.

White (1998) coins the term 'technocality' to refer to the elaborated taxonomies and activity sequences at play in specialized fields. The term usefully calls to mind the technology involved in mechanized fields, where a prolonged apprenticeship is involved in managing machines and their operations. In fields of this kind we often find labelled diagrams outlining relevant composition taxonomies and flow charts imaging relevant tiers of activity (cf. Rose *et al.* 1992 on the discourse of science industry). As White notes, specialized fields often feature acronyms which condense Classifier^{n} Thing complexes into more manageable short-hand terms (e.g. RAM for 'random access memory', or ROM for 'read only memory' in computing). While the taxonomic import of such terms may be lost on lay users, their relative transparency makes them easy to unpack for specialists in a field (thereby enhancing their utility).

In general terms then, although they are learned in the same way as everyday domestic fields, specialized fields can be distinguished in several respects. Their elaborated taxonomies and multi-tiered activity sequences mean that they are learned through mentoring, apprenticeship, training, coaching and initiating rather than parenting. This hands-on transmission means that although the activities involved sink beneath consciousness once mastered, they can be recovered and brought to consciousness as required. Playing a tennis shot for example is something we enact as automatically as possible during a point, so we can concentrate on strategic aspects of play; but if a shot is breaking down, we bring the relevant tier of activity back to consciousness and try to adjust the shot accordingly (e.g. adjusting our grip,

our ball toss, our wrist action, etc. on serve). We can also note here the tendency of specialized fields to complement technical ones (Bernstein's 'vertical discourse') in regions of practice – consider for example the relation of mechanics to engineers, of builders to architects, of trainers to sports physiologists, of lab assistants to scientists, of nurses to doctors, of detectives to forensic scientists, of accountants to economists, of Justices of the Peace to lawyers and so on. Increasingly, in post-Fordist neo-liberal economies, the complementarity of specialized and technical discourses is becoming more weakly classified. There is an increasing tendency for written documentation of specialized taxonomies (in multimodal report genres) and activity sequences (in multimodal procedure and protocol genres); and this means that specialized fields increasingly involve at least some institutionalized learning (technical college, sports academy, boot camp, etc.). The specialized knowledge that once relied on oral transmission in a region of practice now depends at least in part on functional literacy in programmed learning (Rose *et al.* 1992).

Vertical discourse

As noted above, Bernstein (2000: 157) distinguishes horizontal discourse from vertical discourse. He characterizes vertical discourse as taking 'the form of a coherent, explicit and systematically principled structure, hierarchically organized as in the sciences' or 'the form of a series of specialized languages with specialized modes of interrogation and specialized criteria for the production and circulation of texts as in the social sciences and humanities.'

In terms of Martin's (1992: 544) typology of common sense and uncommon sense fields, this type of discourse typically involves written transmission in institutionalized contexts of learning, religious or secular; advanced literacy is crucial. Bernstein's division between the sciences and the social sciences and humanities echoes work by Martin and his colleagues (e.g. Christie and Martin 1997; Martin 2012) on degrees of technicality and abstraction as syndromes of meaning differentiating vertical discourses.

Elaborating this framework Bernstein characterizes the more scientific discourses as 'hierarchical knowledge structures' which evolve by attempting 'to create very general propositions and theories, which integrate knowledge at lower levels' and in this way show 'underlying uniformities across an expanding range of apparently different phenomena' (2000: 161–2). These he opposes to 'horizontal knowledge structures' which tend to evolve via the introduction of a new 'language' which constructs a 'fresh perspective, a new set of questions, a new set of connections, and an apparently new problematic, and most importantly a new set of speakers' (2000: 162). As an example from social science we might propose the diverse models of language proposed in functional linguistics (e.g. role and reference grammar, Dik's functional grammar and systemic functional grammar as reviewed in Butler 2003).

As is well known, SFL generally adopts a tri-nocular perspective on meaning, with ideational meaning construing reality, interpersonal meaning enacting social relations and textual meaning organizing these construals and enactments into

waves of information flow. We'll start our discussion of uncommon sense fields by focusing on ideational meaning, since this is where so many discussions of field and technicality in SFL begin – before moving on to a consideration of interpersonal and textual dimensions of vertical discourse.

Alter-reality (technicality)

Tim Flannery, an acclaimed Australian biologist and environmentalist celebrates the style of Glickson's 2014 *Evolution of the Atmosphere* as follows:

> *[Text 2]*
>
> 'Elevated CO_2 led to acidification of ocean water from –8.2 to –7.5 pH and the extinction of 35–50% of benthic formaminifera over –1000 years.'
>
> This neatly summarizes countless hours of research, and describes an Earth whose atmosphere was so supercharged by greenhouse gases that the acidifying oceans led to mass extinctions, ecosystem crises and an ocean floor corroded red with acid. Only when conditions are reduced to such simple terms can meaningful comparisons between various crises in Earth's history be made.
>
> *(Flannery 2014: 44)*

In particular he admires the concise expression afforded by Glickson's technicality, which includes chemical and mathematical symbols (*CO_2, –8.2, –7.5 pH, 35–50%, –1000*) and technical terms referring to both entities (*benthic formaminifera*) and processes (*acidification, extinction*). Clearly the knowledge condensed in these symbols and terms cannot be learned by simply pointing out concrete objects in the world and jointly undertaking physical activity; the knowledge Glickson and Flannery are sharing here depends on years of training in school and university settings, drawing heavily on written texts, where vertical discourse is stored – supplemented along the way by the text mediating spoken discourse of lectures and seminars, and exemplificatory and exploratory interactive discourse in laboratories and in the field.

As part of this training scientists develop alternative ways of classifying and composing the world and explaining change along many scales of time. In terms of classification, they learn for example that forminifera (literally 'hole bearers') are single-celled amoebid protists, thereby arranging them in a still contested classification of their place among the living things in the world; and they learn that the Classifier *benthic* places the forminifera in question as living at the bottom of a body of water, on or just under sediment. In terms of composition they learn that amoeboid protists feature shells (more technically tests), commonly made of calcium carbonate ($CaCO_3$), and also pseudopodia (literally 'false feet') which extend and retract and are used for movement and nutrition. Note that an accessible definition like the one that follows distils just some of this knowledge:

[Text 3]

> Benthic foraminifera are a phylum of amoeboid protists characterized by their thin pseudopodia that form an external net for catching food and an external shell for living on or within seafloor sediment.

Definitions in science are simply a guide to the uncommon sense classification, composition and implication sequences relating phenomena to one another; they by no means exhaust the field relations involved.

Turning to processes, ocean acidification can be defined as the ongoing decrease in the pH of the Earth's oceans, due to the uptake of carbon dioxide (CO_2) from the atmosphere. This implicates a measure of the acidity or basicity of a liquid (pH), with pure water taken as a base line of 7 (solutions less than 7 are acidic, more than 7 as basic or alkaline). Chemically speaking, what is measured is the concentration of hydronium ions (H^+). And the definition flags a chemical process whereby carbon dioxide (CO_2) reacts with water (H_2O) to form carbonic acid (H_2CO_3). Some of these molecules in turn react with water molecules to produce a bicarbonate ion and a hydronium ion, thereby increasing acidity. I won't take time to consider the classification and composition taxonomies and elemental arrays organizing the chemical entities at play here; their symbolism makes aspects of this clear. Suffice it to say that technicality is as critical to processes in science as it is to entities. Alter-reality construes a world of both uncommon sense entities and the uncommon sense sequences in which they are involved (termed implication sequences to highlight the logical 'if/then' unfolding of such sequences in Martin 1990).

In many knowledge structures the verbal relations reviewed thus far are supplemented by symbolic and imagic modalities that afford a 'hyper-technicality' further extending the vertical discourse of these disciplines. Doran (2018) explores the use of mathematics and images (graphs in particular) to extend physics discourse along these lines. Here I'll draw on an example from linguistics to illustrate the function of symbolization and the alter-grammar symbolism affords.

A fragment of the grammar of English MOOD is presented as Figure 5.6 (following notation reviewed in Martin 2013b). The system network contains a number of technical terms (known in SFL as features) for classes of clause: major, indicative, imperative, declarative, informative, exclamative, interrogative, polar, wh, positive and negative. In addition it contains a number of symbols for the structural implications of these features: P, C, A, Wh-, S, F, MA, Whex and neg. Note that these are symbols, not abbreviations for verbalized terms. Wh- is lexicalized through the interrogative words *who*, *what*, *which*, *where*, *when*, *why* and *how*, Whex through both *what a^…* (e.g. *What a fool he is!*) and *how^…* (e.g. *How silly she was!*) and neg through *not/n't*, *hardly*, *scarcely*, etc.

The technical terms and the symbols are related to one another in the network by the downward slanting arrow, which formalizes the axial relation of system (paradigmatic relations) to structure (syntagmatic relations) in SFL. This relation takes us beyond the taxonomy, array and sequence relations introduced for field above. Doran (personal communication) has suggested the term 'implication complex' for field relations of this kind.

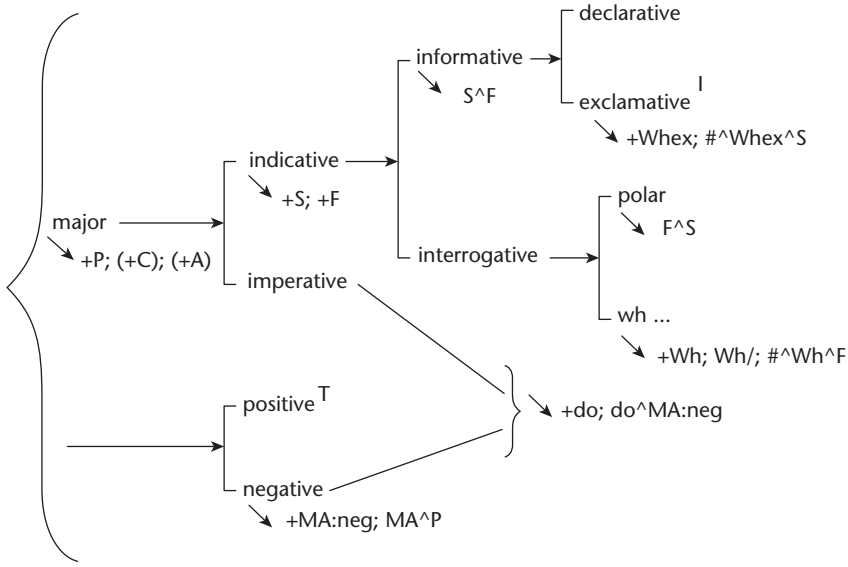


FIGURE 5.6 A fragment of English MOOD (Martin 2013b)

In addition to this implication complexing (axis) the system network formalizes a hyper-technical 'syntax' that relates symbols logically to one another. This is perhaps easier to observe if I remove the technical terms and symbols from the diagram as in Figure 5.7. The right-facing square brackets with horizontal arrows leading into them relate features as alternatives in systems (logical 'or'); and the right-facing brace relates systems as cross-classifying one another (logical 'and'). Turning to the symbols, the + before a symbol for example indicates that the symbol is present in a structure; and #^ indicates that the symbol comes first in its structure. I won't take time here to outline this alter-grammar in more detail; a full discussion is presented in Martin (2013b). My point here is that the hyper-technicality of the symbols and the specialized syntax relating symbols succinctly formalize knowledge that takes much longer to construe in verbal discourse.

The succinctness of this formalization, as an 'eyeful' we might say, in addition facilitates consideration of degrees of interdependency among terms and symbols that would be very awkward to conceive using verbal language alone. As highlighted in Figure 5.8, we can observe a number of interdependencies among features in the network. The $^{I/T}$ superscript notation, for example, ensures that exclamative clauses are positive but not negative (*What a fool he is!,* ⋆*What a fool he isn't!*). The left-facing brace takes into account the fact that negative imperative clauses, but not positive imperative ones, require the insertion of *do* (*Take care*, ⋆*Don't worry*). And the arrows leading from technical terms to the choice of alternative features shows the dependency of certain choices on others; only informative clauses can be exclamative or declarative, not interrogative or imperative ones (*What a fool he is!,* ⋆*Is he what a fool!,* ⋆*Be what a fool!*). It was precisely interdependencies of this

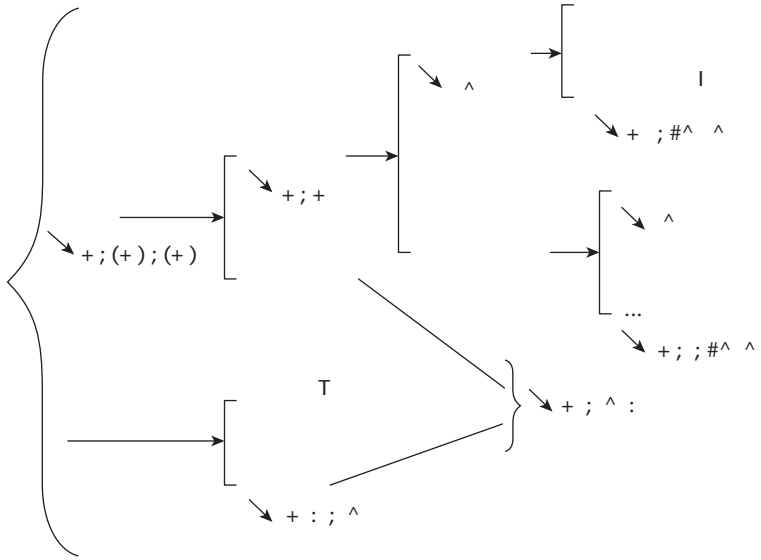


FIGURE 5.7 The hyper-syntax of the MOOD network in Figure 5.6

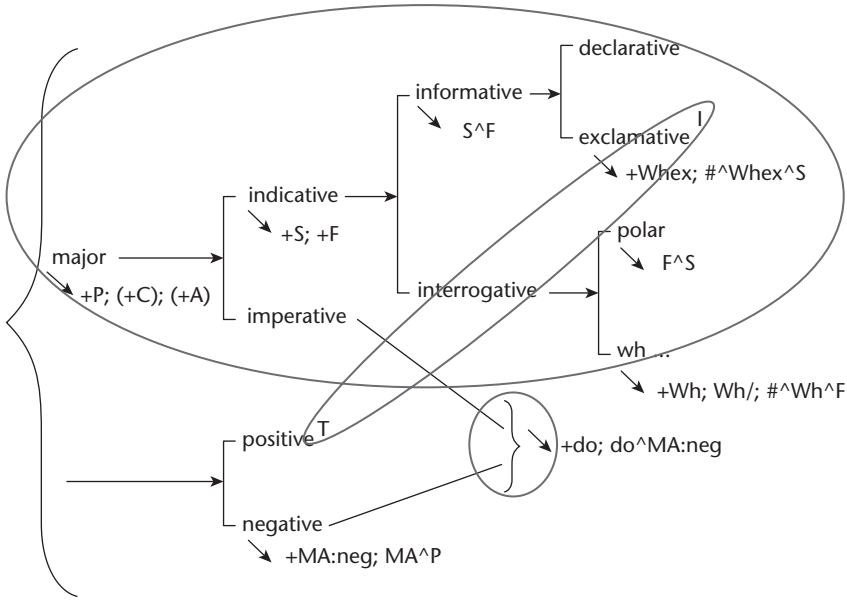


FIGURE 5.8 Interdependency among MOOD systems in relation to the concept of metafunction

order that led Halliday (e.g. 1969) to the 'discovery' of metafunctions – namely the idea that clause systems in English grammar tend to fall into three main groups according to the degree of interdependency among features, which he referred to as TRANSITIVITY, MOOD and THEME (later extended and generalized as ideational, interpersonal and textual strands of meaning across ranks and strata, and later modalities). SFL's hyper-technicality can thus be seen to lead to the derivation of new concepts which the lexicogrammar of verbal language would not afford. Doran (2017) outlines the way in which mathematics works in a comparable way for the generation of new knowledge in phsysics – where it arguably plays a far more instrumental role than hyper-technicality in linguistics (in the interests of both quantification and the derivation of new concepts).

Terms like metafunction in linguistics (or impulse in physics, or semantic density in LCT) are examples of terms for the implication complexes that feature more or less strongly in the technical discourses of the sciences and social sciences. We still have a great deal of work to do exploring the role of symbols, images and artifacts which interact with language in the construal of uncommon sense discourse. Our understanding of field has already been pushed well beyond the initial work on taxonomy and sequencing introduced above, largely through Doran's (2018) work on arrays and implication complexing. Further work on the multimodal texts enacting disciplinarity is likely to lead to further renovations still.

Alter-sensibility (values)

Let's return now to Flannery's review of Glickson, and take note of another dimension of Flannery's identity, reflecting his climate change activism. He prefaces the quotation he subsequently celebrates for its technicality as follows:

> *[Text 2']*
>
> Earth is revealed in all its manifestations: from an oxygen-free infant with toxic oceans and precious little land 3 billions years ago, to an ageing planet destabilized by a plague of bipedal apes. His description of the ocean during the 'greenhouse Earth' episode of 55 million year ago offers a good example of this style:
>
> > 'Elevated CO_2 led to acidification of ocean water from –8.2 to –7.5 pH and the extinction of 35–50% of benthic formaminifera over –1000 years.'
>
> This neatly summarizes countless hours of research, and describes an Earth whose atmosphere was so supercharged by greenhouse gases that the acidifying oceans led to mass extinctions, ecosystem crises and an ocean floor corroded red with acid. Only when conditions are reduced to such simple terms can meaningful comparisons between various crises in Earth's history be made.
>
> *(Flannery 2014: 44)*

Here the lexical metaphor *a plague of bipedal apes* enacts Flannery's negative judgment of our species' stewardship of our planet, a coupling he offers to environmentally concerned readers to share. The review continues by appreciating the effects of the plague as one of various planetary *crises*. This results in an axiologically-charged discourse, condensing the 'feelings, political sensibilities, taste, values, morals, affiliations and so forth' which Maton (2013: 11) describes as one form of semantic density (termed 'axiological-semantic density' and contrasted with 'epistemic-semantic density').

The complementarity of epistemic and axiological condensation is nicely highlighted in the following passage of repartee from a senior secondary History class focusing on what Australians remember as the Vietnam War. One student, David, appears not to be paying attention and his teacher asks him to tell the class about communism.

[4]

Teacher: (teacher lets out a big breath) Where are we? David, you're sitting there by yourself. You can tell us about communism, OK?
David: Don't make me do that. That's against my Christian beliefs.
Students: (laugh)

The humour here of course depends on the axiological charging of communism by many sections of Australian society as intolerant of religion. Epistemologically speaking there is of course no necessary opposition between communism and religion, as the Pope's recently welcomed brokering of Cuban and American relations has illustrated. As far as technicality is concerned, communism contrasts with capitalism, not Christianity – with respect to public or private ownership of the means of production. At the same time, axiologically speaking, in neo-liberal discourse communism is loaded with values which colour it as opposed to freedom, democracy, Christianity and so on. Martin (2013a: 29) refers to weakly classified terms such as the '-isms' of history discourse (communism, socialism, nationalism, colonialism, etc.) as 'flexi-tech' on the basis of the relatively small number of field relations they enter into with comparable terms and the way in which humanities scholars tend to adapt their meaning from text to text according their particular interpretative needs (as documented in Martin and Matruglio (2010) for Australian secondary school Modern History). This perhaps makes such terms especially prone to what Maton (2013) terms 'axiological condensation', especially in politicized discourse – where oppositions such as communism vs religion or socialism vs democracy depend solely on their axiological charge and this charge so often appears to have seriously undermined any epistemological condensation the terms might otherwise afford.

We need to emphasize here, however, that axiological condensation is part and parcel of every field; even technical terms have value. Consider for example Halliday's 1977 review of ideas about language, which epistemologically contrasts a

TABLE 5.1 Ideas about language

Philosophical-logical tradition	*Descriptive-ethnographic tradition*
Linguistics as part of philosophy	Linguistics as part of anthropology
Grammar as part of logic	Grammar as part of culture
Stresses analogy	Stresses anomaly
Prescriptive or normative in orientation	Descriptive in orientation
Meaning as truth function	Meaning as rhetorical function
Language as thought	Language as action
Language as rules	Language as resource
Formal analysis of sentences	Semantic interpretation of discourse
Grammaticality according to rule	Acceptability according to usage
High degree of idealization	Lower degree of idealization
Decontextualized examples	Real examples
Absolutists	Relativists

(Halliday 1977)

philosophical–logical tradition with a descriptive–ethnographic one (as summarized in Table 5.1). While most linguists would readily acknowledge the complementarity of these intellectual traditions in the discipline, in their hearts most would align with one orientation or the other – warmly welcoming work fostering the tradition they favour and negatively valuing work in the other. And it is values, not rationality, that matter most when it comes to many spheres of legitimation – in relation to appointments, promotions, publications, reviews, conference presentations, honours and so on.

So as far as axiology is concerned, even the technicality of both the formal and functional traditions invokes attitude (Martin and White 2005). Maton expands on axiological condensation and charging as follows:

> As Bourdieu argues 'taste classifies, and it classifies the classifier' (1984: 6): your taste in films, furniture, music, clothes and so forth, say something about you. Similarly, a scholar's choice of theory, citations, writing style, figures, titles, punctuation and so forth, offer messages about what kind of person they are by virtue of the axiologically charged constellation to which those stances are assigned . . . They show whether your heart is in the right place, your aesthetic, ethical, moral or political affiliations correct, and so whether you are one of us or one of them. In other words, the axiological cosmology generates a *hierarchical knower structure*, a ranking of actors based on how moral, righteous, virtuous, ethical or politically progressive they are considered to be.
>
> *(Maton 2014: 163)*

From a linguistic perspective this raises the question of how fields accrue values. Recent work on iconization sheds some light on the processes involved from logogenetic (text-time), ontogenetic (life-time) and phylogenetic (evolutionary-time)

perspectives (Bednarek and Martin 2010). Iconization is a process whereby the conceptual meaning of an event or entity is backgrounded and its value to the members of a group is foregrounded – a process whereby ideational meaning is discharged and axiological meaning charged.

We are probably most familiar with this process as it manifests in idioms (Chang 2004). The phrase *cool as a cucumber*, for example, began as a lexical metaphor and over time turned into an idiom judging someone as imperturbable. The expression is now so conventionalized that it doesn't call the salad vegetable to mind. Caple's analysis of image nuclear news stories (2013) describes the way in which images are often used to in effect re-charge the ideational meaning of conventional attitudinal expressions of this kind (as when an image of Belarus soldiers pouring a bucket of cold water over themselves during a Slavic holiday interacts across modalities with the story's title 'Getting the Cold Shoulder').

Iconization is also familiar as it manifests in interpersonal grammatical metaphors, modality metaphors in particular. In the exchange shown in Text 5 (from the episodes 'The great game' in the BBC Television series *Sherlock*), Watson tries to preface a conjecture with an explicitly subjective modality of probability (*Has it occurred to you that*…). But before he can articulate his thought Holmes interrupts him, taking his modality metaphor as face value as a genuine query about his mental processing. Watson perseveres, taking the sardonic interruption in his stride, to make his point – a point which, as ever, Holmes has already considered. The clever repartee of course depends on Holmes re-charging the ideational meaning (i.e. the mental process *occur*) of the metaphor Watson intended as charged with interpersonal meaning (i.e. the modality he might have enacted congruently as *perhaps*).

[Text 5]

Watson: You realize we've only stopped for breath since this thing started. Has it occurred to you…
Holmes: Probably.
Watson: No, has it occurred to you that the bomber's playing a game with you. The envelope. Breaking into the other flat. The dead kid's shoes. It's all meant for you.
Holmes: Yes, I know.

Stenglin, in her work on space grammar (2008; Martin and Stenglin 2007) notes that spaces, artefacts and texts may be supercharged with axiology to the point where they function as bonding icons (bondicons for short) embodying shared values around which fellowships are formed. Among well-known bondicons are the symbols of peace which anchor communities of protest against war (e.g. the semaphore-based peace sign designed for the British disarmament movement in 1958 or the dove), alongside inspirational leaders such as Gandhi or Mandela, who embody (among other values) the principles of peaceful protest and forgiveness respectively. Further examples would include the ceremonies, proverbs, slogans,

memorable quotations, logos, flags, team colours, coats of arms, mascots and so on that rally communities around shared ideals.

Recently Tann (2010a, 2010b, 2013, 2017) has developed a valuable framework for thinking about iconization in relation to communal feeling involving the concepts of *gemeinschaft*, *doxa* and *oracle* – where *gemeinschaft* constructs identities as communities and oppositional categories, *doxa* constructs identities in terms of communal values around which the communities rally and oracle constructs identities as specific people and things that exemplify the community. In terms of this paper oracles can be thought of as bondicons invoking the shared values (*doxa*) which affiliate members in communities (*gemeinschaft*). As far as oracles are concerned, SFL iconography would include its founding guru Halliday, its imagic artifacts (e.g. the co-tangential strata in Figure 5.1 or system network in Figure 5.6) and well-known 'scripture' (such as the passage on shunting from Halliday 1961). A more complete picture of SFL iconography is presented in Figure 5.9. As far as the 'us and them' of *gemeinschaft* is concerned, Australian-based SFL is positioned in relation to America's Role and Reference Grammar (van Valin and LaPolla 1997) and the Netherlands's Functional Discourse Grammar (Hengevelt and Mackenzie 2008). Two key SFL values are highlighted as *doxa*: the notion of meaning as choice and functionalism. And three SFL bondicons are presented: a photo of Halliday, the front cover of the fourth edition of his *Introduction to Functional Grammar* (2014) and

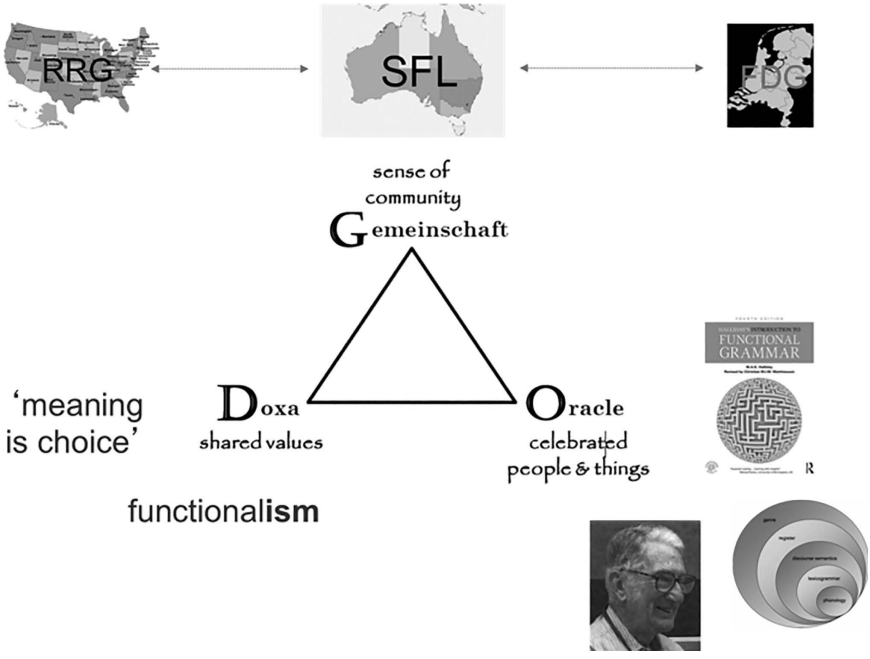


FIGURE 5.9 SFL iconography (after Tann 2013)

the co-tangential circle strata diagram (Martinian articulation). For further exemplification of Tann's model, in the context of restorative justice, see Martin and Zappavigna (2013).

SFL work on processes of iconization in SFL is still in its infancy. But as Maton's provocation has made clear, there is more to any field than its epistemology. What Maton refers to as 'semantic density' includes axiological condensation as well as epistemological condensation; as Maton (2014: 66) puts it 'For every knowledge structure there is also a knower structure'. And this brings shared values clearly into the picture. SFL tools for analyzing attitude, including the attitude invoked by ideational meaning, are by now widely available (based in part on their consolidation in Martin and White 2005). But much more work is needed on their role in charging fields axiologically speaking, as texts unfold, as individuals develop and as cultures evolve.

Alter-texture (composition)

We are now in position to return to Flannery's text a third time and consider how he brings his bi-focal gaze, as scientist and activist, to bear on the passage he cites from Glickson. As far as the discourse semantic system of identification is concerned (Martin and Rose 2007), in play here are two instances of text reference[4] – *this* and *such*. The demonstrative *this* is used to consolidate the quotation as a participant (which as such can summarize research); the comparative *such* (cf. *simple terms like this*) likewise consolidates the quotation, this time as a circumstance (the semiotic product of Glickson's labours).

[Text 3]

> 'Elevated CO_2 led to acidification of ocean water from –8.2 to –7.5 pH and the extinction of 35–50% of benthic formaminifera over –1000 years.'

> **This** neatly summarizes countless hours of research, and describes an Earth whose atmosphere was so supercharged by greenhouse gases that the acidifying oceans led to mass extinctions, ecosystem crises and an ocean floor corroded red with acid. Only when conditions are reduced to **such** simple terms can meaningful comparisons between various crises in Earth's history be made.
> *(Flannery 2014: 44)*

As we can see, text reference allows writers to construe passages of discourse as semiotic entities and thereby afford their participation in clause grammar. Indefinitely large configurations of meaning can be aggregated in this way. Unlike technicality, which distils configurations of meaning as concepts in a field, text reference aggregates meaning instantially, as a text unfolds. The consolidation of meaning is thus text specific; it does not in itself reconstrue (ideationally) or charge (axiologically) the field. By way of illustrating something of the range of meaning that can be aggregated using text reference, consider Text 6 below, where *this* in the final paragraph consolidates the preceding four paragraphs as a Circumstance of cause.[5]

[Text 6]

While Pompeii is one of the most studied of the world's archaeological sites, it has been plagued with serious conservation problems, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.

Much of the restoration work on Pompeii has been done by local firms with no specialized knowledge of restoration techniques. For example the timber roof on the House of Maeger was so poorly designed it could not support the weight of the tiles and collapsed. Poor quality mortar has also been used to protect ancient stonework. Over time this mortar has cracked, allowing water and vegetation to penetrate.

The incursion of uncontrolled weeds has hastened the decay of the ruins. Over 30 different varieties have been identified, including ivy, fennel and fig. As the roots grow they open up further cracks, allowing even more weeds in.

Pompeii's position as an international tourist attraction brings half a million visitors each year. No special walkways for viewing platforms have been constructed, so tourists walk along ancient paths and enter buildings that are not roped off. In some places ancient lead water pipes have been exposed.

There seems to be no overall management plan for the site. Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. Available finance has been poorly managed and no proper conservation and interpretation program has been put in place.

As a result of **this**, the description of Pompeii as a victim of state neglect and indifference and an archaeological catastrophe of the first order is an apt one. It's ongoing destruction since its discovery in the 1590s has arguably resulted in a greater disaster than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

Periodicity is another resource which can be deployed to aggregate meaning instantially as a text unfolds. The Hyper-Themes for each paragraph in Text 6' below consolidate the elaborating meanings which follow. In Text 6' there is also a Macro-Theme consolidating the meaning of these Hyper-Themes and a Macro-New, aggregating the meaning developed in the text as a whole. I have used the symbol '=' below to flag the way in which higher level Theme and New aggregate lower level waves of information.

[Text 6']

Macro-Theme
While Pompeii is one of the most studied of the world's archaeological sites, it has been affected by poor restoration work, damage from vegetation, pressure from tourism and poor site management.
=

Hyper-Theme
Much of the restoration work on Pompeii has been done by local firms with no specialized knowledge of restoration techniques.

=

For example the timber roof on the House of Maeger was so poorly designed it could not support the weight of the tiles and collapsed. Poor quality mortar has also been used to protect ancient stonework. Over time this mortar has cracked, allowing water and vegetation to penetrate.

Hyper-Theme
The incursion of uncontrolled weeds has hastened the decay of the ruins.

=

Over 30 different varieties have been identified, including ivy, fennel and fig. As the roots grow they open up further cracks, allowing even more weeds in.

Hyper-Theme
Pompeii's position as an international tourist attraction brings half a million visitors each year.

=

No special walkways for viewing platforms have been constructed, so tourists walk along ancient paths and enter buildings that are not roped off. In some places ancient lead water pipes have been exposed.

Hyper-Theme
There seems to be no overall management plan for the site.

=

Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. Available finance has been poorly managed and no proper conservation and interpretation program has been put in place.

=

Macro-New
The description of Pompeii as a victim of state neglect and indifference and an archaeological catastrophe of the first order is an apt one. Its ongoing destruction since its discovery in the 1590s has arguably resulted in a greater disaster than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

Textual aggregation often interacts with ideational and interpersonal resources which both reinforce and take advantage of the scaffolding. Ideationally speaking semiotic nouns may couple with text reference to both name and aggregate a phase of discourse. Flannery uses metadiscourse in this way in Text 6 through the phrase *such…terms* (with *such* as text reference and *terms* as metadiscourse). Text 6' is reworked as 6" below, which deploys the semiotic noun *factor* to name the causes of the degeneration of Pompeii as an archaeological site.

[Text 6′′]

Macro-Theme
While Pompeii is one of the most studied of the world's archaeological sites, it has been affected by a number of **factors**, including poor restoration work, damage from vegetation, pressure from tourism and poor site management.
=
[…]
=
Macro-New
As a result of these **factors**, the description of Pompeii as a victim of state neglect and indifference and an archaeological catastrophe of the first order is an apt one. Its ongoing destruction since its discovery in the 1590s has arguably resulted in a greater disaster than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

Internal conjunction can also be deployed to reinforce the scaffolding composed by high level periodicity. The conjunction *finally* is used in this way in Text 6′′′ below to temporally position the final cause canvased in relation to the presentation of the previous three. The rhetorical effect is to aggregate the first three factors in relation to the fourth.

[Text 6′′′]

[6′′′] Much of the restoration work on Pompeii has been done by local firms with no specialised knowledge of restoration techniques. For example the timber roof on the House of Maeger was so poorly designed it could not support the weight of the tiles and collapsed. Poor quality mortar has also been used to protect ancient stonework. Over time this mortar has cracked, allowing water and vegetation to penetrate.

A second problem is the incursion of uncontrolled weeds which have hastened the decay of the ruins. Over 30 different varieties have been identified, including ivy, fennel and tig. As the roots grow they open up further cracks, allowing even more weeds in.

Pompeii's position as an international tourist attraction brings half a million visitors each year. No special walkways for viewing platforms have been constructed, so tourists walk along ancient paths and enter buildings that are not roped off. In some places ancient lead water pipes have been exposed.

Finally, there seems to be no overall management plan for the site. Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. Available finance has been poorly managed and no proper conservation and interpretation program has been put in place.

A comparable effect can be achieved through an interaction of text reference and metadiscourse as in Text 6'''' below. There *another factor* and *further factor* use comparative reference coupled with metadiscourse to position causes in relation to one another.

[Text 6'''']

Much of the restoration work on Pompeii has been done by local firms with no specialized knowledge of restoration techniques. For example the timber roof on the House of Maeger was so poorly designed it could not support the weight of the tiles and collapsed. Poor quality mortar has also been used to protect ancient stonework. Over time this mortar has cracked, allowing water and vegetation to penetrate.

Another factor is the incursion of uncontrolled weeds has hastened the decay of the ruins. Over 30 different varieties have been identified, including ivy, fennel and fig. As the roots grow they open up further cracks, allowing even more weeds in.

A **further factor** is that Pompeii's position as an international tourist attraction brings half a million visitors each year. No special walkways for viewing platforms have been constructed, so tourists walk along ancient paths and enter buildings that are not roped off. In some places ancient lead water pipes have been exposed.

Finally, there seems to be no overall management plan for the site. Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. Available finance has been poorly managed and no proper conservation and interpretation program has been put in place.

Interpersonally speaking, higher level periodicity can be used to position attitudes in such a way that they prosodically colour elaborating meanings. Inscribed attitude is highlighted in Text 6'''' below where it features in the text's Macro-Theme (*problem*) and Macro-New (*neglect*, *indifference*, etc.) and one of its Hyper-Themes (*problem* again), and is explicitly reinforced in three of the elaborations of Hyper-Themes (*poorly*, *poor*, *carelessly*). The overall effect is to accumulate the negative appreciation, turning up the volume as the text unfolds. With or without lower level propagation of this kind the inscription of negative appreciation in higher level Theme and New enacts an interpersonal aggregation of meaning as the prosodic domain of controlling attitude; in rhetorical terms the text provides evidence for and thus justifies the values being charged.

[Text 6'''''']

While Pompeii is one of the most studied of the world's archaeological sites, it has been plagued with serious conservation **problems**, including poor

restoration work, damage from vegetation, pressure from tourism and poor site management.

Much of the restoration work on Pompeii has been done by local firms with no specialized knowledge of restoration techniques.

For example the timber roof on the House of Maeger was so **poorly** designed it could not support the weight of the tiles and collapsed. **Poor** quality mortar has also been used to protect ancient stonework. Over time this mortar has cracked, allowing water and vegetation to penetrate.

A second **problem** is the incursion of uncontrolled weeds which have hastened the decay of the ruins.

Over 30 different varieties have been identified, including ivy, fennel and fig. As the roots grow they open up further cracks, allowing even more weeds in.

Pompeii's position as an international tourist attraction brings half a million visitors each year.

No special walkways for viewing platforms have been constructed, so tourists walk along ancient paths and enter buildings that are not roped off. In some places ancient lead water pipes have been **carelessly** exposed.

Finally, there seems to be no overall management plan for the site.

Damaged paths and walls have not been repaired, frescoes have not been preserved, and mangy dogs roam the site. Available finance has been **poorly** managed and **no proper** conservation and interpretation program has been put in place.

As a result of these factors, the description of Pompeii as a victim of state **neglect** and **indifference** and an archaeological **catastrophe** of the first order is an **apt** one. Its ongoing destruction since its discovery in the 1590s has arguably resulted in a greater **disaster** than its initial destruction by the eruption of Mt Vesuvius one and a half millennia earlier.

In spoken discourse, the turn-taking resources of negotiation can also be coupled with metadiscourse (and possibly text reference) to aggregate meaning. In the following phase of classroom interaction[6] the teacher asks for one of the students to read aloud (using the semiotic verb *read* to nominate the relevant task) and a male student nominates himself (the A2 A1 A2f exchange below); the student then reads the passage and the teacher acknowledges the service (the A1 A2f exchange below). As we can see the student's A1 move performs a linguistic service aggregating a phase of meaning from the relevant text. Extended services of this kind are often found in classroom interaction, typically managed through what Christie (adapting Bernstein) refers to as regulative discourse (Christie 2002).

[Text 7]

[7]		
A2	T	...Who wants to read?
	Sf	I'm sure Jessica would love to
	SJ	No (inaudible)...
A1	Sm	I'll read.
A2f	T	Thank-you.
A1	Sm	Ah THE ELDER PLINY (AD TWENTY-THREE OR TWENTY-FOR SO SEVENTY- NINE) WAS A DISTINGUISHED WRITER OF EQUESTRIAN STATUS WHO AS A YOUNG MAN HAD SERVED IN THE ARMY ON THE GERMAN FRONTIER. ALTHOUGH HE WROTE ON ROMAN MILITARY HISTORY AND ON ORATORY HE IS REMEMBERED FOR HIS INVESTIGATION OF SCIENTIFIC MATTERS. HIS NATURAL HISTORY COVERED TOPICS INCLUDING GEOGRAPHY, GEOLOGY, BOTANY AND ZOOLOGY. THIS WORK, FINISHED IN AD SEVENTY-SEVEN, WAS DEDICATED TO TITUS, THE SON OF THE EMPEROR VESPIAN
	T	//Vespasian//
	Sm	VESPASIAN, WHO HIMSELF SUBSEQUENTLY BECAME EMPEROR IN AD SEVENTY-NINE. IN AD SEVENTY-NINE PLINY THE ELDER WAS IN COMMAND OF THE ROMAN NAVAL FLEET THAT WAS STATIONED AT MISENUM
	T	//Misenum//
	Sm	=MISENUM, THIRTY-TWO KILOMETRES ACROSS THE BAY FROM VESUVIUS
A2f	T	**Okay.**

One final perspective on aggregation we should comment on here involves multimodal texts which combine verbiage and image in synoptic displays of knowledge. Figure 5.10 below illustrates a multimodal assemblage of this kind which deals with the biological implication sequence inflammation. Stages in the process are summarized verbally along the bottom of the text; and the first two stages are specified multimodally – to the left, image and captions detail the infection, vasodilation and phagocyte migration response (in addition to providing useful information about the compositional relations involved), and to the right the process of phagocytosis is 'blown up' to illustrate phagocytes (both neutrophils and macrophages) squeezing through the walls of a dilated blood vessel and engulfing bacteria. Multimodal synopses of this kind highlight the multi-tiered nature of uncommon sense implication sequences, and the uncommon sense classification and composition relations involved. Where well supported by reading and classroom discussion they can work effectively as summative aggregations of accumulated knowledge; where supportive reading and classroom interaction has not taken place they may well function as impenetrable obstacles to teaching/learning. There is certainly nothing transparent about the knowledge structure they encode.

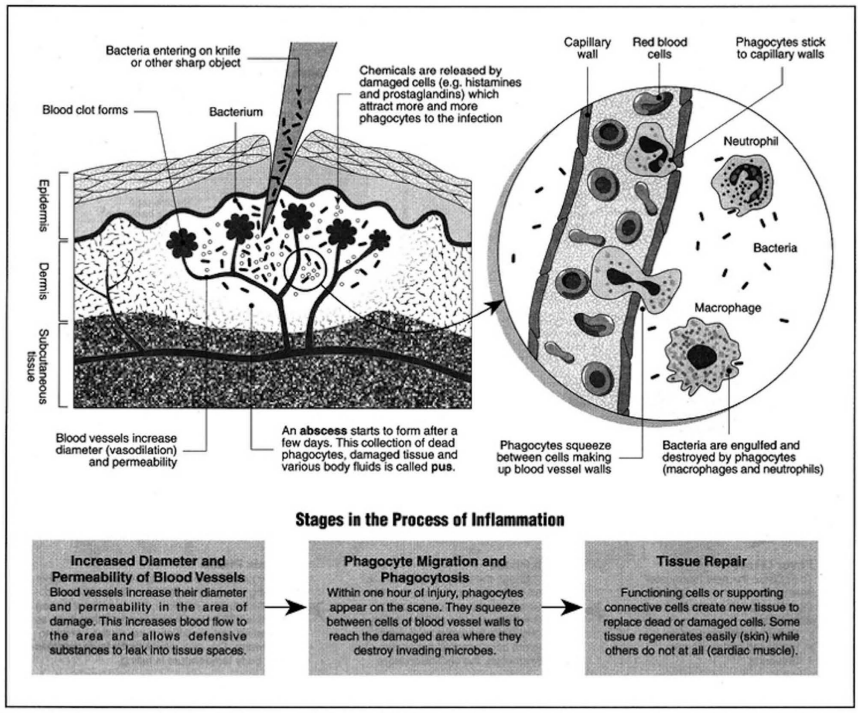


FIGURE 5.10 Inflammation processes (Allen and Greenwood 2004: 119)

Knowledge structure – a metafunctional perspective

Muller (2007) proposes the notion of 'verticality' to describe how theories progress – via ever more integrative or general propositions (echoing Bernstein's strong/weak internal grammar, 2000: 132–4) or via the introduction of a new language which constructs a 'fresh perspective, a new set of questions, a new set of connections, and an apparently new problematic, and most importantly a new set of speakers' (Bernstein 2000: 162). And Muller proposes 'grammaticality' to describe how theoretical statements deal with their empirical predicates (echoing Bernstein's strong/weak external grammar; 2000: 132–4). The stronger the (external) grammaticality of a language, the more stably it is able to generate empirical correlates and the more unambiguously because the more restricted the field of referents. In this paper I have tried to give some semiotic substance to these notions by exploring the structure of knowledge metafunctionally, from the perspectives of ideational, interpersonal and textual meaning. From the perspective of ideational meaning, the key variable is **technicality** – to what degree does the knowledge structure distil meaning as technical terms arranged in field-specific taxonomies, arrays, sequences and complexes. From the perspective of interpersonal meaning the key variable is **iconization** – to what degree does the

knowledge structure charge meaning with values legitimizing participation in a community of practice. From the perspective of textual meaning the key variable is **aggregation** – to what degree does a text consolidate meaning, prospectively or retrospectively, as it unfolds.

Taken together, technicality, iconization and aggregation might be grouped together in SFL under the cover term **mass**. This avoids confusing SFL and LCT by deploying Maton's term 'semantic density' in two distinct theories with different disciplinary affiliations and different knowledge–knower structures. The range of meanings which have been proposed here for the term mass means care must be taken to clarify what variables are being considered whenever the term is used. The number of variables considered will of course depend on the problem being addressed. A study of the transition from home to school, and thus from common to uncommon sense, might well focus on variables associated with technicality. A study of the demands of academic literacy in secondary school would need to add a focus on aggregation to the picture, as managing concentrations of technicality in reading and writing becomes a focal challenge for so many students. A study of the discourses of the humanities would have to deal carefully with iconization and the sensibilities assumed when interpreting the past (in History), literature (in English) or performances (in Creative Arts). Selecting tools on the basis of a problem is the key.

Mass and presence

As noted above, SFL/LCT dialogue around the question of cumulative knowledge-building in secondary school prompted the re-appraisal of work on field in SFL undertaken here. In this paper I have responded to Maton's concept of 'semantic density' from a linguistic perspective by factoring knowledge structure metafunctionally – giving rise to ideational (technicality), interpersonal (iconicity) and textual (aggregation) orientations to mass.

Alongside semantic density Maton proposes 'semantic gravity' as a complementary factor of the LCT dimension named 'Semantics':

> One can thus conceptualize practices in terms of the degree to which meaning relates to its context. This *semantic gravity* may be relatively stronger or weaker along a continuum. When semantic gravity is stronger, meaning is more closely related to its social or symbolic context of acquisition or use; when it is weaker, meaning is less dependent on its context. One can also describe processes of *strengthening* semantic gravity, such as moving from abstract or generalized ideas towards concrete and delimited cases, and *weakening* semantic gravity, such as moving from the concrete particulars of a specific case towards generalizations and abstractions whose meanings are less dependent on that context.
>
> *(Maton 2014: 110)*

Maton's allusion to 'contextual dependency' naturally invited a response from functional linguists who have theorized comparable terminology for some decades in relation to the register variable mode. Martin and Matruglio (Chapter 4, this volume) have responded to this challenge by factoring context dependency metafunctionally – giving rise to ideational (iconicity), interpersonal (negotiability) and textual (implicitness) orientations to what he terms semantic gravity. This factoring is summarized in Table 5.2 below, which in addition considers the kind of presence typically associated with academic discourse – where 'anti-gravity' resources couple in a syndrome of explicitness, factuality and abstraction.

Here I have tried to complement this reconceptualization of context dependency in SFL in relation to a reconsideration of disciplinarity. Table 5.3 summarizes the metafunctional factoring of mass aggregation, iconization and technicality introduced in this paper, and in addition considers the kind of mass associated with academic discourse – where uncommon sense resources amass meaning in a syndrome of integration, radiation and condensation.

Maton (2016: 16) portrays a 'semantic plane' (see Figure 1.7 of Martin *et al.*, Chapter 1, this volume): a topology intersecting the concepts of semantic density and semantic gravity to map semantic codes and position four principal modalities which form the basis of achievement or status in social practices. Inspired by his mapping, I have intersected mass and presence in Figure 5.11 below by way of mapping disciplinarity in terms of the syndromes of meaning characterizing their knowledge–knower structures. The vertical axis orders disciplinarity with respect to degrees of presence; the horizontal axis orders disciplinarity with respect to degrees of mass. The topology thus idealizes (i) the humanities as proto-typically interpretive discourse (−presence, −mass) in relation to its relatively weakly classified technicality, high degree of abstraction and invoked values; (ii) science as prototypically

TABLE 5.2 Types of presence in relation to academic discourse

metafunction	*type of presence*	*academic discourse*
textual	implicitness	explicitness
interpersonal	negotiability	factuality
ideational	iconicity	abstraction

TABLE 5.3 Types of mass in relation to academic discourse

metafunction	*type of mass*	*academic discourse*
textual	aggregation	integration
interpersonal	iconization	radiation
ideational	technicality	condensation

technical discourse (−presence, +mass) in relation to its relatively strongly classified condensed conceptualizations and high degree of abstraction, factuality and explicitness; (iii) trades, crafts, sport, etc. as proto-typically specialized discourse (+presence, +mass) in relation to their relatively complex technicality and hands-on 'here and now' practices; and (iv) domestic activity as prototypically everyday discourse (+presence, −mass) in relation to its relatively simple segmental taxonomies and sequences learned ostensively by doing things with others.

In simpler terms Figure 5.11 idealizes discourses featuring alter-sensibility (the humanities), alter-reality (science), extended reality (trades, crafts, sport, etc.) and common sense (everyday practices). Note however that the axes in our typology are clines, and that discourses or individual texts can be positioned anywhere along the clines in this two-dimensional metaphoric space. Note in addition that Figure 5.11 radically simplifies the outlines of mass and presence in Tables 5.2 and 5.3; the topology is potentially multidimensional, since both mass and presence can each be factored metafunctionally as three axes[7] not one. Note in this regard that for Figure 5.11 I have concentrated on the epistemological dimension of mass (technicality and aggregation), setting aside axiology (iconization). I will not pursue the more delicate mapping of knowledge structures afforded by this factoring here.

As we noted when responding in Martin and Matruglio (Chapter 4, this volume) to Maton's work on semantic gravity (2009, 2011, 2013, 2014; Chapter 3, this volume), interdisciplinarity at its most productive encourages disciplines to interrogate their own knowledge–knower structure, and adjust and expand it as required. SFL and code sociology have impacted on one another in these terms many times over the course of cooperative research since Halliday and Bernstein's initial collaborations in Britain in the 1960s (see Martin 2011; Maton and Doran 2017a, 2017b). Responding to Maton's semantic gravity and semantic density I have had to return

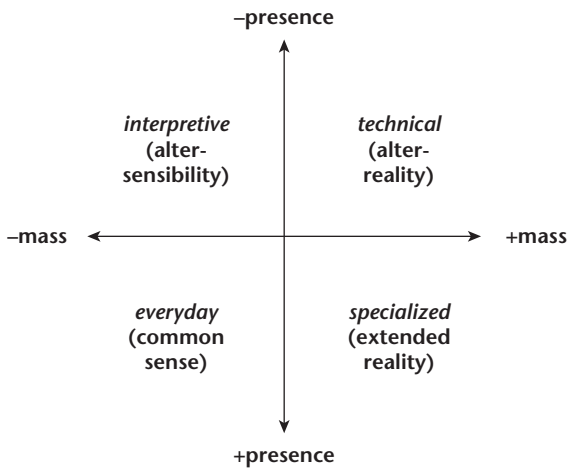


FIGURE 5.11 Mapping knowledge structures (presence by mass)

to the register variables mode and field, and reconsider the picture of meanings at risk outlined in Figure 5.1 – where mode is positioned as by and large composed by textual meanings and field by and large construed by ideational ones. Maton's challenge has led me to rework our understanding of both context dependency and disciplinarity from the perspective of all three metafunctions, not just one. And this of course calls into question the traditional association of context dependency with mode and disciplinarity with field in SFL's realization hierarchy.

I would probably be the last systemicist to set aside the insights afforded by Halliday's association of metafunctions with register variables. As outlined in Martin (2014), one of the primary reasons for proposing a stratified model of context was to strengthen the field/ideational meaning, tenor/interpersonal meaning and mode/textual meaning hook-up Halliday proposed. The predicted correlations have never been properly explored, mainly because of the difficulty we face analysing the discourse semantics of the big data required. This is simply a technological issue and it is far too early to abandon Halliday's vision now.

In the meantime we need to position cross-functional concepts such as presence and mass in our model, in order to foster work on these syndromes of meaning – whether focusing on big data or small. The natural place to escape the tyranny of metafunctions in current SFL theory is the hierarchy of instantiation, where meanings couple across systems as a text unfolds (Martin 2010). Along this hierarchy it doesn't matter whether the couplings draw on meanings from different ranks, strata or metafunctions (or different modalities or even languages for that matter). The challenge is to show how choices from system integrate in an apparently seamless unfolding text. Exploring syndromes of meaning such as presence and mass which cut across metafunctions is a natural part of studies of this kind, and can lead productively to understandings of context dependency and disciplinarity not afforded by the realizational association of textual meaning with mode and ideational meaning with field.

Let me end with just one illustration of this point. If our studies of field are limited to ideational meaning, what can we say about the values associated with knowledge-knower structure in any discipline? To study values we have to consider attitude and this means bringing the interpersonal resources of appraisal into the picture and asking how they are coupled with ideation in a discipline and by whom. No discipline relies on epistemology alone. I expect that our negative characterization of the humanities in terms of a relative absence of technicality is predicated on just this limitation. We haven't arrived at a productive characterization of its alter-sensibility and its role in academe and beyond precisely because the questions we've been asking about disciplines have been too ideational. We need the perspective afforded by instantiation alongside that of realization in this regard, and so see field as one dimension of disciplinarity, not the whole story. As Maton (2014) highlights, every social practice involves both knowledge and knowers; and we are much indebted to him in SFL for reminding us that knowers and their values are a critical dimension of knowledge-building in social practices of every kind.

Notes

1 This paper arises from work done for the PEAK Project; the author acknowledges the support of the Australian Research Council (Discovery Project: Maton, Martin, Unsworth and Howard, DP130100481).
2 Photo credit: John Coppi (Spinifex country near Barrow Creekm NT. 1992); downloaded 7/10/2018 from www.scienceimage.csiro.au/image/4195/
3 Sample source for lyrics: https://kids.niehs.nih.gov/games/songs/childrens/index.htm
4 I follow here the simplified terminology used in Martin and Rose (2007); Halliday and Hasan (1976) use the term 'extended reference' for this phenomenon.
5 The versions of Text 6 used as illustrations here are an emergent factorial explanation based on Lawless *et al*. (2008: 273–4), an ancient history secondary school textbook (further discussed in Martin 2013a).
6 To simplify the presentation the tracking and challenging moves in these interactions have not been annotated.
7 The weight given to one or another metafunction in such factoring would also be a critical variable; for example, if we made iconization critical as far as mass was concerned, we might well reverse the position of science (−iconization for alter-reality) and humanities (+iconization for alter-sensibility) in the topology.

References

Allen, R. and Greenwood, T. (2004) *Year 12 Biology* 2003, Hamilton, NZ: Biozone Learning Media.

Bednarek, M. and Martin, J. R. (eds) (2010) *New Discourse on Language: Functional perspectives on multimodality, identity and affiliation*, London: Continuum.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique*, London: Rowman & Littlefield.

Butler, C. S. (2003) *Structure and Function: A guide to three major structural-functional theories*, Amsterdam: John Benjamins.

Caple, H. (2013) *Photojournalism: A social semiotic approach*, London: Palgrave McMillan.

Chang, C. (2004) *English Idioms and Interpersonal Meaning*, Guangzhou: Sun Yat Sen University Press.

Christie, F. (2002) *Classroom Discourse Analysis*, London: Continuum.

Christie, F. and Martin, J. R. (eds) (1997) *Genre and Institutions: Social processes in the workplace and school*, London: Cassell.

Christie, F and Martin, J. R. (eds) (2007) *Language, Knowledge and Pedagogy: Functional linguistic and sociological perspectives*, London: Continuum.

Christie, F. and Maton, K. (eds) (2011) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum.

Doran, Y. J. (2017) '*The role of mathematics in physics: Building knowledge and describing the empirical world*', Onomázein Special Issue, March: 209–226.

Doran, Y. J. (2018) *The Discourse of Physics: Building knowledge through language, mathematics and image*, London: Routledge.

Flannery, T. (2014) 'The last of their kind: Tim Flannery on Andrew Glickson's *Evolution of the Atmosphere*', *The Monthly*, March: 44–7.

Halliday, M. A. K. (1961) 'Categories of the theory of grammar', *Word*, 17(3): 241–92.

Halliday, M. A. K. (1969) 'Options and functions in the English clause', *Brno Studies in English*, 8: 81–8.

Halliday, M.A.K. 1975. *Learning how to mean: Explorations in the development of language*, London: Arnold (Explorations in Language Study).

Halliday, M. A. K. (1977) 'Ideas about language', in M. A. K. Halliday *Aims and Perspectives in Linguistics*, Applied Linguistics Association of Australia (Occasional Papers 1): 32–49.
Halliday, M. A. K. (2003) *The Language of Early Childhood, Vol. 4: Collected works of M. A. K. Halliday* (J. Webster ed.), London: Continuum.
Halliday, M. A. K. (2004) *The Language of Science, Vol. 4: Collected works of M. A. K. Halliday* (J. Webster ed.), London: Continuum.
Halliday, M. A. K. (2014) *Halliday's Introduction to Functional Grammar*, London: Routledge.
Halliday, M. A. K. and Hasan, R. (1976) *Cohesion in English*, London: Longman.
Halliday, M. A. K. and Martin, J. R. (1993) *Writing Science: Literacy and discursive power*, London: Falmer.
Hengevelt, K. and Mackenzie, L. (2008) *Functional Discourse Grammar*, Oxford: Oxford University Press.
Lawless, J., Cameron, K. and Young, C. (2008) *Unlocking the Past: Preliminary studies in the ancient world*, Melbourne: Nelson.
Martin, J. R. (1989) 'Technicality and abstraction: Language for the creation of specialised texts', in F. Christie (ed.) *Writing in Schools: Reader*, Geelong, Vic.: Deakin University Press, 36–44.
Martin, J. R. (1990) 'Literacy in science: Learning to handle text as technology', in F. Christie (ed.) *Literacy for a Changing World*, Melbourne: Australian Council for Educational Research, 79–117.
Martin, J. R. (1992) *English Text: System and structure*, Amsterdam: John Benjamins.
Martin, J. R. (2007) 'Genre and field: Social processes and knowledge structures in systemic functional semiotics', in L. Barbara and T. Berber Sardinha (eds) *Proceedings of the 33rd International Systemic Functional Congress*, São Paulo: PUCSP, 1–35.
Martin, J. R. (2010) 'Semantic variation: Modelling system, text and affiliation in social semiosis', in M. Bednarek and J. R. Martin (eds) *New Discourse on Language: Functional perspectives on multimodality, identity and affiliation*, London: Continuum, 1–34.
Martin, J. R. (2011) 'Bridging troubled waters: Interdisciplinarity and what makes it stick', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 35–61.
Martin, J. R. (2012) *Register Studies*, *Vol. 4: Collected Works of J. R. Martin* (W. Zhenhua ed.) Shanghai: Shanghai Jiao Tong University Press.
Martin, J. R. (2013a) 'Embedded literacy: Knowledge as meaning', *Linguistics and Education*, 24(1): 23–37.
Martin, J. R. (2013b) *Systemic Functional Grammar: A next step into the theory – axial relations*, Beijing: Higher Education Press.
Martin, J. R. (2014) 'Evolving systemic functional linguistics: Beyond the clause', *Functional Linguistics*, 1(3): 1–3.
Martin, J. R. and Rose, D. (2007) *Working with Discourse: Meaning beyond the clause*, London: Continuum.
Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.
Martin, J. R. and Stenglin, M. (2007) 'Materialising reconciliation: Negotiating difference in a post-colonial exhibition', in T. Royce and W. Bowcher (eds) *New Directions in the Analysis of Multimodal Discourse*, Mahwah, N. J.: Lawrence Erlbaum, 215–38.
Martin, J. R. and Veel, R. (1998) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge.
Martin, J. R. and White, P. R. R. (2005) *The Language of Evaluation: Appraisal in English*, London: Palgrave.
Martin, J. R. and Zappavigna, M. (2013) 'Youth Justice Conferencing: Ceremonial redress', *International Journal of Law, Language and Discourse*, 3: 103–42.

Martin, J. R., Maton, K. and Matruglio, E. (2010) 'Historical cosmologies: Epistemology and axiology in Australian secondary school history', *Revista Signos*, 43(74): 433–63.

Maton, K. (2009) 'Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building', *British Journal of Sociology of Education*, 30(1): 43–57.

Maton, K. (2011) 'Theories and things: The semantics of disciplinarity', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 62–84.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Maton, K. (2016) 'Legitimation Code Theory: Building knowledge about knowledge-building', in K. Maton, S. Hood and S. Shay (eds), *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 1–23.

Maton, K. and Doran, Y. J. (2017a) 'Semantic density: A translation device for revealing complexity of knowledge practices in discourse, part 1 – wording', *Onomázein Special Issue*, March: 46–76.

Maton, K. and Doran, Y. J. (2017b) 'Condensation: A translation device for revealing complexity of knowledge practices in discourse, part 2 – clausing and sequencing', *Onomázein Special Issue*, March: 77–110.

Maton, K., Hood, S. and Shay, S. (2016) (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge.

Muller, J. (2007) 'On splitting hairs: Hierarchy, knowledge and the school curriculum', in F. Christie, and J. R. Martin (eds) *Language, Knowledge and Pedagogy*, London: Continuum, 65–86.

Ormerod, J. (1981) *Sunshine*, London: Frances Lincoln Children's Books.

Painter, C. (1984) *Into the Mother Tongue: A case study of early language development*, London: Pinter.

Painter, C. (1999) *Learning through Language in Early Childhood*, London: Cassell.

Painter, C. (2003) 'Developing attitude: An ontogenetic perspective on APPRAISAL', *Text*, 23(2): 183–210.

Rose, D, McInnes, D. and Körner, H. (1992) *Scientific Literacy (Write it Right Literacy in Industry Research Project – Stage 1)*, Sydney: Metropolitan East Disadvantaged Schools Program.

Scott, L. and Robinson, S. (1993) *Australian Journey: Environments and communities*, Melbourne: Longman.

Stenglin, M. (2008) 'Olympism: How a bonding icon gets its "charge"', in L. Unsworth (ed.) *Multimodal Semiotics: Functional analysis in the contexts of education*, London: Continuum, 50–66.

Tann, K. (2010a) 'Imagining communities: A multifunctional approach to identity management in texts', in M. Bednarek and J. R. Martin (eds) *New Discourse on Language: Functional perspectives on multimodality, identity and affiliation*, London: Continuum, 163–94.

Tann, K. (2010b) *Semogenesis of a Nation: An iconography of Japanese identity*, PhD Dissertation, University of Sydney, Australia.

Tann, K. (2013) 'The language of identity discourse: Introducing a framework for functional iconography', *Linguistics and the Human Sciences*, 8(3): 361–91.

Tann, K. (2017) 'Nijonjinron and the context of culture', in E. A. Thompson, M. Sano and H. de Silva Joyce (eds) *Mapping Genres, Mapping Cultures: Japanese texts in context*, Amsterdam: John Benjamins, 213–40.

Unsworth, L. (1997a) 'Scaffolding reading of science explanations: Accessing the grammatical and visual forms of specialised knowledge', *Reading*, 31(3): 30–42.

Unsworth, L. (1997b) 'Explaining explanations: Enhancing scientific learning and literacy development', *Australian Science Teachers Journal*, 43(1): 34–49.

Unsworth, L. (1997c) '"Sound" explanations in school science: A functional linguistics perspective on effective apprenticing texts', *Linguistics and Education*, 9(2): 199–226.

Van Valin, R. D. and *LaPolla, R.* (1997) Syntax: Structure, meaning, and function, Cambridge: Cambridge University Press.

Veel, R. (1992) 'Engaging with scientific language: A functional approach to the language of school science', *Australian Science Teachers Journal*, 38(4): 31–5.

White, P. R. R. (1998) 'Extended reality, proto-nouns and the vernacular: Distinguishing the technological from the scientific', in J. R. Martin and R. Veel (eds) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge, 266–96.

Wignell, P. (2007) *On the Discourse of Social Science,* Darwin: Charles Darwin University Press.

Wignell, P., Martin, J. R. and Eggins, S. (1990) 'The discourse of geography: Ordering and explaining the experiential world', *Linguistics and Education*, 1(4): 359–92.

PART III

Bringing SFL and LCT together to explore knowers and values

6

SEEING VALUES

Axiology and affording attitude in Australia's 'invasion'

Y. J. Doran

Values and academic discourse

Values permeate academic discourse. They underpin evaluations of what is right and what is wrong; what is good and what is bad; what is worthwhile and what is worthless. Although such evaluations are regularly contested across communities and intellectual fields, *within* communities or fields they are often remarkably consistent and stable; if one puts a foot wrong, it is obvious to all those listening. In this sense, evaluations do not just attribute meaning to that being evaluated, they also position the person doing the evaluation. For students learning a discipline, this means it is not sufficient to simply learn the 'content' of a field, they must also learn its values. While in some disciplines these values will be heavily emphasized and in others they may be relatively downplayed, what is common is that they are often highly implicit and assumed by those who hold them. As far as literacy programmes targeting disciplinary knowledge are concerned, this poses a problem for how to 'see' these values systems and the language used to organize them, in order to aid programmes aiming to teach them.

From the perspective of linguistics, one vantage point is through the work on evaluative language that in Systemic Functional Linguistics (SFL) is captured under the system of APPRAISAL (Martin and White 2005). In recent decades, appraisal has proven remarkably effective in enabling linguists to understand both overt evaluation and the more subtle stances that permeate texts. Martin and White (2005) usefully distinguish between explicit evaluations that specify a clear stance in relation to some target, known as inscribed attitude, and those that are more implicit to a greater or lesser degree, known as invoked attitude. Inscribed attitudes occur when there is a definite token of evaluation, such as *crucial* in *one <u>crucial</u> area of natural language research*. In contrast, invoked attitudes arise through a range of linguistic resources that offer various degrees of implicitness. The most explicit are those

that provoke evaluation through metaphors, such as in *on the football field, he flew*. Here the use of metaphor makes it clear there is an evaluation and usually leaves little room for one to read differently than what is intended. Slightly less explicit are attitudes that are flagged through the intensifying or amplifying resources of graduation, such as *he was the biggest footballer I've ever seen*. These mark that there is subjectivity in the text and so suggest evaluation is probably occurring, but they do not necessarily make it clear what this evaluation is (Hood and Martin 2007).

Finally, the most implicitly invoked attitude is affording attitude. In contrast to provoking and flagging attitude, affording attitude does not use any indicators that evaluation is occurring (Martin and White 2005). Rather, as Bednarek (2009: 117) explains, affording attitude utilizes ideational meanings that 'are neutral on the surface but can imply positive or negative meanings depending on the reader's position'. That is, affording attitude involves language that is not inherently evaluative, but gains its evaluation only in certain fields, situations or communities. It is this type of evaluative language that often construes the values of intellectual fields. By virtue of its implicitness, this evaluative language is often difficult to see if it has not already been learnt. But this also gives it much of its power; by being only accessible to particular communities, it often invokes large networks of values relatively efficiently.

Although affording attitude is highly implicit, for people in the right community the evaluations will be abundantly clear. For example in Text 6.1, the use of the words *technicist*, *masculinist*, *modernist* and *conservative* all invoke very strong negative evaluation. It would be a rare person with any training in humanities at a tertiary level that would miss this evaluation, even if the ideational meanings are not so clear.

[Text 1]

> The second, more specific point developed in this paper is that the particular linguistic analyses of the language of school science (including geography) produced within the 'genre' project have functioned to produce and promote a very particular view of science, one which is most congenial to the theoretical premises and methodological technologies of a particular version of systemic linguistics developed with the 'genre' project… From the perspective of feminist and postmodernist critiques of science, this work is technicist, masculinist and modernist; as a curriculum project, it is profoundly conservative.
>
> *(Lee 1993: 132, underlining added)*

Although clearly evaluative, the four underlined words do not explicitly maintain the same evaluation across all contexts (i.e. the attitude is not inscribed). Taking *conservative* as an example, in modern politics, there is a large segment of society that would very happily take such an epithet as a positive endorsement. Similarly in literature, many scholars hold the works of *modernist* writers, such as Yeats, Eliot

and Joyce in tremendously high esteem. The point here is that in this text they afford negative evaluations largely because of the field they are situated in (specified explicitly as *feminism* and *postmodernism*). Although in this particular text, the evaluative language here is flagged by the graduation shown through *profoundly* preceding *conservative* and the repetition of Epithets in succession – *technicist, masculinist and modernist* – this only flags that there is evaluation, it does not indicate what the evaluation is (Hood and Martin 2007). Similarly, the terms *feminist* and *postmodernist* indicate alignment with a particular community or field of practice and to many in that community would indicate positive evaluation of the author. However to others who may be antagonistic to the fields, such terms could immediately raise an ire that could lead to a resistant reading, as Martin and White (2005) call it, that may disavow the arguments being made.

Although for this text it appears relatively clear what the evaluative position of these terms are, we have the issue of how we justify our analysis linguistically without resorting to intuition or insider knowledge. Compounding this, for many who have not had sufficient training in the humanities to intuitively understand this evaluation, we also have the issue of how to discover that these are evaluative. This issue is more clearly seen when we move into more specialized fields that do not mark their evaluative position as obviously. Text 2 shows an example from education.

> *[Text 2]*
>
> One crucial area of natural language research which can be drawn on in an attempt to establish an active directing role for the adult in natural language learning is Bruner's concept of 'scaffolding' (e.g. Bruner 1983, 1986). Scaffolding is a process whereby parents and children jointly construct texts that are based on shared experience. In doing this, the parents actively support children's learning attempts by providing models of the appropriate language and by structuring and regulating the input they provide so children can gradually take over the task of text production.
>
> *(Gray 1987: 6–7)*

For those internal to the educational field this is targeted to – broadly known as genre-pedagogy (Rose and Martin 2012) – this text includes a number of lexical items and turns of phrase that clearly align the author with a particular community while disaligning him with others, such as *learning*, *scaffolding*, *jointly construct*, *shared experience*, *actively support*, *models*, *Bruner* and others. But for those outside the field it would be difficult to see the values invoked through the text and so much of the meaning would be missed.

A little closer to home, in linguistics whether you rally around, emphasize, promote or prioritize 'social' or 'cognitive' linguistics, 'rhetoric' or 'logic', 'meaning' or 'form', 'language as a resource' or 'language as rules', 'system' or 'structure' (derived from Halliday 1977) positions you in one community or another and potentially

leads to significant evaluation of what is being said. Obviously such binaries are crude generalizations of the distinctions in the field, but they do give a small insight into how these terms function.

Importantly for this paper, discussion of each of the instances of evaluation mentioned above have relied entirely on an intuition developed through prolonged enculturation in the field of linguistics and education. There have been minimal linguistic arguments to articulate why each are evaluative, and if pushed, there are few methods for justification. This is a significant issue for a linguistics that aims to understand evaluative language, highly charged discourse and the values systems they invoke. To this end, this paper works toward a means for seeing the highly implicit evaluative meanings of affording attitude and justifying its analysis so that we can move away from the current reliance on intuition and make more visible these meanings that organize much of our social life.

Axiological constellations

To develop a linguistic account of affording attitude and the values systems they invoke, we will first take a step away from linguistics and into sociology, specifically the framework of Legitimation Code Theory (LCT). LCT is a framework that focuses on the underlying principles organizing social practices and knowledge, and with them, variations in discourse (Maton 2014). In recent years, LCT has been productively used in conjunction with SFL in exploring knowledge practices and discourse, by offering a complementary set of analytical tools to the SFL gaze (Maton and Doran 2017a; Maton *et al*. 2016; Martin 2011). In this paper, conceptualizations in LCT will be used to guide a number of analytical choices made in understanding the language used in texts.

LCT argues that each community involves a particular set of values that cluster into tighter or looser alignments, known as axiological constellations (Maton 2014; Martin *et al*. 2010). Depending on how tightly integrated the values in the constellations are, if one set of values is accepted, it may be presumed that others are necessarily entailed. Using an example from Maton (2014: 155), in educational circles an opposition is often maintained between approaches that valorize 'student-centred learning', 'learning-oriented' approaches or simply 'learning', and those that are 'teacher-centred', 'instruction-oriented' or 'teaching' based approaches. Each polarized position generally involves a range of terms. Maton illustrates this by presenting a list of terms originally developed by Jonassen and Land (2000: viii) gathered from a synthesis of literature associated with both 'student-centred' and 'teacher-centred' approaches (a small proportion of which is given in Table 6.1).

LCT argues that by choosing, valorizing or emphasizing any particular word or concept involved in a constellation such as this, other meanings in that constellation will likely also be invoked. That is to say, depending on how tight the constellation, if you indicate that you hold one set of values, it will often be assumed that you also hold a range of others. Just as the use of highly technical terms in science implicate large technical taxonomies, sequences of implication and properties (Halliday and

TABLE 6.1

Teacher-centred constellation	*Student-centred constellation*
abstract, symbolic	contextualized, authentic, experiential
idealist, rational	pragmatist
symbolic reasoning	situated learning
laboratory	in situ
theoretical	everyday
objective, modelable	experiential, interpretive
disembodied	experiential
conceptual, memorial	perceptual
decontextualized	embedded in experience

Martin 1993; Doran and Martin 2020; Maton and Doran 2017b, 2017c), terms with highly charged evaluative meanings in particular fields will resonate out to a range of other meanings.

In SFL, these constellations can be interpreted as networks of bonds that constitute the value systems of a community (Knight 2010, 2013; Martin and Stenglin 2006; Szenes 2017). These bonds involve shared couplings of ideational meaning and interpersonal meaning. Through these networks of shared content/evaluation bonds, communities are able to distinguish between insiders and outsiders. To use a simple example, for those aligning with the 'student-centred' approach in Table 6.1, the ideational meaning associated with *situated learning* is bonded with a positive evaluation as it is part of the constellation that they align with. In contrast, the ideational meaning associated with being *abstract* may be bonded with a negative evaluation as it is in a constellation in opposition to it. Thus in particular communities that align with *situated learning*, the promotion of *abstract* knowledge may afford a negative evaluation.

In SFL's conceptualization, these bond networks organize the values of a community and so are likely to be significant candidates for instances of affording attitude. Thus, to develop a method by which we can see these implicit evaluation and the values systems associated with them, a useful path is to first develop a map of the bonding networks (in SFL terms) or axiological constellations (in LCT terms) in which they sit. This paper will offer a method for developing such a map by utilizing the appraisal framework of SFL (Martin and White 2005).

Seeing axiological constellations through appraisal

As axiological meanings are built over time through innumerable instances of text, the method developed in this paper focuses on how ideational meanings are charged with interpersonal evaluations. Depending on the need of any particular study, it may be applied across multiple texts to build a comprehensive map. But for the purposes of illustration, this paper will focus on a text that is relatively explicit in many of its axiological meanings. The text, given as Text 3, is a news article from

a prominent Australian newspaper based in Sydney, *The Daily Telegraph*. It concerns a controversy surrounding a set of guidelines published by The University of New South Wales (UNSW), known as The Cultural Diversity and Inclusive Practice toolkit. Among other things, this document makes suggestions about appropriate language use in relation to Indigenous Australian people.

[Text 3]

University of NSW students told to refer to Australia as having been 'invaded'

STUDENTS at a leading NSW university are being told to refer to Australia as having been 'invaded' instead of settled in a highly controversial rewriting of official Australian history.

They are also told it is offensive to suggest James Cook 'discovered' Australia and inappropriate to say that indigenous people have lived here for 40,000 years.

Instead, they should say 'since the beginning of the Dreamings'.

A so-called Diversity Toolkit on indigenous terminology for University of NSW undergraduates argues that Australian history should be broken up into categories, including 'pre-invasion' and 'post-invasion'.

It also claims the word settlement ignores the reality of indigenous lands 'being stolen'.

'Australia was not settled peacefully, it was invaded, occupied and colonized', according to the guidelines, which are prescribed reading for some undergraduate students.

'Describing the arrival of the Europeans as a "settlement" attempts to view Australian history from the shores of England rather than the shores of Australia,' the document says. 'Most aboriginal people find the use of the word "discovery" offensive.'

Students are also being taught the terms 'Aborigines' and 'aboriginal people' are inappropriate, and they should use the term 'indigenous Australian people'.

The phrase 'The Dreamings' is apparently more appropriate than 'Dreamtime', because the latter tended to indicate a time period that has finished.

The accepted historical period of 40,000 years is also rejected because it 'puts a limit on the occupation of Australia and tends to lend support to migration theories and anthropological assumptions'.

But historian Keith Windschuttle said the term 'invasion' was wrong. 'Under international law, Australia has always been regarded as a settled country according to the leading judgements in international law, both here and around the world,' he said.

'Until the law changes, there is no sound basis on which to say invaded. That is wrong.'

Institute of Public Affairs research fellow Matthew Lesh criticized the guidelines, saying they suffocate 'the free flow of ideas'.

> Federal Education Minister Simon Birmingham said universities 'enjoy autonomy when it comes to academic concepts', however he stressed they should be a place where 'ideas are contested and open to debate'.
>
> A UNSW spokeswoman said the guides were 'commonplace' across universities.
>
> *(Bye 2016)*

This article and the Diversity Toolkit it reports on relate to a long running division in Australian society about the most appropriate description of the arrival of English people to Australian shores and subsequent Indigenous Australian history. The controversy involves a number of highly charged terms and ways of speaking that are both positive and negative, depending on which side of the 'debate' you are on (see Coffin 2003 for a discussion of the role of judgement in this debate). Much of the Australian population will tacitly understand the evaluations associated with various components of the article and be able to very clearly associate different terms with different perspectives. But it is important to develop a methodology for seeing these not as insiders but as linguists and text analysts. This is so we can teach such systems that permeate academic fields to students who do not have this intuitive knowledge.

The method stepped through in this paper includes two broad stages of analysis that can be reiterated across multiple texts (see Martin and White 2005; White 2003):

1 an *attitude analysis*, to look at the relatively explicit evaluation in texts; and
2 an *engagement analysis* to see the heteroglossic positioning of voices that occur

Step 1: Attitude analysis

Evaluative meanings arise in social practice. For something to maintain stable evaluative meaning, it needs to first have this meaning built in previous texts (Coffin and O'Halloran 2005). The most obvious way for this to occur is through relatively explicit evaluation. This can be analyzed in SFL through *attitude*. The method will thus begin by considering the inscribed, provoked (through metaphor) or flagged (through graduation) attitudes that the text displays (Martin and White 2005). For this paper, we will be concerned with:

1 the polarity of the evaluation (positive or negative),
2 what is being evaluated (the trigger or appraised); and
3 what is doing the evaluating (the appraiser).

For this illustration, we will not be concerned with anything more delicate such as whether the attitude involves appreciation, judgement or affect (though subtypes of attitude would become important if we wish to develop a more nuanced picture of the values in a text). Table 6.2 gives the inscribed, provoked and flagged attitude in the text.

TABLE 6.2 Evaluative attitude in the UNSW Diversity Toolkit text

Appraising item	*Appraiser*	*Appraised*	*Polarity*
leading	*The Daily Telegraph*[1]	University of New South Wales	positive
highly controversial	*The Daily Telegraph*	rewriting of Australian history	negative
offensive	UNSW Diversity Toolkit	to suggest James Cook discovered Australia	negative
inappropriate	UNSW Diversity Toolkit	to say indigenous people have lived here for 40,000 years	negative
stolen	UNSW Diversity Toolkit	(the English acquisition of Australian lands)	negative
not peacefully	UNSW Diversity Toolkit	(the English remaining on Australian lands)	negative
invaded, occupied, colonized	UNSW Diversity Toolkit	(the English arrival, acquisition of and remaining on Australian lands)	negative (flagged)
view Australian history from the shores of England rather than the shores of Australia	UNSW Diversity Toolkit	Describing the arrival of the Europeans as a 'settlement'	negative (provoked)
offensive	most Aboriginal people	the use of the word 'discovery'	negative
inappropriate	UNSW Diversity Toolkit	the terms 'Aborigines' and 'Aboriginal people'	negative
More appropriate than "Dreamtime"	UNSW Diversity Toolkit	The phrase 'The Dreamings'	positive
rejected	UNSW Diversity Toolkit	The accepted historical period of 40,000 years	negative
Wrong	Historian Keith Windschuttle	the term 'invasion'	negative
leading	Historian Keith Windchuttle	judgements in international law, both here and around the world	positive
No sound basis	Historian Keith Windschuttle	to say invaded	negative (provoked)
Wrong	Historian Keith Windschuttle	to say invaded	negative

Appraising item	*Appraiser*	*Appraised*	*Polarity*
criticized	Institute of Public Affairs research fellow Matthew Lesh	the guidelines	negative
suffocate	Institute of Public Affairs research fellow Matthew Lesh	the guidelines	negative (provoked)
free flow of ideas	Institute of Public Affairs research fellow Matthew Lesh	(free speech)	positive (provoked)
Enjoy	universities	autonomy when it comes to academic concepts	positive
commonplace	A UNSW spokeswoman	the guides	positive (flagged)

This initial analysis gives us a first look at the charging of particular items as either positive or negative. To see the patterns more clearly, we will reorder the table in terms of the appraiser, as shown in Table 6.3, and relabel appraiser as 'source' and appraised as 'target' (which helps incorporate other analyses below).

Evaluations establish relations between the source and the target (the appraiser and the appraised). As the source becomes associated with a target's particular charging, this means that not only does the target become part of the constellation (or bond network), so does the source. For example, *Historian Keith Windschuttle* not only negatively charges the term *invasion* (as being 'wrong'), but also becomes associated with that negative evaluation. The assumption here is that if you align with a particular evaluation, it is likely you will also align with the source. In this case, if you agree that the term *invasion* (the target) is 'wrong', you are more likely to align with *Keith Windschuttle* (the source). Similarly, if you align with *Keith Windschuttle* you are also likely to align with the suggestion that the term *invasion* is 'wrong'.

Under this interpretation, Table 6.3 gives a first look at the constellations established in the text. Institute of Public Affairs research fellow Matthew Lesh and Historian Keith Windschuttle are associated with negative charging of the UNSW Diversity Toolkit (*the guidelines*) and positive charging of free speech (through the metaphor *free flow of ideas*). The UNSW Diversity Toolkit on the other hand is associated with negative charging of James Cook's 'discovery' of Australia, the terms *Aborigines*, *Aboriginal people* and *settlement*, and the arrival of the English population to Australia. This analysis illustrates a division between the UNSW Diversity Toolkit and those associated with negative charging of the Diversity Kit (such as *Historian Keith Windschuttle* and *Institute of Public Affairs research fellow Matthew Lesh*). As we move to further layers of analysis, this division will become more pronounced.

TABLE 6.3 Preliminary list of charged elements based on attitude

Source	*Target*	*Charge*
The Daily Telegraph	University of New South Wales	positive
	rewriting of Australian history	negative
UNSW Diversity Toolkit	The phrase 'The Dreamings'	positive
	to suggest James Cook discovered Australia	negative
	To say indigenous people have lived here for 40,000 years	negative
	(the English acquisition of Australian lands)	negative
	(the English remaining on Australian lands)	negative
	(the English arrival, acquisition of and remaining on Australian lands)	negative
	Describing the arrival of the Europeans as a 'settlement'	negative
	the terms 'Aborigines' and 'Aboriginal people'	negative
	The accepted historical period of 40,000 years	negative
most aboriginal people	the use of the word 'discovery'	negative
Historian Keith Windschuttle	judgements in international law, both here and around the world	positive
	the term 'invasion'	negative
	to say invaded	negative
	to say invaded	negative
Institute of Public Affairs research fellow Matthew Lesh	(freedom of speech)	positive
	the guidelines	negative
	the guidelines	negative
universities	autonomy when it comes to academic concepts	positive
A UNSW spokeswoman	the guides	positive

Step 2. Engagement analysis

Although Table 6.3 gives a preliminary map of the charging associated with various targets and their sources, it by no means captures all of the axiological meaning in the text. In this text in particular, the vast majority of targets in the constellation so far are negatively charged; sources disalign from many targets, but they do not align with much. To get a fuller picture of the axiological meaning in the text, the next step involves seeing what each source promotes. As noted above, if a reader aligns with a source, they will most likely align with what the source promotes. This means that if a source advocates some information, we can place this in the constellation.[2]

The attitude analysis builds a preliminary list of sources that are axiologically charged. This next step focuses on what these sources promote in order to see what meanings they align with. We will do this through the SFL tool of ENGAGEMENT

which is concerned with the range of voices acknowledged in a text (White 2003; Martin and White 2005). This step only considers instances where the text indicates multiple voices, known as heteroglossia. For example, in *They are also told it is offensive to suggest James Cook 'discovered' Australia*, the text acknowledges it is a particular source that makes the assertion that *it is offensive to suggest James Cook 'discovered' Australia*. This leaves open the possibility that others may not hold this position. This is in contrast to a monoglossic utterance, such as *Institute of Public Affairs research fellow Matthew Lesh criticized the guidelines*, that does not indicate there is any question about whether Matthew Lesh criticized the guidelines.[3] Monoglossic instances will be left out of the analysis.[4]

Heteroglossia is often shown through four main linguistic resources (Martin and Rose 2007):

1 modality, such as in:

they should say 'since the beginning of the Dreamings'

2 negation, such as in:

Australia was not settled peacefully

3 counterexpectancy conjunctions, such as in:

… but historian Keith Windschuttle said…

4 projection of speech or thought, such as in:

It claims the word settlement ignores the reality of indigenous lands 'being stolen'

Heteroglossia can also indicate whether a source aligns with the information they are putting forward (positively charging it) or disaligns with it (negatively charging it). As Martin and White's model of heteroglossia involves a diverse array of resources, we will step through three main sets of resources that indicate alignment or disalignment.

1) Projections indicate alignment between the source and the information being projected (positive charging in relation to the source)

Barring irony, sarcasm, joking, etc., heteroglossic statements shown through projection of speech and thought indicate the source aligns with what they say or think,[5] such as in:

> *'Australia was not settled peacefully, it was invaded, occupied and colonized' according to the guidelines.*

In this example (known as heteroglossic acknowledgement), we can presume that *the guidelines* align with the statement '*Australia was not settled peacefully, it was invaded,*

occupied and colonized' and the negative attitudes it includes ('not peacefully', 'invaded, occupied and colonized'). For this reason, we can take this information to be positively charged in relation to its source. In Text 3, projections such as these cover the majority of instances, however there are a few other instances that we should take into account.

2) Instances of heteroglossic distance or disclaim indicate disalignment (negative charging in relation to the source)

When texts use instances such as:

> *It [UNSW Diversity Toolkit] also claims the word settlement ignores the reality of indigenous lands 'being stolen'*

The author (*The Daily Telegraph*) indicates they wish to distance themselves from the claim being made (known as heteroglossic distancing, Martin and White 2005; White 2003). This indicates disalignment from the information being put forward (that *the word settlement ignores the reality of indigenous lands 'being stolen'*[6]), and by extension, the original source of this information (the UNSW Diversity Toolkit). This means that both the information being positioned and its source are negatively charged in relation to *The Daily Telegraph*.

In this particular instance, there are in fact two sets of charging going on. The projection means that the UNSW Diversity Toolkit is aligning with the statement that *the word settlement ignores the reality of indigenous lands being stolen*, while the uses of distancing indicates that *The Daily Telegraph* is disaligning from both the information and the UNSW Diversity Toolkit.

Another resource for disaligning is when a text uses either a negation to deny a proposition, such as:

> *Australian was not settled peacefully*

or uses a counterexpectancy conjunction to counter it, such as in:

> *The accepted historical period of 40,000 years is also rejected because it 'puts a limit on the occupation of Australia and tends to lend support to migration theories and anthropological assumptions'.*
> *But historian Keith Windschuttle said the term 'invasion' was wrong.*

In the first case, the source is explicitly denying the suggestion that Australia was settled peacefully, while the second instance makes it clear through the use of *but* that Keith Windschuttle's assertion is opposed to the assertion in the paragraph before it.

These two resources – deny and counter – are both grouped under the more general term of heteroglossic *disclaim*. As such, for our analysis, if heteroglossic

disclaiming occurs, a source is disaligning with the information being disclaimed and so it will be negatively charged in relation to the source.

3) Instances of heteroglossic proclaim indicate alignment (positive charging in relation to the source)

Finally, where a source makes a positive assertion in favour of some information, known as heteroglossic proclaim, they indicate alignment with this information (positive charging). For example, in:

> *they <u>should</u> use the term 'indigenous Australian people'*

the source (in this case The UNSW Diversity Toolkit) is proclaiming that the use of the term 'indigenous Australian people' should occur, and so is aligning with it. For any of the above instances, any reasonings or justifications for each position will also be included in the analysis (see White 2003: 274 for discussion of heteroglossic justifications).

The linguistic resources guiding the analysis of alignment or disalignment (positive or negative charging) are given in Table 6.4. Any instances that are not entirely clear in their position one-way or the other will be left out. This is primarily the case for monoglossia and for heteroglossic category of entertain, such as *it is <u>possible</u> that there was an invasion*.

For our text, the sources we will focus on that arose in the attitude analysis are:

The Daily Telegraph
UNSW Diversity Kit
Most aboriginal people
Historian Keith Windschuttle
Institute of Public Affairs research fellow Matthew Lesh
Universities
A UNSW spokeswoman

Using the analytical tools stepped through above, Table 6.5 presents the engagement analysis of our example text, with the markers of heteroglossia underlined.

On the basis of this analysis, we can synthesize a number of specific terms and ideas that arrange into constellations. For example, although the term *invasion* invokes a negative judgement of the English arrivals (made most explicit by the repetition in *invaded, occupied, colonized*), the UNSW Diversity Toolkit emphasizes that this is their preferred term for describing the English arrival to Australia. This means that by using the term *invasion*, one can be seen to align with the constellation of values endorsed by the UNSW Diversity Toolkit, while also disaligning with the arrival of Europeans itself. As we will discuss below, this in turn may afford a positive judgement of the person using the term. In addition to terminology, certain ideas and reasons are also made more explicit: The UNSW Diversity Toolkit

TABLE 6.4 Linguistic resources indicating alignment (positive charging) or disalignment (negative charging)

Linguistic resources	*Aligning/ Disaligning*	*Example*	
positive attitude	aligning (positive charge)	*The phrase 'The Dreamings' is appropriate*	The source (UNSW Diversity Toolkit) aligns with the phrase 'The Dreamings'.
negative attitude	disaligning (negative charge)	*Keith Windschuttle said the term 'invasion' was wrong*	Keith Windschuttle disaligns with the term 'invasion'.
projection (including heteroglossic acknowledge)	aligning (positive charge)	*'Australia was not settled peacefully, it was invaded, occupied and colonized' according to the guidelines.*	Alignment between proposition (in quotes) and *guidelines*
distance	disaligning (negative charge)	*It [UNSW Diversity Toolkit] also claims the word settlement ignores the reality of indigenous lands 'being stolen'*	The author (*Daily Telegraph*) disaligns with the proposition (that *the word settlement ignores…*) and its source (The UNSW Diversity Toolkit).
disclaim	disaligning (negative charge)	*Australian was not settled peacefully*	The source (the UNSW Diversity Toolkit) disaligns with the proposition that Australian was settled peacefully.
proclaim	aligning (positive charge)	*they should use the term 'indigenous Australia people'*	The source (The UNSW Diversity Toolkit) aligns with the suggestion that they should use the term 'indigenous Australian people'.

believes that *Australian history should be broken up into categories, including 'pre-invasion' and 'post-invasion',* and that the reason for the rejection of the term *settlement* is that it *ignores the reality of indigenous lands 'being stolen'* (suggesting that they disalign with the theft of indigenous lands). In contrast, Historian Keith Windschuttle comfortably aligns with using the term *settlement*, which he justifies through *leading judgements in international law, both here and around the world*. Through this engagement analysis, we can build another map of the constellations associated with each

TABLE 6.5 Heteroglossia and charging

Instance	*Source*	*Target*	*Charge*
University of NSW students told to refer to Australia as having been 'invaded'	(UNSW Diversity Toolkit)	to refer to Australia as having been 'invaded'	aligning (positive charge)
Students at a leading NSW university are being told to refer to Australia as having been 'invaded' instead of settled	(UNSW Diversity Toolkit)	to refer to Australia as having been 'invaded' instead of settled	aligning (positive charge)
They are also told it is offensive to suggest James Cook 'discovered' Australia and inappropriate to say the indigenous people have lived here for 40,000 years	(UNSW Diversity Toolkit)	it is offensive to suggest James Cook 'discovered' Australia and inappropriate to say the indigenous people have lived here for 40,000 years	aligning (positive charge)
they should say 'since the beginning of the Dreamings'	(UNSW Diversity Toolkit)	to say 'since the beginning of the Dreamings'	aligning (positive charge)
A so-called Diversity Toolkit on indigenous terminology for University of NSW undergraduates	The Daily Telegraph	Diversity Toolkit on indigenous terminology for University of NSW undergraduates	disaligning (negative charge)
A so-called Diversity Toolkit on indigenous terminology for University of NSW Undergraduates argues that Australian history should be broken up into categories, including 'pre-invasion' and 'post-invasion'.	A so-called Diversity Toolkit on indigenous terminology	Australian history being broken up into categories, including 'pre-invasion' and 'post-invasion'.	aligning (positive charge)
It also claims the word settlement ignores the reality of indigenous lands 'being stolen'	It (UNSW Diversity Toolkit)	the word settlement ignores the reality of indigenous lands 'being stolen'	aligning (positive charge)
It also claims the word settlement ignores the reality of indigenous lands 'being stolen'	The Daily Telegraph	the word settlement ignores the reality of indigenous lands 'being stolen' & UNSW Diversity Toolkit	disaligning (negative charge)

(*Continued*)

TABLE 6.5 (Continued)

Instance	*Source*	*Target*	*Charge*
'Australia was not settled peacefully, it was invaded, occupied and colonised' according to the guidelines	UNSW Diversity Toolkit	Australia was not settled peacefully, it was invaded, occupied and colonised	aligning (positive charge)
Australia was not settled peacefully	UNSW Diversity Toolkit	Australia was settled peacefully	disaligning (negative charge)
'Describing the arrival of Europeans as a "settlement" attempts to view Australian history from the shores of England rather than the shores of Australia' The document says. 'Most Aboriginal people find the use of the word "discovery" offensive'	UNSW Diversity Toolkit	'Describing the arrival of Europeans as a "settlement" attempts to view Australian history from the shores of England rather than the shores of Australia' & 'Most Aboriginal people find the use of the word "discovery" offensive'	aligning (positive charge)
'Most Aboriginal people find the use of the word "discovery" offensive'	Most Aboriginal people	the use of the word 'discovery' being offensive	aligning (positive charge)
Students are also being taught the terms 'Aborigines' and 'Aboriginal people' are inappropriate and they should use the term 'indigenous Australian people'	(UNSW Diversity Toolkit)	the terms 'Aborigines' and 'Aboriginal people' are inappropriate and they should use the term 'indigenous Australian people'	aligning (positive charge)
The phrase 'The Dreamings' is apparently more appropriate than 'Dreamtime'	(UNSW Diversity Toolkit)	The phrase 'The Dreamings' is more appropriate than 'Dreamtime'	aligning (positive charge)
The phrase 'The Dreamings' is apparently more appropriate than 'Dreamtime' because the latter tended to indicate a time period that has finished	(UNSW Diversity Toolkit)	Dreamtime as indicating a time period that has finished	disaligning (negative charge)
The phrase 'The Dreamings' is apparently more appropriate than 'Dreamtime'	The Daily Telegraph	The phrase 'The Dreamings' is more appropriate than 'Dreamtime' & UNSW Diversity Toolkit	disaligning (negative charge)
The accepted historical period of 40,000 years	The Daily Telegraph	The historical period of 40,000 years	aligning (positive charge)

The accepted historical period of 40,000 years is also rejected because it 'puts a limit on the occupation of Australia and tends to lend support to migration theories and anthropological assumptions'.	(UNSW Diversity Toolkit)	putting a limit on the occupation of Australia & supporting migration theories and anthropological assumptions	disaligning (negative charge)
But historian Keith Windschuttle said the term 'invasion' was wrong	Historian Keith Windschuttle	UNSW Diversity Toolkit	disaligning (negative charge)
historian Keith Windschuttle said the term 'invasion' was wrong	Historian Keith Windschuttle	the term 'invasion' was wrong	aligning (positive charge)
'Under international law, Australia has always been regarded as a settled country according to the leading judgements international law, both here and around the world' he said	Historian Keith Windschuttle	Under international law, Australia has always been regarded as a settled country according to the leading judgements in international law, both here and around the world	aligning (positive charge)
Under international law, Australia has always been regarded as a settled country according to the leading judgements in international law, both here and around the world	the leading judgements in international law, both here and around the world	Australia is a settled country	aligning (positive charge)
'Until the law changes, there is no sound basis on which to say invaded. That is wrong'	Historian Keith Windschuttle	'Until the law changes, there is no sound basis on which to say invaded. That is wrong'	aligning (positive charge)
there is no sound basis on which to say invaded.	Historian Keith Windschuttle	there is a sound basis on which to say invaded	disaligning (negative charge)
Institute of Public Affairs research fellow Matthew Lesh… saying they suffocate 'the free flow of ideas'	Institute of Public Affairs research fellow Matthew Lesh	The UNSW Diversity Toolkit suffocates the free flow of ideas.	aligning (positive charge)
A UNSW spokeswoman said the guides were 'commonplace' across universities.	A UNSW spokeswoman	the guides were 'commonplace' across universities.	aligning (positive charge)

source. Table 6.6 focuses on elements that were not already captured by the attitude analysis.

From this analysis, we can now pull together the results to present the constellations developed in this text. As we have seen, the relations centre around a small set of sources that either broadly align with the UNSW Diversity Toolkit or are opposed to it. For ease of reference, we will divide the results into two constellations along these lines. Table 6.7 shows the constellation associated with the UNSW Diversity Toolkit and Table 6.8 shows the constellation opposed to the UNSW Diversity Toolkit. As we are building a more abstract map of relations than the precise instances of the text, the table synthesizes the constellations into generalized sources, terms and ideas ('Ideas' here are understood broadly in SFL as activities and items at the level of field, Doran and Martin 2020).

TABLE 6.6 List of charged elements based on heteroglossic engagement

Source	*Target*	*Charge*
UNSW Diversity Toolkit	Australia was invaded	positive
	Australia was invaded instead of settled	positive
	indigenous people have been here 'since the beginning of the Dreamings'	positive
	Australian history being broken up into categories, including 'pre-invasion' and 'post-invasion'	positive
	the word settlement ignores the reality of indigenous lands 'being stolen'	positive
	Australia was 'invaded, occupied and colonized'	positive
	the term 'indigenous Australian people'	positive
	Australia was settled peacefully	negative
	putting a limit on the occupation of Australia	negative
	supporting migration theories and anthropological assumptions	negative
The Daily Telegraph	the historical period of 40,000 years	positive
	The name 'Diversity Toolkit on indigenous terminology'	negative
	UNSW Diversity Toolkit	negative
	the word settlement ignores the reality of indigenous lands 'being stolen'	negative
	The phrase 'The Dreamings' is more appropriate than the 'Dreamtime'	negative
Historian Keith Windschuttle	Under international law, Australia has always been regarded as a settled country	positive
	UNSW Diversity Toolkit	negative
	there is a sound basis on which to say invaded	negative
the leading judgements in international law, both here and around the world	Australia is a settled country	positive

TABLE 6.7 Constellation associated with the UNSW Diversity Toolkit

Aligning with (positively charged)			*Disaligning with (negatively charged)*		
Sources	*Terms*	*Ideas*	*Sources*	*Terms*	*Ideas*
UNSW spokeswoman Most Aboriginal People	*invasion, occupation, colonization, stolen* *Indigenous Australian people* *The Dreamings*	Indigenous people have been here since the beginning of the Dreamings Australian history being broken up into categories including 'pre-invasion' and 'post-invasion'		*discovery, settlement* *Aborigines, Aboriginal people* *Dreamtime*	Indigenous people have lived here for 40,000 years English people's acquisition of Australian lands Australia was settled peacefully putting a limit on the occupation of Australia migration theories and anthropological assumptions

TABLE 6.8 Constellation opposed to the UNSW Diversity Toolkit

Aligning with (positively charged)			*Disaligning with (negatively charged)*		
Sources	*Terms*	*Ideas*	*Sources*	*Terms*	*Ideas*
The Daily Telegraph Historian Keith Windschuttle Institute of Public Affairs research fellow Matthew Lesh Judgements in international law	*settlement* *Dreamtime*	University of New South Wales free flow of ideas (freedom of speech) the historical period of 40,000 years for Indigenous occupation of Australia	The UNSW Diversity Toolkit	*invasion* *The Dreamings*	The rewriting of Australian history the word settlement ignores the reality of indigenous lands being stolen

These tables present relatively broad maps of each constellation. Following the LCT analysis of axiological values systems, this map indicates terms, ideas and sources that may resonate out to larger constellations. By using any particular term or aligning with ideas or sources from one constellation, one evokes the meanings of others in the constellation. In this case, for example, by using the term *invasion*

to describe the arrival of English people to Australia, one may tacitly indicate alignment with a community that would likely also accept the terms *occupation*, *colonization* and *stealing* to describe the arrival, the term *Indigenous Australian people* for the original inhabitants of the continent and the notion that *indigenous people have been here since the beginning of the Dreamings*, while rejecting the terms *discovery*, *settlement*, *Aboriginal people* and *Aborigines*, and the idea that *Australia was settled peacefully*. By using the term *settlement*, on the other hand, although this term would be rejected by the 'UNSW Diversity Toolkit' community, this analysis suggests it would indicate positive alignment with another community that included people such as *Historian Keith Windschuttle* and *Institute of Public Affairs research fellow Matthew Lesh*, as well as the newspaper *The Daily Telegraph*.

In this way, although they are not explicitly evaluative, elements from these constellations do not neutrally convey ideational meaning. Rather, they indicate bonds of ideational and interpersonal evaluative meaning associated with particular communities. This means that depending on the community reading the text, using elements in these constellations may afford particular evaluations. Using the term *invasion* to describe the arrival of English people to Australia not only invokes a negative judgement on the English arrivals, but depending on the readership also affords a judgement of the speaker/author as having the 'right' or 'wrong' values. If read by a community sympathetic to the constellation associated with the values indicated by the UNSW Diversity Toolkit, the use of *invasion* may tacitly afford a positive judgement of the author. If read by a community opposed to these values (or aligned with values associated with *Keith Windschuttle* and *The Daily Telegraph*), it may afford a negative judgement of the author.

It is crucial to keep in mind, however, that such an evaluative response is not a fait accompli. By its nature, affording attitude (and indeed all invoked attitude) may be read as non-evaluative, depending on a large range of factors. What this analysis suggests is that these terms are likely to be associated with particular communities and thus *may* invoke evaluative responses. In this way, we have a means of 'seeing' such affording attitude and the axiological constellations or values systems they invoke, as well as justifying this analysis without resorting to intuitions or ethnographic assertions. The broad method outlined here is summarized as follows:

1 Analyze all instances of evaluation, for the source, target and charging (positive or negative).

   [In SFL terms, analyze for attitude. Focus on the appraiser, appraised and polarity (positive or negative).]

2 Group according to the source/appraiser.
3 Analyze the alignment or disalignment of information associated with the sources identified in Steps 1 and 2. Use Table 6.4 to guide your analysis.

   [In SFL terms, analyze for engagement, focusing on heteroglossia from sources identified in Steps 1 and 2. Use Table 6.4 to interpret the heteroglossic analysis in terms of alignment/disalignment (positive/negative charging).]

4 Add to the constellation built in Step 2.
5 Repeat across multiple texts, progressively building the constellation as necessary.

The constellations in Tables 6.7 and 6.8 were built on the basis of text analysis, but the results mirror a larger political division in Australia associated with what is known as the 'History Wars' (Macintyre and Clark 2003). This division surrounds interpretations of British colonization and the treatment of Indigenous Australians often aligned with 'conservative' or 'progressive' political positions. Those who align with a more conservative political position are generally understood as aligning with more positive evaluations of European arrival to Australia, while those with a more progressive view tend to be more aligned with negative evaluations of the arrival. One of the major figures of this division is the historian Keith Windschuttle who is situated in the constellation opposed to the UNSW Diversity Toolkit. Windschuttle authored two volumes entitled *The Fabrication of Aboriginal History* (2002, 2009), which, among other things, accused a number of Australian historians of fabricating evidence about the poor treatment and killings of Indigenous Australians. This position also tends to align with positions put forward by the conservative think-tank The Institute of Public Affairs (aligned with Windschuttle in Table 6.8). As the constellations suggest, one of the flashpoints of this debate surrounds whether the arrival of Europeans was an *invasion* or *settlement*. This becomes prominent each year around the time of an Australian national holiday officially known as *Australia Day*, but which certain segments of the community term *Invasion Day* (or *Survival Day*) due to its placement on the anniversary of the arrival on Australian soil of a large fleet of British ships known as the First Fleet. Although none of this information was used in justifying the constellations built in Tables 6.7 and 6.8, we can see that it clearly reflects this division in Australian society.

As a final step, we can illustrate the utility of building such a map of these constellations by applying it briefly to Text 4, a comment piece from another Australian newspaper, the *Herald Sun*. For this article, we will underline the particular terminology used in this article that arose in the constellations developed in Tables 6.7 and 6.8.

[Text 4]

Black benefits of white settlement

Professor Paul Frijters and PhD student Tony Beatton attack the stifling political correctness among our social scientists:

Consider ethnic diversity (commonly seen as a good thing) and Aboriginal welfare (widely regarded as having grown worse). . . . For example, news articles often report the claim by academics that the life expectancy of Aborigines is almost 20 years below the national average. As social science researchers, we lack a data set of all those with some Aboriginal ancestry. What we rely on is the group that self-identifies as Aboriginal, so we cannot say with certainty what Aboriginal life expectancy is. The number of people

> reporting their Aboriginality has risen sharply in the past 20 years – the population registered in this way has almost doubled – so the official figures captured over time may not be representative. What can be said is that self-identified Aborigines – who may not be representative – are estimated to die on average 17 years earlier than other Australians. One behavioural scientist, Nikola Balvin from the University of Melbourne, used this at best partial finding to argue last year in the Australian Journal of Peace Studies that 'Australia, because it permits such inequities and poor care for its indigenous people, is not a civilized nation'. Is it really self-evident that Aboriginal peoples are worse off than their ancestors 200 years ago, or that they are poorly cared for? The best guess of anthropology is that hunter-gatherers such as the Aborigines had a life expectancy of about 30 years. Average expectancy in Aboriginal surveys now is close to 60 years. On the face of it, that's a doubling of the length of life, related to Western medicine (vaccinations and the like) and Western-style public services (such as pure drinking water, relatively safe transport, and basic housing). According to the federal Department of Health, average health expenditure on Aboriginals is 20 to 50 per cent higher than on other Australians . . . [T]he sacrifice made by public servants and taxpayers on behalf of Aborigines does not immediately jump at you as being so 'poor' that it is 'uncivilized' . . . The most fascinating thing about the ethnic diversity debate is that we as an academic community seem reluctant to push our arguments to their logical conclusion. If diversity is so great, then why don't we argue the supposed advantages for Aborigines of the greater diversity brought in with European settlement? If living in a sea of diversity is so wonderful for other Australians, why not for Aborigines?
>
> *(Bolt 2007, underlining added)*

Like the first text we looked at, this text includes a significant degree of inscribed attitude and heteroglossic engagement that develop particular evaluations and position different constellations. However for our purposes, what is noticeable is that this text repeatedly utilizes a small number of elements from the constellations developed in Tables 6.7 and 6.8. This includes regular reference to the original inhabitants of Australia as *Aborigines*, *Aboriginal*, *Aboriginals*, as well as a description of the arrival of Europeans as *settlement* and acknowledgement of *best guesses of anthropology*.[7] This set of terminology is situated in the constellation that disaligns with the UNSW Diversity Kit. In this way, it positions the authors, *Professor Paul Frijters* and *PhD student Tony Beatton*, as well as the author quoting them, journalist Andrew Bolt, as disaligning with the Diversity Kit and aligning with people such as *Keith Windschuttle* and *Institute of Public Affairs Research Fellow Matthew Lesh*. The argument of this paper is that for those who align with the UNSW Diversity Kit (very broadly, those who are may be considered politically left-wing in Australia), the use of this terminology will afford a negative judgement of these authors, which will likely colour many of the arguments made in the text. Though to be sure of this, a much larger range of texts would need to analyzed to see how tight the constellation is.

Nonetheless, the opposition of the terms *Aborigines*, *Aboriginals*, etc. to their counterparts in the constellation aligning with the Diversity Kit is reinforced by the single use of the term *indigenous people* in this text. Rather than being directly specified by the authors of this text, it is positioned in projected speech and attributed to *Nikola Balvin from the University of Melbourne*:

> One behavioural scientist, Nikola Balvin from the University of Melbourne, used this at best partial finding to argue last year in the Australian Journal of Peace Studies that 'Australia, because it permits such inequities and poor care for its indigenous people, is not a civilized nation'.

The text makes clear that the authors disalign with this quote and by extension with *Nikola Balvin* and the use of the term *indigenous people*. This is most obvious in the disclaim: denial and negative evaluation of Balvin's charaterization of Australia as not being *civilized* and of providing *poor care*, in '[T]he sacrifice made by public servants and taxpayers on behalf of Aborigines does not immediately jump at you as being so "poor" that it is "uncivilized"'. The different use of the terms *Aborigine*, *Aboriginal*, etc. and *indigenous people* thus correlates with the different constellations set up through the previous text analysis. By developing the analysis of the constellations of values, we have been able to get an initial handle on the different positions being put forward in this paper. Moreover, we have a linguistic method for justifying why people in certain communities might baulk at this text, while others may praise it. In this sense, a method has been developed that enables us to argue that the choice of *Aborigine* as opposed to *indigenous people* is not neutral – they in fact afford evaluations – without having to resort to intuition.

If we accept that the choice of each term likely affords a judgement on whoever uses them, then the constellation analysis offers a means through which we can see highly implicit affording attitude, and potentially enables an understanding of the rich swathe of field-specific evaluative language that permeates language use. In the case of the above article, it positions the sources of each term (*Paul Frijters and Tony Beatton* vs *Nikolas Balvin*) in different communities, which will potentially affect how each is read by those aligning or not with these communities.

It is obvious that the map we have built by no means captures all of the potentially evaluative meanings associated with each community nor that these are the only two communities in our society. After all, the map has been derived from only a single text. To achieve a more comprehensive map, this method may be applied iteratively across multiple texts, such as that of Text 4. Nevertheless, by building this initial map from Text 3 we can glean insights into some of the evaluative meanings at stake in various communities. By progressively expanding this map through analyses of multiple texts, we could see which elements are stable across multiple texts (and so more likely to be shared bonds across a wider community) and which appear to be only instantial tokens in a single text. From such a map, we can begin to see the values systems that organize our communities, the highly implicit

affording attitude that invoke these values systems, and where appropriate, teach these to students learning new intellectual fields.

Notes

1 When the text itself does the appraising without attributing this to someone else, this will be labeled as *The Daily Telegraph*.
2 This does not mean everything an axiologically condensed source says will necessarily gain a significant foothold in the constellation (in LCT terms, it does not mean it will develop relatively strong axiological semantic density). If it is only mentioned a small number of times by a source, then it will likely have only a relatively weak association with this constellation and so will be somewhat peripheral to the field. However if it is repeated, explained, developed and used widely, it will develop a significantly stronger association with the constellation and become more tightly bound to the field. To see how this develops, large corpus studies of the evaluative patterns would be of use here.
3 Note here, the question is not whether the guidelines are worthy of criticism, rather we are concerned with whether or not Matthew Lesh did indeed criticize the guidelines. The text does not indicate that he may not have. In contrast, the previous example notes that the proposition *it is offensive to suggest James Cook 'discovered' Australia*, is in some sense questionable, by giving it a source (implicitly the UNSW Diversity Toolkit).
4 Although authors may use monoglossic utterances to evoke various networks of values, there is no linguistic marking that enables us to see this at this stage. For this reason, monoglossic statements will not be considered.
5 This is more precisely formulated in terms of positioned figures under Hao's (2020) discourse semantic framework.
6 Here I am taking the quotation marks around '*being stolen'* as genuinely quoted material, rather than as 'scare quotes'. If read as scare quotes, this would be another heteroglossic resource used to disalign from the terms *being stolen*.
7 It is arguable whether *the best guess of anthropology* should be captured here. The constellation suggests that the UNSW Diversity Kit disaligns with *anthropological assumptions*, but whether this is specifically the *assumptions* made by anthropologists, or anthropological models in general would need further text analysis to tease out.

References

Bednarek, M. (2009) 'Polyphony in APPRAISAL: Typological and topological perspectives', *Linguistics and the Human Sciences*, 3(2): 107–36.

Bolt, A. (2007, February 14) 'Black benefits of white settlement', *Herald Sun*. http://www.heraldsun.com.au

Bye, C. (2016, March 30) 'University of NSW students told to refer to Australia as having been 'invaded'', *The Daily Telegraph*. http://www.dailytelegraph.com.au

Coffin, C. (2003) 'Reconstruals of the past – settlement or invasion? The role of JUDGEMENT analysis', in J. R. Martin and R. Wodak (eds) *Re/reading the Past: Critical and functional perspectives on time and value*, Amsterdam: John Benjamins, 219–46.

Coffin, C. and O'Halloran, K. A. (2005) 'Finding the Global Groove: Theorizing and analyzing dynamic reader positioning using APPRAISAL, corpus, and a concordance', *Critical Discourse Studies*, 2(2): 143–63.

Doran, Y. J. and Martin, J. R. (2020) 'Field relations: Understanding scientific explanations', in K. Maton, J. R. Martin and Y. J. Doran (eds) *Studying Science: Knowledge, Language, Pedagogy*, London: Routledge.

Gray, B. (1987) 'How natural is "natural" language teaching? Employing wholistic methodology in the classroom', *Australian Journal of Early Childhood*, 12(4): 3–19.

Halliday, M. A. K. (1977) 'Ideas about language', in M. A. K. Halliday *Aims and Perspectives in Linguistics,* Applied Linguistic Association of Australia (Occasional Papers I), 32–55.

Halliday, M. A. K. and Martin, J. R. (1993) *Writing Science: Literacy and discursive power*, London: Falmer.

Hao, J. (2020) *Analysing Scientific Discourse from a Systemic Functional Linguistic Perspective: A framework for exploring knowledge-building in Biology*, London: Routledge.

Hood, S. and Martin, J. R. (2007) 'Invoking attitude: The play of graduation in appraising discourse', in R. Hasan, C. M. I. M. Matthiessen and J. J. Webster (eds) *Continuing Discourse on Language: A functional perspective* (Vol. 2), London: Equinox, 739–64.

Jonassen, D. H. and Land, S. M. (2000) 'Preface', in D. H. Jonassen and S. M. Land (eds) *Theoretical Foundations of Learning Environments*, London: Lawrence Erlbaum, iii–x.

Knight, N. K. (2010) 'Wrinkling complexity: Concepts of identity and affiliation in humour', in M. Bednarek and J. R. Martin (eds) *New Discourse on Language: Functional perspectives on multimodality, identity and affiliation*, London: Continuum, 35–54.

Knight, N. K. (2013) 'Evaluating experience in funny ways: How friends bond through conversational humour', *Text and Talk*, 33(4–5): 553–74.

Lee, A. (1993) 'Whose Geography? A feminist-poststructuralist critique of systemic 'genre'-based accounts of literacy and curriculum', *Social Semiotics*, 3(1): 131–56.

Macintyre, S. and Clark, A. (2003) *The History Wars*, Melbourne: Melbourne University Press.

Martin, J. R. (2011) 'Bridging troubled waters: Interdisciplinarity and what makes it stick' in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 35–61.

Martin, J. R. and Rose, D. (2007) *Working with Discourse: Meaning beyond the clause*, London: Continuum.

Martin, J. R. and Stenglin, M. (2006) 'Materializing reconciliation: Negotiating difference in a transcolonial exhibition', in T. D. Royce and W. L. Bowcher (eds) *New Directions in the Analysis of Multimodal Discourse*, Mahwah, N. J.: Erlbaum, 215–38.

Martin, J. R. and White, P. R. R. (2005) *The Language of Evaluation: Appraisal in English*, Basingstoke: Palgrave Macmillan.

Martin, J. R., Maton, K. and Matruglio, E. (2010) 'Historical cosmologies: Epistemology and axiology in Australian secondary school history discourse', *Revista Signos*, 43(74): 433–63.

Maton, K. (2014) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Maton, K. and Doran, Y. J. (2017a) 'SFL and code theory', in T. Bartlett and G. O'Grady (eds) *The Routledge Handbook of Systemic Functional Linguistics*, London: Routledge, 605–18.

Maton, K., and Doran, Y. J. (2017b) 'Semantic density: A translation device for revealing complexity of knowledge practices in discourse, part 1 – wording', *Onomázein Special Issue*: 46–76.

Maton, K., and Doran, Y. J. (2017c) 'Condensation: A translation device for revealing complexity of knowledge practices in discourse, part 2 – clausing and sequencing', *Onomázein Special Issue*: 77–110.

Maton, K., Martin, J. R. and Matruglio, E. (2016) 'LCT and systemic functional linguistics: Enacting complementary theories for explanatory power', in K. Maton, S. Hood, S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 93–113.

Rose, D. and Martin, J. R. (2012) *Learning to Read/Reading to Learn: Genre, knowledge and pedagogy in the Sydney School*, London: Equinox.

Szenes, E. (2017) 'The linguistic construction of business reasoning: Towards a language-based model of decision-making in undergraduate business', Unpublished PhD Dissertation, Department of Linguistics, The University of Sydney.

White, P. R. R. (2003) 'Beyond modality and hedging: A dialogic view of the language of intersubjective stance', *Text*, 23(2): 259–84.

Windschuttle, K. (2002) *The Fabrication of Aboriginal History, Vol. 1: Van Dieman's Land 1803–1847*, Paddington: Macleay.

Windschuttle, K. (2009) *The Fabrication of Aboriginal History, Vol. 3: The stolen generations 1881–2008*, Paddington: Macleay.

7

HISTORICAL EVENTS AND PROCESSES IN THE DISCOURSE OF DISCIPLINARY HISTORY AND CLASSROOM INTERACTION

Teresa Oteíza

Introduction[1]

The main purpose of this chapter is to illustrate how the construction of events and processes in historical discourses also implies the construction of valorative prosodies (Martin and White 2005) involving different levels of abstraction and the participation of concrete historical facts and people. We propose that a joint analysis using the APPRAISAL system from systemic functional linguistics (SFL) and the dimension of Semantics from Legitimation Code Theory (LCT) helps interpret the transmission of memories of human rights violations in Chile's recent past in classroom interactions focusing on the construction of historical significance regarding this period.

This work is part of a broader research interest in the valorative reconstruction of historical memories as it unfolds in history discourse and official reports of human rights violations and the transmission of historical memories of these human rights violations to new generations, particularly through its recontextualization in History classrooms. The historical periods contemplated in this research are Allende's Popular Unity government (1970–73) and Pinochet's civil-military dictatorship (1973–90).

When dealing with the transmission of historical memories of a nation's past to new generations, personal and social memories play a crucial role. Accordingly a valorative approach to history, focusing on how meaning is constructed to build cumulative axiological and epistemological knowledge, including a focus on how semantic gravity (context-dependence of meaning) and semantic density (complexity of meaning) contribute to historical thinking.

We are particularly interested in the interpretations of the past that are constructed in the recent Chilean historical discourse, taking into account the fact that the legitimation of certain memories also contributes to our understanding

of present and future societies (Achugar 2009, 2016; Achugar *et al.* 2013; Oteíza 2014; Oteíza *et al.* 2015; Wodak 2011). In order to better understand how teachers transmit specialized disciplinary knowledge to their students we ask the following questions: How do teachers reproduce or not the official and academic discourses specified in the official curriculum and professional documents? And, to what level are the concrete facts that are part of personal and social memories of human rights violations constructed in History classes? We postulate that it is of particular relevance to pay attention to issues highlighted by the LCT concepts of semantic gravity and semantic density through which classroom interaction enacts explanations of history, explanations that help students integrate social and collective memories of the recent past into the historical thinking of a nation. In some respects, *epistemic–semantic density* (where the meanings being condensed are empirical descriptions or formal definitions) is privileged in the classroom interaction considered in this chapter; nevertheless, as noted in the project overall, this epistemic–semantic density is regularly combined with a highly charged *axiological–semantic density* (where meanings being condensed are moral, political, affective, aesthetic and political stances) which privileges a moral and ethical approach to the topic (Oteíza *et al.* 2015; Oteíza 2018).

The corpus of this research is composed of classroom interactions and relevant academic publications. The representation of the Popular Unity government of President Salvador Allende (1970–73) is illustrated from the perspective of the sociologist Tomás Moulian (1997) and historians Correa, Figueroa, Jocelyn-Holt, Rolle and Vicuña (2001). Both books are well known in Chile and have been read by the general public and at universities. Moulian's book can be considered a sociology essay, while Correa *et al.* is a historical textbook. Many excerpts of these books are quoted in recently published History textbooks designed for primary and secondary education in the country – the very materials that History teachers use to prepare their classes (including study guides, PowerPoint presentations and lectures) (Oteíza *et al.* 2015).

This chapter is organized in the following manner: the first section is a brief presentation of the appraisal framework developed by Martin and White (2005) and the elaboration of the APPRECIATION system in relation to the construction of events and processes in historical discourses by Oteíza and Pinuer (2012) and Oteíza (2014). To illustrate this complementary APPRECIATION system, we present examples taken from disciplinary discourse written by historians and sociologists regarding recent Chilean history. The following section deals with an extract of an eleventh-grade classroom interaction, as an example of a recontextualization of history discourse. For this analysis we reconsider the appraisal analysis in relation to the sociological concepts from LCT of semantic gravity and semantic density (Maton 2013, 2014a, 2014b; Chapter 3, this volume). The chapter concludes with some remarks related to the potential of the appraisal framework for doing discourse analysis, and in particular, the use of the revised APPRECIATION system for working with historical discourse, and the use of the categories of semantic density and semantic gravity for dealing with issues of classroom interactions and the transmission of historical memories.

The analytical framework of appraisal as a model for discourse analysis

General presentation of the appraisal framework

The appraisal framework is a model of evaluative discourse semantic systems proposed by Martin and White (White 2003; Martin 2003; Martin and White 2005). It is a development of the interpersonal metafunction (Halliday and Matthiessen 2004) and its role enacting the register variable tenor. As Martin (2014) explains:

> as discourse analysts we wanted a system that would generalise across diverse lexicogrammaticalisations, bringing feelings together in relation to one another so that we could describe prosodies of evaluation in relation to genre (and later on in relation to the tenor of face-to-face interaction and the negotiation of identity (Eggins and Slade 1997; Martin 2010c). This meant turning from a grammatical perspective on evaluation to a discourse semantic one.
>
> *(Martin 2014: 17–18)*

Consequently, as Martin and White (2005) have emphasized, the main objective of the appraisal framework has been to present a comprehensive and systematic discourse semantic perspective on linguistic resources that can be used to value social experience.

This framework allows us to consider how intersubjectivity is built by writers and readers, who interact in every text in a determinate social and cultural space which has shaped the way emotions and opinions are codified through language or by means of other semiotic modes. Evaluation thus plays a constructive role in the social organization, in the sense that it shows how we share feelings in the discourse in order to generate social belonging, a process that at the same time has the potential to naturalize reading positions (Martin 2004).

The appraisal framework considers that every element in a text, whether considered discretely or in tandem with other meanings, is a potential instance of subjectivity; interpersonal meanings are accordingly considered as a prosody that works in a cumulative way to create a radiating pattern of evaluative meaning in discourse. This idea that evaluation tends to unfold throughout the whole text, instead of being limited to one particular part of it, is well recognized by linguists working in this area (Thompson and Hunston 2000: 19). In doing an appraisal analysis,

> ideational and textual meanings are also considered because they may contribute to interpersonal meaning or are built simultaneously with interpersonal meaning in the discourse. Consequently, the ideational choices indicate valuations of ATTITUDE, which are rarely neutral and are not inscribed explicitly, but rather invoked. That is, the selection of ideational meanings

> could invoke evaluation by means of a metaphorical language, for example, although explicit attitudinal lexis is absent in the text.
>
> *(Oteíza and Pinuer 2013: 48)*

APPRAISAL organizes evaluation in three main semantic domains: ENGAGEMENT, ATTITUDE and GRADUATION (Martin and White 2005). The subsystem of ATTITUDE has three semantic arenas: (a) emotions (AFFECT), which deals with the expression of positive and negative feelings; (b) ethics/morality (JUDGEMENT), which is concerned with attitudes toward character and behaviour of people (to admire or to criticize, to praise or to condemn); and (c) aesthetics/values (APPRECIATION), which involves evaluations of semiotic and natural phenomena according to the ways in which they are valued in a given field.

The subsystem of GRADUATION has to do with the fact that the strength of attitudes can be raised or lowered in the discourse. It is possible to intensify or diminish our meanings (FORCE), for example: 'an unprecedented experience that has generated many hopes, failed', or we can 'sharpen' or 'soften' the boundaries of categorical meanings of an experiential phenomenon or attitudinal value (FOCUS) using words like *sort of* or *kind of* among others, for example: 'It was an experience that effectively had valuable repercussions'.

The semantic system of ENGAGEMENT focuses attention to the source of attitudes, involving either a monoglossic or heteroglossic orientation. Authors may recognize alternative positions, thus adopting a more heteroglossic orientation, or ignore such positions, therefore closing down the dialogic space with a monoglossic stance. Engagement analysis implies adopting a Bakhtinian perspective, which means that every verbal interaction is viewed as dialogic:

> This principle echoes the idea that the sign is socially motivated and for that reason, it is impossible to separate it from the social situation. This takes us to the dialectic relationship between language and context that has been emphasized by Halliday (1978), and by many discourse analysts working with SFL, regarding the view that language constitutes social context and that it is also shaped by the social context.
>
> *(Oteíza 2017: 458)*

The general network system of the appraisal framework is presented in Figure 7.1.

Recontextualizing APPRECIATION: A proposal for analyzing events and processes

History is a social science that aims to comprehend the complexity of human societies from a diachronic perspective. In History there are three main domains that are critical for constructing historical explanations: causality, time and space, and evidentiality. Causality can be construed in a linear or multifactorial way to present

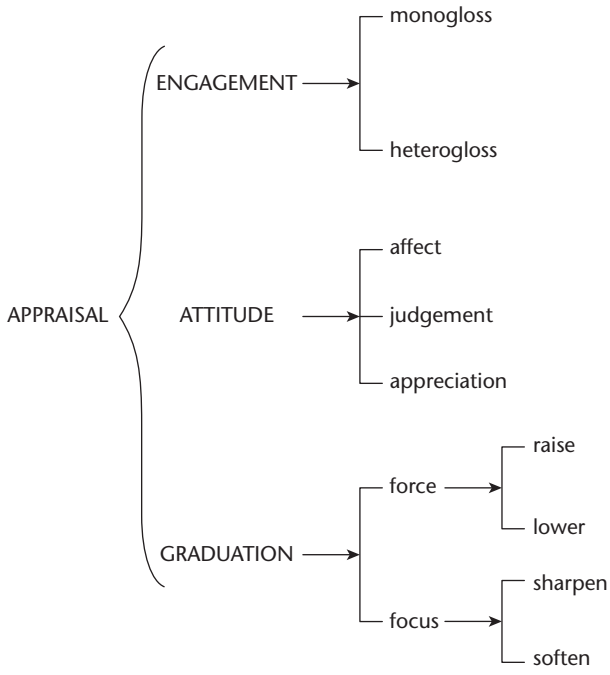


FIGURE 7.1 APPRAISAL: Basic semantic systems (Martin and White 2005)

facts, motivations and conditions, among others, in order to construct historical significance. The temporal–spatial dimension has a fundamental and global role in the interpretation of the discourse of history, which can have a chronological articulation on discourse as phasing, setting in time, segmenting time, sequencing or duration (Coffin 2006) or a more symbolic representation of the time framework as progression (accelerating and deepening) and expectation (Oteíza and Pinuer 2013). A more symbolic representation of time is critical to the construction of argumentation and the evaluative orientation of more complex and explicative discourses of history. The dimension of evidentiality refers to the fact that historians make a selection of the information held in primary and secondary sources with the purpose of elaborating evidence that allows them to construct historical significance in their historical explanations (see also Oteíza and Pinuer 2012; Oteíza and Pinuer 2016; Oteíza 2014 for further explanations).

These three main dimensions are relevant for explaining facts in which individual and collective historical actors are involved, the very material that specialists construct as historical events and processes assigning to them a historical significance. Consequently, in our analysis, the *actoral axis* refers to the individual or collective actors typically involved in historical discourses, for example individual figures as 'General Augusto Pinochet' or 'Salvador Allende'; and collective social actors as the 'Military Junta', 'left-wing party', 'right-wing party', 'Chileans', 'Chilean society'.

The *processual axis* in turn, refers to the events that can be located in a particular time in the past, as a single significant historical fact, as for example 'the bombing of La Moneda' or 'Salvador Allende's Presidential election'; and the historical processes, which comprise a larger amount of time and a more complex explanation, as for example 'a process of human rights violations' or 'the escalation of violence'. These events and processes can also be located in temporal and spatial situations, as for example 'the first years of Pinochet's dictatorship'. The use of technicality in historical discourses rests necessarily on other disciplines that help the construction of a historical explanation in a given area of history, for example political science, economy, sociology, among others. Figure 7.2 is an attempt to illustrate the actoral and processual axes.

Returning to the system of APPRECIATION as designed by Martin and White (2005), we would like to emphasize that this system was designed to deal with the analysis of semiotic products, performances and natural phenomena; this shaped the categories of reaction, composition, and valuation proposed by these authors (and they noted the sub-category of valuation was especially sensitive to field). When dealing with the discourse of social, historical, cultural and political phenomena among others, we in fact found that different categories were needed to account for the specificity of historical processes and events. Consequently, we proposed the categories of power, conflict, impact and integrity for the semantic domain of APPRECIATION. These categories make it easier to take into account the particularity

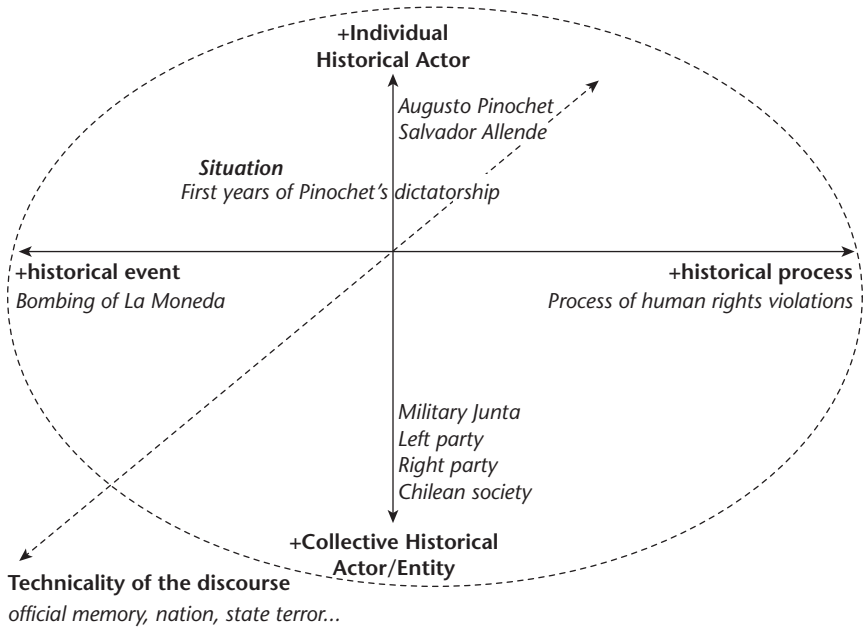


FIGURE 7.2 Representation of actors, events, processes and situations in historical discourses (Oteíza and Pinuer 2012, with examples added in italics)

and complexity of the processual cline (events, processes, situations) of historical discourse, which can be legitimized or delegitimized (Oteíza and Pinuer 2012; Oteíza 2014).

The category of conflict deals with the characterization of societies in terms of the different forms of social conflict that are constructed in historical discourses – for example tension, opposition, and contradiction among values and social relations. This category involves the manifestation of a social, political and/or economic tension that can be expressed with different grades of radicalism along a cline.

The category of power, which interacts with the semantic category of conflict and is also a cline, is associated with the action and influence of powerful and dominant groups. Social power can be understood as the control that a group or an organization has over the actions and decision-making capacity of other groups, limiting their freedom of action and influencing their knowledge, attitudes or ideologies (Oteíza and Pinuer 2012; Oteíza 2014).

Integrity refers to moral or legal evaluations; in our formulation, it is a category that applies to historical processes, events and situations. In historical discourse, human agency tends to be codified in an implicit way by means of impersonalizations, or in an incongruent manner through nominalizations. For example the nominalization 'outbreak of cruelty' in the context of human rights violations during Pinochet's dictatorship, although it implies the action of people that can be analyzed with a negative social sanction of impropriety, is codified in the discourse as a historical process that 'happened' during the first years of the dictatorship, without any mention of human agency (Oteíza and Pinuer 2012). Consequently, in cases like this, we consider that is analytically useful to make the distinction between social sanction of the integrity attributed to the behaviour of people and negative appreciations of integrity targeting a historical process without a specification of human agency.

Finally, the category of impact refers to a semantic dimension that is considered in part under the appreciation sub-category of 'valuation' in Martin and White (2005). Impact refers to the importance and social value that authors attribute to historical events, processes or situations in the discourse. These four categories can be inscribed or invoked, and work together to build discourses of historical legitimation or delegitimization. Figure 7.3 presents the Martin and White categories for analysing the semantic area of APPRECIATION and Figure 7.4 presents Oteíza and Pinuer's proposal for the analysis of historical events and processes.

In the following examples, we illustrate the categories of APPRECIATION proposed in Figure 7.4 for the analysis of events, processes and situations. In addition, we draw on Martin and White's categories of JUDGEMENT for evaluating people and their behaviour, and AFFECT for evaluating emotional reactions. The examples presented are followed by an analysis that includes the entities that have been appraised (historical actors, situations, events and processes), and the inscribed or evoked appraisals by which they are constructed in the discourse.

The following notation is used in the examples: inscribed evaluations of ATTITUDE are **bold and underlined**; evoked evaluations of ATTITUDE are ***bold, underlined***

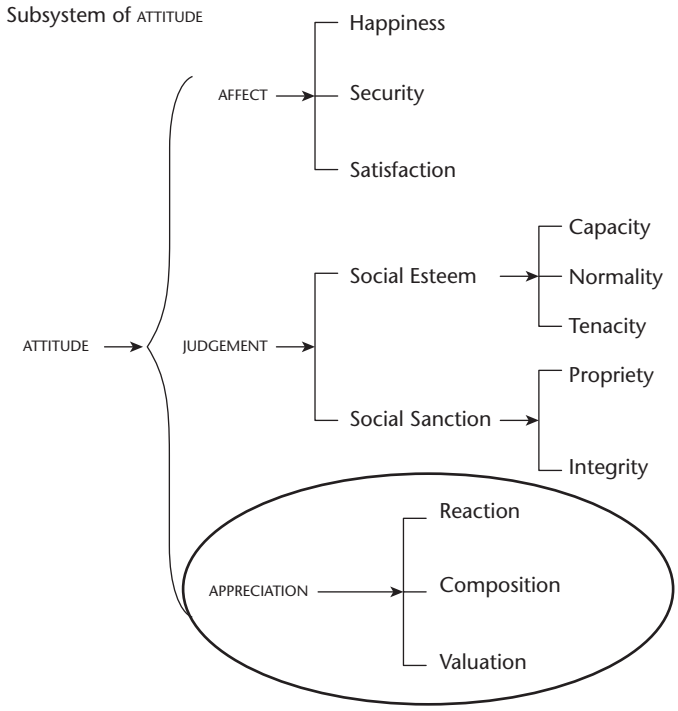


FIGURE 7.3 APPRECIATION system (Martin and White 2005)

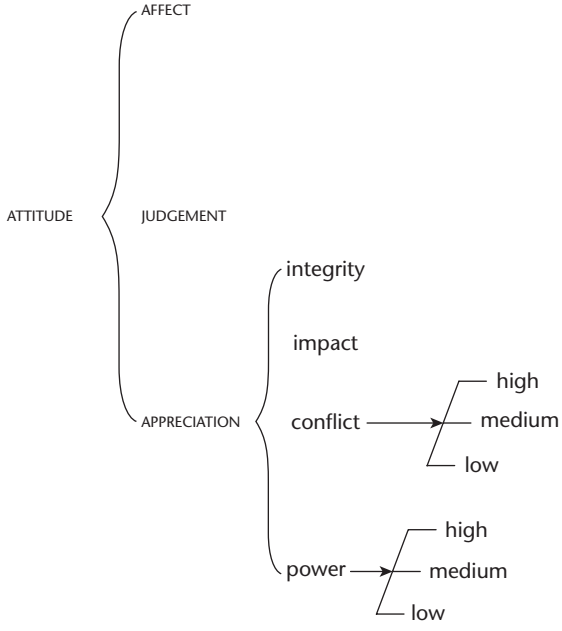


FIGURE 7.4 APPRECIATION system for analyzing events and processes (Oteíza and Pinuer 2012; Oteíza 2014)

and italicized; GRADUATION of attitudes as Force or Focus are underlined. Negative evaluations are marked with '−ve', and positive evaluations with '+ve'.

Example 7.1

A lack of restraint (loss of control) was the distinctive feature of the last years of the 1960s, foreshadowing ***the convulsions*** that would accompany the presidential elections of 1970 and the later development of the popular government.

(Correa et al., 2001)

El desenfreno fue la marca distintiva de los últimos años de las década de 1960, presagiando las ***convulsiones*** que acompañarían la elección presidencial de 1970 y al desenvolvimiento posterior del gobierno popular.

(Correa et al., 2001)

Entity appraised:	*Inscription and invocation:*	*APPRAISAL:*
The last years of the 1960s (historical situation)	**lack of restraint (loss of control)**	− ve APPRECIATION: high Conflict (inscribed) Graduated by high force: distinctive
Presidential elections of 1970 (historical event)	***convulsions***	− ve APPRECIATION, high Conflict (evoked by the process 'presaging' which has a strong meaning of 'flagging' what is going to happen in the near future)
Popular government (historical process)	***(convulsions)***	− ve APPRECIATION, high Conflict (evoked)

In Example 7.1, temporality is expressed in terms of expectation in the historical discourse, 'foreshadowing' or 'presaging' the failure of Allende's government and the generalized social chaos that the society is experiencing, thus explaining and justifying the military coup and constructing Allende's government (1970–73) from the delegitimation of a social, political and economical crisis. 'Convulsions' and 'lack of restraint'/'loss of control' are infused with force as intensification that reinforces the meaning of a historical explanation of the crisis that 'led to' a military coup.

Example 7.2:

From the second half of the decade of the 1960s, coincident with **the revolutionary wave** triggered in both Europe and in the United States, Chilean society precipitated **a whirl of agitation**.

(Correa et al., 2001)

Desde la segunda mitad de la década de 1960, coincidente con **la oleada revolucionaria** que se desencadenó tanto en Europa como en los Estados Unidos, la sociedad chilena se precipitó en **un torbellino de agitación**.

(Correa et al., 2001)

Entity appraised:	*Inscription and invocation:*	*Appraisal:*
Second half of the 1960s (historical situation)	**the revolutionary wave**	− ve APPRECIATION: high Conflict (inscribed) Graduated by high force of scope: space: in both Europe and in the United States
Chilean society (social actor)	**a whirl of agitation**	− ve JUDGEMENT, Social Esteem: Normality (inscribed) Graduated by high force: precipitated

In Example 7.2, 'triggered' ('se desencadenó') and 'precipitated' ('se precipitó') are both in middle voice, thus there is no grammaticalization of agency. Chilean society is presented as one which mirrored the social processes that occurred both in Europe and in the United States ('coincident with'). The causal connection is realized implicitly by the processes 'precipitated' and 'triggered', which make the nominalization 'a whirl of agitation' the effect of another nominalization: 'the revolutionary wave'. High force as temporal intensification is infused in 'triggered' and 'precipitated', adding the meaning of movement and acceleration, in this case, one of social, political and economical processes, with an invoked evaluation of high conflict that conveys a negative connotation associated with chaos, crisis and lack of social stability.

In Example 7.3, below, the sociologist Tomás Moulian (1997) is dealing with Allende's government (1970–73) and is referring to the political agenda of the 'Chilean path to socialism' proposed by the leftist Popular Unity coalition government (Unidad Popular). Popular Unity proposed in its platform a 'peaceful road to socialism', which had the distinctive characteristic of not involving an armed struggle (as had other revolutions in Latin America). This process was considered a unique socialist initiative that aroused interest and expectation in many countries; but it was also considered by some as a threat to democracy and a potential path to a 'Marxist dictatorship' (Loveman 2001).

Example 7.3

The ***aborting*** of the 'peaceful path' was a **culminative** moment in the history of Chile and of world history of Marxism and of the socialist experience. An **unprecedented** experience that had generated many **hopes failed** (. . .) It was an experience that in effect had international ***repercussions***. How was that ***abortion*** possible? To 'understand' this it is **essential** to recreate the

conditions that forged an **outbreak of cruelty** and the capability of living in this **cruelty**. It is also **necessary** to ask how the Popular Unity ***made possible this transformation from a political culture*** to one that gave rise to **killer instincts**. The left wing militants, many of whom were immersed in **political romanticism**, ***dreamed that they were giving birth to something like a full moon***, the entire process ***without the pain of giving birth***: 'the Chilean path to socialism', (with its vision of) **egalitarian** freedom, obtained without **killings** or **dictatorships**. But they witnessed with **horror *the birth of the leviathan***.

(Moulian 1997)

El ***aborto*** de la 'vía pacífica' fue un momento **culminante** de la historia de Chile y de la historia mundial del marxismo y de las experiencias socialistas. **Fracasó** una experiencia **inédita**, que había suscitado múltiples **esperanzas** (. . .) Se trató de una experiencia que efectivamente tuvo una **repercusión** internacional ¿Cómo se llegó a ese ***aborto***? Para 'comprender' es **indispensable** recrear las condiciones en que se fue forjando **el estallido de la crueldad** y la capacidad de vivir en la **crueldad**. También es **necesario** preguntarse de qué modo *la Unidad Popular hizo posible esa mutación de una cultura política sacando a flote* los **instintos de muerte**. Los militantes de la izquierda, una parte importante de ellos sumidos en el **romanticismo político**, ***soñaban en que estaban dando a luz algo parecido a una luna llena,*** la **plenitud *sin los dolores del parto***: 'la vía chilena al socialismo', la liberación **igualitaria**, conseguida sin **matanzas** ni **dictaduras**. Pero presenciaron con **espanto *el alumbramiento del leviatán***.

(Moulian 1997)

Entity appraised:	*Inscription and invocation:*	*APPRAISAL*
'the Chilean path to socialism' (historical process)	***aborting***	−ve APPRECIATION: low Power (evoked by means of a lexical metaphor)
	culminative	+ve APPRECIATION: Impact (inscribed) Graduated by high force, scope: space: world history
	failed	-ve APPRECIATION: low Power (inscribed)
	unprecedented	+ve APPRECIATION: Impact (inscribed)
	hopes	+ve AFFECT, Happiness (inscribed) Graduated by high force: many
	repercussions	+ve APPRECIATION: Impact (evoked) Graduated by focus: in effect and by high force, scope:space: international
	abortion	−ve APPRECIATION: low Power (evoked by means of a lexical metaphor)

(*Continued*)

Entity appraised:	*Inscription and invocation:*	*APPRAISAL*
The recreation of the conditions that forged an 'outbreak of cruelty' (historical situation)	**essential**	+ve APPRECIATION: Impact (inscribed)
	necessary	+ve APPRECIATION: Impact (inscribed)
Social situation (referring to the period of the dictatorship) (historical situation)	**outbreak of cruelty**	−ve APPRECIATION: Integrity (inscribed)
	cruelty	−ve APPRECIATION: Integrity (inscribed)
Popular Unity (collective social actors)	***made possible this transformation from a political culture***	−ve JUDGEMENT, Social Sanction: Propriety (evoked)
	killer instincts	−ve JUDGEMENT, Social Sanction: Propriety (inscribed)
left-wing militants (collective social actors)	**political romanticism**	−ve JUDGEMENT, Social Esteem: Capacity (inscribed) Graduated by high force: <u>many of whom</u>
	dreamed that they were giving birth to something like a full moon	−ve JUDGEMENT, Social Esteem: Capacity (evoked)
'the Chilean path to socialism' (historical process)	***without the pain of giving birth***	−ve APPRECIATION: Integrity (evoked)
	egalitarian (without)	+ve APPRECIATION: Integrity (inscribed)
	killings (without)	+ve APPRECIATION: Integrity (inscribed)
	dictatorships	+ve APPRECIATION: Integrity (inscribed)
(Military coup/ state terror)	**horror**	−ve AFFECT: Disinclination (Fear) (inscribed)
	the birth of the leviathan	−ve APPRECIATION: Integrity (evoked by means of a lexical metaphor)

In Example 7.3, the 'Chilean path to socialism', and hence Allende's government (1970–73), is constructed in terms of the delegitimation of the historical perspective of a social, political and economical failure. The author first constructs the 'Chilean path to socialism' as a positive political project with national and international repercussions; however, from the beginning of the extract, the lexical

metaphor 'abortion' is constructing a strong negative evaluation which becomes clear in the co-text with the mention of 'cruelty' and 'horror' that was going to characterize the coup d'état. The left-wing party militants are represented in the discourse with a negative evaluation of social esteem of capacity due to their lack of vision or 'political romanticism'. The fear and horror felt by left-wing militants is triggered by human rights violations codified metaphorically by 'the birth of the leviathan'. Both the Popular Unity and the left-wing militants are going to be constructed indirectly as the cause of the 'outbreak of cruelty' of the dictatorship.

In the following section, we briefly explain the concepts of semantic gravity and semantic density from LCT (Maton 2013, 2014a, 2014b; Chapter 3, this volume) in order to integrate them with the appraisal analysis using the elaboration of the APPRECIATION system suggested by Oteíza and Pinuer (2012). Our purpose is to explore the possibilities of a joint analysis of the transmission of memories of the recent past.

Historical events and processes viewed from semantic gravity and semantic density

Legitimation Code Theory (LCT) is a sociological approach for analyzing and changing social practice (Maton 2014a). The framework comprises a multi-dimensional conceptual toolkit, where each dimension offers concepts for analyzing a particular set of organizing principles underlying practices. Here we focus on the dimension of Semantics and in particular on two key concepts: semantic gravity and semantic density (Maton 2013, 2014a, 2014b; Chapter 1, this volume).

Semantic gravity (SG) is defined by Maton (2014a: 110) as 'the degree to which meaning relates to its context'. Semantic gravity may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less dependent meaning is on its context. Semantic gravity traces a continuum of strengths and therefore can be used to analyze change over time by describing processes of: weakening semantic gravity, such as moving from the concrete particulars of a specific case towards generalizations; and strengthening semantic gravity, such as moving from abstract or generalized ideas toward concrete and delimited cases. According to Maton (2014a: 110), one condition for cumulative knowledge-building and learning may be the capacity to master semantic gravity, in order for knowledge to be decontextualized, transferred and recontextualized into new contexts.

Semantic density is defined by Maton as the condensation of meaning within socio-cultural practices (symbols, terms, concepts, phrases, expressions, gestures, actions, clothing, etc.) and explores their degree of complexity. Semantic density may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic density (SD+), the more meanings are condensed within practices; the weaker the semantic density (SD−), the fewer meanings are condensed. Strengthening semantic density involves 'moving from a practice or symbol

that denotes a small number of meanings towards one that implicates a greater range' (Maton 2014a: 130). Weakening semantic density involves 'moving from a highly condensed practice or symbol to one that involves fewer meanings. For example, explaining a technical concept from an academic source in simpler terms typically enacts only a limited number of its meanings' (Maton 2014a: 130). Semantic density may involve *epistemological condensation* of formal definitions of concepts and empirical descriptions or *axiological condensation* of affective, aesthetic, ethical, political and moral stances.

We propose here that the LCT concepts of semantic gravity and semantic density contribute to understanding the transmission of memories in History classroom interactions and the construction of the historical significance of processes and events (Oteíza *et al.* 2015). In History classes, teachers and students negotiate their personal and social memories with respect to both the official curriculum of History textbooks alongside alternative resources that create a space for countermemories and elaborations that take into consideration the conceptual complexity of discourses on the topic. To do this, teachers and students deploy a range of resources, such as nominalizations, mental, verbal and material processes, and periphrastic structures. These resources construct subjectivity in discourse and help determine levels of abstraction, generalization, interpretation, and description of concrete facts.

In the next section, we present an extract from an eleventh-grade History class interaction. According to the national History curriculum in Chile, the unit 'The Military Dictatorship' has as its general objective the characterization of the main features of the coup d'état and ensuing military dictatorship in Chile, including treatment of human rights violations, political violence and suppression of the rule of law ('Estado de derecho') in the country.

History class interaction and the transmission of historical memories of human rights violations through the historical conceptualization of violence[2]

The class interaction that we present below is from a private school, with all male students and a female History teacher. There was less interaction between teacher and students in this class in comparison with what we observed in government subsidized and partially subsidized schools (Oteíza *et al.* 2015). The teacher here tends to use most of the time for class lecturing and makes little room for student participation. She also tends to focus on historical processes at a high level of conceptualization.

At the beginning of the class, the teacher characterizes human rights violations using concepts such as 'state of siege', 'individual freedom', 'political freedom', 'press freedom', 'restrictions to the citizenship', 'citizens' guarantees', 'deportations', 'exile' and 'neutralization of the enemy'. The teacher exemplifies each concept by relating them to everyday situations that different professionals in the country experienced,

using congruent and concrete language for these illustrations. This teacher uses a PowerPoint presentation throughout the entire class; in this presentation the notions of a 'restricted citizen' and of 'elimination of citizens' guaranties', 'arrest' and 'torture' were emphasized. We reproduce a brief fragment of the lesson, translated by us (relatively literally, to give the flavour of the classroom discourse) from the Spanish original, as Example 7.4 below:

Example 7.4[3]

T 1 because of the state of siege (1) the idea of citizenship is restricted (1) it's what is
2 normal for a democratic state is (2) in a democratic state if a citizen is arrested (1) they have
3 the right to know why they are being arrested (1) in a democratic state a citizen cannot
4 be deported (1) cannot be sent to another country or their country of origin unless they
5 have committed a serious crime and they are to be judged in their country of origin (1)
6 all that is suspended (1) therefore citizens' guarantees are eliminated (1) resulting in
7 arbitrary arrests (1) deportation of foreigners (1) they can be sent to their country of
8 origin disappearance of people assassination of people by state agents and tortures by
9 state agents (2) why do I say state agents there? Because the military junta in its
10 process of institutionalization is going to create organisms of
S 11 the DINA
T 12 secret police for example the DINA and the CNI who are going to realize this kind
13 of activity (2) if this were public if they said we're going to torture and disappear
14 people (1) Chile internationally and publicly from the citizens would have been in a
15 situation of a lot of criticism towards the government therefore there are going to be
16 secret police organisms that are going to act (1) with these kinds of examples ((the
17 teacher points to the projected PowerPoint)) towards the citizens: arbitrary arrest
18 deportation torture disappearance and assassination (1) not only in Chile (1) because

19 they're going to have an international network and international military operations to
20 assassinate some people that the military government didn't want intervening in the
21 future or trying to destabilize their government (1) what is the objective? (1) that they are
22 always going to use and that they use a euphemism (1) a word that doesn't sound so
23 strong to say we're going to kill everyone that is opposed: neutralization (1) the idea
24 of neutralizing ((the teacher writes neutralize the opposition on the board)) the
25 opposition means for the military government in Chile assassinate (2) it didn't mean
26 exile in most cases because important individuals had the opportunity of exile (1) but
27 those who did not have contacts (1) those who did not have access to embassies and that
28 kind of things stayed in Chile and lived or in hiding[4] or in ((pointing to the
29 board)) torture or disappearance and assassination or torture and they escaped being
30 assassinated a series of things (2) therefore that neutralizes the opposition (1) that's
31 exemplified (1) yes?

S 32 Yes (1) so (1) but everyone still knew about the existence of the CNI and these polices?

T 33 It's just that they are going to engage in other work (1) the CNI and the DINA
34 officially exist but the CNI and the DINA aren't going to be saying that they are
35 arbitrarily putting people under arrest

S 36 So but internationally (1) the existence of concentration camps in Chile was known

T 37 Yes [internationally]

S 38 [So]

T 39 and some sectors of Chilean society as well (1) but there are other sectors that say they
40 had no idea

In this class interaction, the teacher generally uses a high level of technicality including terms such as 'deportation', 'torture', 'disappearance',[5] 'DINA', 'CNI', 'citizens' guarantees', to refer to the process of human rights violations, with some inclusions of concrete examples; she incorporates social actors involved in material

and verbal processes such as 'they can be sent to their country of origin' or 'what the organisms of secret police wouldn't say and what they did'.

The main evaluation constructed in the interaction is one of inscribed negative APPRECIATION of integrity regarding citizens' rights that were suppressed in the country during Pinochet's dictatorship ('the idea of citizenship is restricted'). The process of institutionalization of the military government is explained basically by means of resources of opposition (lines 1–10), contrasted with a 'normal' situation in a democratic state where a person cannot be deported or sent to another country. Therefore, the teacher starts with knowledge characterized by relatively weak semantic gravity and relatively strong semantic density (SG−, SD+) by drawing on complex ideas that cover a wide range of possible instances as it is shown in Table 7.1.

In line 11, a student tries to participate by mentioning the 'DINA' (National Directorate of Intelligence), showing his knowledge of one of the main repressive organisms that operated in that period of Chilean history. This is a more concrete and simpler instantiation, strengthening semantic gravity and weakening semantic density. The teacher however continues referring to the more technical and general 'organisms of secret police'; using the DINA and the CNI (National Intelligence Central) as examples of how these systematically organized actions of repression had concrete expression through those two institutions. She thus maintains weaker semantic gravity and stronger semantic density, keeping the discussion at a general and somewhat abstract level. She presents these organisms with an evoked negative Judgement of social sanction of propriety ('this kind of activity') that refers to the previously mentioned actions of 'arbitrary arrest', 'deportation', 'disappearance', 'assassination' and 'torture' (lines 1–10), inscribing a negative APPRECIATION of Integrity.

Regarding the level of technicality that the teacher uses to explain the process of human rights violations, it is possible to argue that semantic gravity is strengthened and semantic density is weakened with the inclusion of social actors such as the DINA and the CNI. However, those institutions are still part of the technicality of the state process of repression inside the country and in the rest of Latin America ('military international operations'). Consequently, although they constitute a general knowledge that a Chilean secondary school student may have, the teacher incorporates them as key participants in a broader historical explanation. So dealing with these collective actors as part of 'secret police organisms' adds a level of specialization because they were, as institutions, part of the state terror that was responsible for the material actions of 'assassinate', 'intervene', 'destabilize' the government (lines 18–19), as it is shown in Table 7.2.

The teacher then strengthens semantic gravity and weakens semantic density by explaining that the planned and state-driven action had the main objective 'of killing' the opposition to the military government. With the extra-vocalization of attribution, the teacher makes a negative and inscribed judgement of Social Sanction of Integrity regarding the organisms of secret police: 'We are going to kill all that are in opposition', which explains and unpacks the euphemism of 'neutralization'. In

TABLE 7.1 Analysis 1 of classroom interaction

LINES INTERACTION	*SEMANTIC GRAVITY AND SEMANTIC DENSITY*	*LINGUISTICS RESOURCES*	*VALORATIVE STANCE*	*Inscription and invocation*	*ENTITY APPRAISED HISTORY EVENTS, PROCESSES OR ACTORS*
T (1–2)	SG−, SD+	Nominalizations: *Idea of citizenship, democratic state*	−ve APPRECIATION: Integrity (inscribed)	**restricted**	HISTORICAL PROCESS: Process of human rights violations (the idea of citizenship)
T (3–5)	SG+, SD−	Material and mental processes: rights that a citizen has in a democratic state	+ve JUDGEMENT, Social Sanction: Integrity (evoked) −ve JUDGEMENT, Social Sanction: Integrity (inscribed)	(cannot) ***be deported*** (unless they have committed) **serious crime**	SOCIAL ACTOR: Citizen
T (6–7)	SG−, SD+	Nominalizations *Citizen's guarantees; arbitrary arrests, deportation*	−ve APPRECIATION: Integrity, high Power (inscribed) × 3	**eliminated** **arbitrary (arrests)** **deportation**	EVENTS and PROCESSES of human rights violations
T (7)	SG+, SD−	Material processes: *they can be sent to their country of origin*	−ve JUDGEMENT, Social Esteem: Capacity (inscribed) × 2 −ve JUDGEMENT, Social Esteem: Capacity (evoked) −ve APPRECIATION: Integrity, high Power (evoked)	**arbitrary (arrests)** **deportation** ***they can be sent to their country of origin***	SOCIAL ACTORS: *Citizens* (Indirectly: HISTORICAL PROCESS of human rights violations)
T (8)	SG−, SD+	Nominalizations: *disappearance, assassination, tortures*	−ve JUDGEMENT, Social Sanction: Integrity (inscribed) × 3 −ve APPRECIATION: Integrity, high Power (inscribed)	**disappearance, assassination, tortures**	SOCIAL ACTORS: *State agents* (Indirectly: HISTORICAL PROCESS of human rights violations)
T (9)	SG+, SD−	Verbal process *Why do I say state agents here?*	−ve JUDGEMENT, Social Sanction: Propriety (inscribed)	(by means of co-text: **disappearance, assassination, tortures)**	SOCIAL ACTORS: *State agents*

TABLE 7.2 Analysis 2 of classroom interaction

LINES INTERACTION	*SEMANTIC GRAVITY AND SEMANTIC DENSITY*	*LINGUISTICS RESOURCES*	*VALORATIVE STANCE*	*Inscription and invocation*	*ENTITY APPRAISED HISTORY EVENTS, PROCESSES OR ACTORS*
T (10)	SG−, SD+	Nominalizations: *process of institutionalization*	−ve APPRECIATION: Integrity, high Power (evoked)	(to create) ***organisms of secret police***	HISTORICAL PROCESS of institutionalization of the military junta
S (11)	Medium SG, SD	Technicality: *DINA*	−ve JUDGEMENT, Social Sanction: Propriety (inscribed)	(by means of co-text: **disappearance, assassination, tortures)**	SOCIAL ACTOR: *DINA* (more particular: example of organism of secret police)
T (12)	Medium SG, SD	Technicality: *Organisms of secret police*	−ve JUDGEMENT, Social Sanction: Integrity (evoked)	***this kind of activity***	SOCIAL ACTORS: *Organisms of secret police* (less particular)
T (12–17)	Medium SG, SD	Technicality: *DINA*, *CNI*	−ve JUDGEMENT, Social Sanction: Integrity (inscribed) × 3 Graduated by force: a <u>lot</u> of criticism	**Torture disappear** (people) **criticism**	SOCIAL ACTORS: *DINA*, *CNI* (more particular: examples of organisms of secret police)
T (18–19)	SG−, SD+	Nominalizations: arbitrary arrest *deportation, torture, disappearance, assassination, international military operations*	−ve JUDGEMENT, Social Sanction: Propriety (inscribed) × 5 −ve APPRECIATION: Integrity, high Power (inscribed)	**arbitrary arrest deportation torture disappearance assassination**	SOCIAL ACTORS 'They' DINA and CNI and International network and international military operations (Indirectly: HISTORICAL PROCESS of human rights violations)

TABLE 7.3 Analysis 3 of classroom interaction

LINES INTERACTION	*SEMANTIC GRAVITY AND SEMANTIC DENSITY*	*LINGUISTICS RESOURCES*	*VALORATIVE STANCES*	*INSCRIPTIONS AND EVOCATION OF APPRAISAL*	*ENTITY APPRAISED HISTORY EVENTS, PROCESSES OR ACTORS*
T (19–23)	SG+, SD−	Verbal and material processes: what the organisms of secret police wouldn't say and what they did	−ve JUDGEMENT, Social Sanction: Propriety (inscribed)	(we are going) **to kill…**	SOCIAL ACTORS: *organisms of secret police*

this manner, with the inclusion of what these secret organisms would not be able to say but that they were actually doing (verbal and material processes), the teacher strengthens the semantic gravity and weakens semantic density in line 23, as it is possible to appreciate in Table 7.3.

The political repression of the DINA and CNI against the opposition of the military government that is constructed with the modal deontic verb 'can' ('they can deport', 'they can order'), marks the power of these state organisms in opposition with the powerless position of the former (the opposition to the military government). Also relevant in terms of the repressive power of the DINA and the CNI is the use of periphrastic verbs to express the actions of these secret organisms: 'they are going to be', 'they are going to act', 'they are going to have', 'they are going to use', and 'we are going to kill'. This use of periphrastic verbs supports the presentation of events in a basic form of narrative, and forms a more open or potential meaning in the interaction with the use of everyday language. So these passages bring these living organisms into the picture, talking and threatening Chilean society in a very concrete way (SG+, SD−).

It is possible to appreciate, in contrast with the written specialized extracts of specialized discourse of history analyzed, a more chronological treatment of time in the teacher's discourse, with the use of past, future and 'present in present' tense selections, for example: 'we are going to torture and disappear people'; 'there are going to be secret police organisms that are going to act'; 'the DINA aren't going to be saying that they are'. This use of time is similar to the mode of 'commentary' founded by Matruglio *et al.* (2013) in their analysis of an Ancient History class interaction.[6]

The teacher also uses congruent ways of expressing causality in her discourse, and students also construct causality in a very congruent and colloquial manner

using 'so' three times. The teacher utilizes 'therefore' and 'because' three times each to construct this logico-semantic relationship. Only once does she choose a non-congruent resource to express causality: 'resulting' (line 6), in which a non-finite verbal form expresses the effect of a historical process:

Therefore citizens' guarantees are eliminated
Resulting in arbitrary arrests, deportation of foreigners

This highly nominalized clause complex is later unpacked by congruent actions in which state agents are declared responsible for material actions:

disappearance of people by state agents
assassination of people and tortures by state agents

Then the teacher asks:

Why do I say state agents there?
because
The military junta in its process of institutionalization is going to create organisms of

Student: The DINA
Teacher: Secret police for example the DINA and the CNI

Here, it is possible to appreciate an interesting 'semantic wave'[7] in which the teacher makes a connection of social actors (state agents) with a social and political process of 'institutionalization'. It seems that it is crucial for her to make her students understand that the acts of repression and of human rights violations were made by people that were part of the government institution, which is why she stops talking to ask the rhetorical question, 'Why do I say state agents there?' The DINA and the CNI were treated as examples of the process of institutionalization of a military junta that violently arrived to power through a coup d'état.

In the following lines (29–30), the teacher again relies on a chain of contrasting material processes to explain how the important individuals were able to escape repression and death because they had the means to escape being assassinated. They are thus are constructed in the discourse with an invoked positive evaluation of judgement of social esteem of capacity, whereas the rest of the opposition that was not able to escape the repression are represented with an inscribed negative evaluation of judgement of social esteem: capacity:

because
important individuals had the opportunity of exile
but

those who did not have contacts those who did not have access to embassies and that kind of things stayed in Chile and lived or in clandestineness or in torture or disappearance and assassination or torture
and
they escaped being assassinated a series of things
therefore
that neutralizes the opposition

Starting in line 30, the teacher reassumes the notion of 'neutralization of the opposition'; here, semantic gravity is weakened and semantic density is strengthened again because the explanation is related to the more abstract historical process of annihilation of the opposition to the military regime. The teacher at this point checks again for understanding of the historical process, giving in this occasion time for students' participation, as it is shown in Table 7.4.

The negative evaluation of the integrity of the CNI and the DINA, the organisms that operated concentration camps in Chile, is invoked by the teacher and by the student who asks about the international knowledge of the existence of these centres (line 36). The teacher maintains weaker semantic density when she answers the student with the information that 'some sectors of the Chilean society also [knew about the existence of concentration camps], but other sectors say that they didn't have any idea' (lines 37–40). Student and teacher refer to people that 'think' and 'say' something, but we need to take into consideration that both of them are bringing political actors to the historical explanations and not just 'people' in general, as other History classes observed in this same level (Oteíza *et al.* 2015).[8]

This last opposition, between social sectors who knew about the existence of concentration camps and the social and political sectors that did not have any idea, introduces heteroglossic discourse that the teacher later on emphasizes regarding the long process that the country needed to experience in order to recognize, after the publication of *The National Commission on Torture and Political Prison* (Valech Report 2004/2011), the massive and systematic practice of torture committed by the state in the country during Pinochet's dictatorship, as it is possible to appreciate in Table 7.5.

In Figure 7.5 we present an illustration of the semantic waves constructed by the teacher and two students in this extract of History classroom interaction. When semantic density strengthens (shifting upwards), this in part depends on the use of nominalizations and technicality reflecting a more specialized discourse of the process of human rights violations that goes beyond the common sense of everyday language and constructs a more abstract historical significance and contextualization. This use of a combination of stronger, medium and low semantic gravity and stronger, medium and low semantic density create semantic waves which build a historical explanation. Figure 7.5 shows the whole extract, in two semantic profiles (1–23 and 23–40).

TABLE 7.4 Analysis 4 of classroom interaction

LINES INTERACTION	*SEMANTIC GRAVITY AND SEMANTIC DENSITY*	*LINGUISTICS RESOURCES*	*VALORATIVE STANCES*	*Inscription and invocation*	*ENTITY APPRAISED HISTORY EVENTS, PROCESSES OR ACTORS*
T (23–24)	SG−, SD+	Nominalizations: *neutralization*, *idea of neutralizing.*	−ve APPRECIATION: Integrity, high Power (evoked) × 2	***neutralization*** ***idea of neutralizing***	HISTORICAL PROCESS of annihilation of the opposition to the military regime (human rights violations)
T (25–30)	SG+, SD−	Material processes: actions taken by the different sectors of the opposition regarding repression	+ve JUDGEMENT, Social Esteem: Capacity (inscribed) −ve JUDGEMENT, Social Esteem: Capacity (evoked) −ve JUDGEMENT, Social Esteem: Capacity (evoked) × 2 −ve JUDGEMENT, Social Esteem: Capacity (inscribed)	**well contacted** (those who) ***did not have contacts*** (those who) ***did not have access to embassies*** ***that kind of things*** **clandestineness**	SOCIAL ACTORS: Political actors of the opposition 'well contacted' Political actors of the opposition without contacts
T (30)	SG−, SD+	Nominalization partially unpacked: (that) *neutralizes the opposition*	−ve APPRECIATION: Integrity, high Power (inscribed) × 5 −ve APPRECIATION: Integrity, high Power (evoked)	**torture** **disappearance** **assassination** **torture** **assassinated** **neutralizes the opposition**	HISTORICAL PROCESS of annihilation of the opposition to the military regime (human rights violations)
T (31)	SG+, SD−	Check for understanding of the historical process of human rights violations	–	–	–
S (32)	SG+, SD−	Mental process: Ask for information regarding the knowledge regarding the existence of the 'CNI and these policies'	+/−ve JUDGEMENT, Social Esteem: Capacity (inscribed) Graduated by Force: Scope: <u>everyone</u>) −ve APPRECIATION: Integrity, high Power (evoked)	(everyone) ***still knew about the existence of the CNI these policies***	SOCIAL ACTORS: *everyone* (knowledge of the existence of concentration camps) HISTORICAL PROCESS of human rights violations/ existence of concentration camps

TABLE 7.5 Analysis 5 of classroom interaction

LINES INTERACTION	*SEMANTIC GRAVITY AND SEMANTIC DENSITY*	*LINGUISTICS RESOURCES*	*VALORATIVE STANCE*	*Inscription and invocation*	*ENTITY APPRAISED HISTORY EVENTS, PROCESSES OR ACTORS*
T (33–35)	SG+, SD−	Technicality: *CNI, DINA* + Verbal processes: What the DINA and the CNI aren't going to be saying	−ve JUDGEMENT, Social Sanction: Propriety (inscribed)	**arbitrarily** (putting people under arrest)	SOCIAL ACTORS: *CNI, DINA*
S (36)	SG+, SD−	Mental process: Ask for international knowledge of the existence of concentration camps in Chile	−ve APPRECIATION: Integrity, high Power (evoked) −ve JUDGEMENT, Social Esteem: Capacity (evoked) Graduated by Force: Scope: internationally	***existence of concentration camps was known***	HISTORICAL PROCESS of human rights violations SOCIAL ACTORS: international knowledge of the existence of concentration camps)
T (37–40)	SG+, SD−	Mental and verbal processes: What different social sectors say and know regarding the existence of concentration camps.	+ve JUDGEMENT, Social Esteem: Capacity (evoked) −ve JUDGEMENT, Social Esteem: Capacity (evoked)	(was known as well) (they had) ***no idea***	SOCIAL ACTORS: those who know and those 'who say' that they don´t know' about the existence of concentration camps and human rights violations.

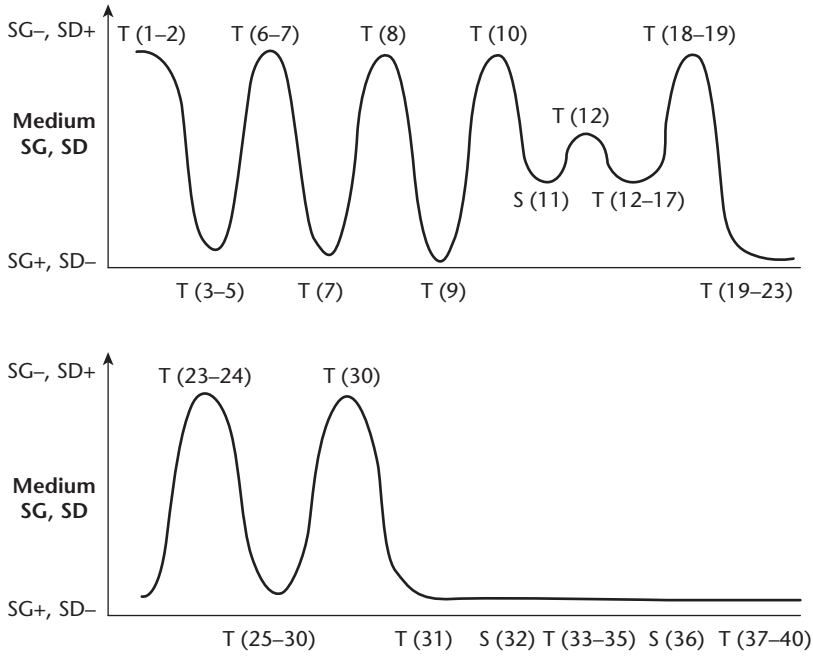


FIGURE 7.5 Semantic waves of classroom interaction

Final remarks

In the process of 'historizing memory' (Jelin 2002; Lechner 2006; Ricouer 2010), the manner by which social actors, events, situations and social processes are constructed in history discourses is crucial. This construction, as all history discourses, implies the selection and privileging of certain aspects and actors of the past: as Jelin argues, this notion of 'historizing' memory implies 'the selection and emphasizing of certain dimensions and aspects of the past that different actors rescue and privilege, and of the changing emotional and affective interpretations that this implies' (Jelin 2002: 69).

We postulated at the beginning of this chapter that the construction of events and processes in disciplinary discourses, and also in the pedagogical discourse of class interaction, is crucial for building historical significance. Students need to be able to move from concrete facts and individual and collective social actors (SG+, SD−) to a more complex and general understanding of historical processes (SG−, SD+) and back again building semantic waves. This can be even more central when dealing with a traumatic national past that is still under the dynamics of social and cultural construction of collective memories, counter memories and official memories (Stern 2006, 2013; Lira 2013).

The results of a joint analysis of appraisal resources with linguistic instantiations (in this text) of the concepts of semantic gravity and semantic density has been

useful to begin showing how this process can operate in History classroom interactions. In this manner, a specialized and abstract language can be associated with weaker semantic gravity and stronger semantic density (more context-independent and more complex), as we expected, but also with the elaboration of historical processes, and thus with a more complex explanation of historical thinking that allows historizing social memories with epistemological condensation of meaning. Social actors and facts tend to be constructed with stronger semantic gravity and weaker semantic density (more concrete and simpler).

It is possible to appreciate in the analysis that, as Maton (2014a, 2014b) states, teachers need to manage both semantic density and semantic gravity in order to produce cumulative knowledge. Reasoning along the same lines, Matruglio *et al.* (2013) have suggested regarding students' use of language for understanding historical significance that:

> in order to demonstrate mastery of the pedagogic discourse of History, which is more than personal narrative and involves an array of specialized terms, students must display knowledge in assessments that involves weaker semantic gravity (by, for example, discussing events with more 'objective' detachment) and stronger semantic gravity (through, for example, marshalling technicalized terms). Students must reason about the relevance and importance of the source for the study of History. This necessitates moving back up the semantic scale.
>
> *(Matruglio et al. 2013: 44).*

The stronger semantic gravity that we demonstrated is associated with the construction of the historical process of 'neutralizing the opposition' as part of the 'process of institutionalization' of the military junta in Chile after the coup d'état of 1973. In the particular class interaction analyzed, as shown in Figure 7.5, it is built in a wave with stronger and medium semantic gravity in which main social actors and specific facts have prominence (what the DINA and the CNI did, said and decided not to say to keep a national and international positive ethical image).

In addition, technicality also plays its role as bridging, in this particular classroom interaction, social memories with the integration of the general knowledge that students have about the recent Chilean past of human rights violations. In this way, the DINA and the CNI are incorporated in the discourse as particular examples of a more general organization of secret police organisms that operationalize state terror inside the country, and also, as part of an international orchestra of repression against left-wing parties in the whole Latin America.

In this chapter we have presented only a brief fragment of History classroom interaction taken from a Chilean private school. However, conclusions from analyses of public schools in the country also show that some teachers do include historical explanations that are ideologically closer to the official discourse about human rights violations committed during Pinochet's dictatorship, and others that are closer to an axiological semantic condensation perspective which emphasizes an

ethical and political position of consensus and reconciliation in the country (Oteíza *et al.* 2015). Political violence is transmitted in History classes in part through emotions and personal agency. Intentions and motivations are transmitted with more prominence than historical knowledge about political processes of violence that Chilean society experienced, especially during the first years of Pinochet's dictatorship. Semantic gravity and semantic density here are emotionally charged, emphasizing a personal gaze closer to affective and ethical understandings of the recent past of human rights violations.

According to several historians, sociologists and social psychologists, Chilean society has not fully processed the trauma of human rights violations it experienced from 1973 to 1990. Indeed, there is still a lack of historicity, as the past has not been elaborated. Therefore, Lechner and Güell (1998) state, we are a society that cannot recognize itself in a shared history. Nevertheless, after filming History classes, and interviewing teachers and students in primary and secondary schools (Oteíza *et al.* 2015; Oteíza 2018), we believe, optimistically, that the process of constructively 'historizing' the memory of Chilean recent past is taking place in new generations of youth and children, especially thanks to the efforts of many History teachers around the country. It is true that we need to elaborate the delicate and difficult experience of human rights violations and the urgent call for justice from many sectors of Chilean society from an ethical, emotional and political perspective. However, 'the birth of the leviathan', as sociologist Moulian (1997) referred to the state terrorism that begun with the coup d'état, also needs a historical explanation for us to produce a critical reflection of our recent past as a society, and to overcome personal empathy.

Notes

1 This chapter presents findings from research grant FONDECYT 1130474 and FONDECYT 1170331 (National Funds for Science and Technology Development, Chile).
2 We acknowledge here our debt to the History teachers and students who generously agreed to participate in this study.
3 Notation for the class interaction: (T): teacher, (S): student. Numbers in parenthesis indicate the length of pauses in seconds; words underlined indicate intonational emphasis/volume. Double parenthesis indicates relevant contextual information. Question marks have been added to facilitate reading the text. The original language of the class interaction was Spanish (included in an Appendix at the end of the chapter). We have made a semi-literal/idiomatic translation into English, trying to maintain as far as possible the kind of lexicogrammatical choices made by teachers and students.
4 Literally 'clandestineness'.
5 The Spanish term *desaparición* is a technical one in the Chilean context. It refers to a well-known process of forced disappearance of people that were secretly abducted and later killed by state organisms of secret police during Pinochet's dictatorship (1973–90).
6 Matruglio *et al.* (2013), in analyzing an Ancient History class interaction, demonstrated how temporality is implicated in 'semantic waves' or movements between stronger and weaker semantic gravity and semantic density in unpacking and re-packing meanings. For illustrating a 'temporal shifting', they consider four modes of history that 'can be plotted along a continuum representing degrees along a cline between language in action and language as reflection'. These modes, which are organized from more action-oriented to more reflection-oriented, are characterized as commentary, comment, recount and

generalization, and privilege respectively, present-in-present, simple present, past tense and simple present tense. Temporality regarding recent national past functions differently, due to the fact that events are more related to personal and social memories and those memories are 'historized' in History classes, thus they gain weight in terms of historical thinking and meaning.

7 A 'semantic wave' refers to recurrent movements between stronger and weaker semantic gravity and semantic density (see Chapter 3, this volume).

8 Extract taken from a History class interaction of eleventh grade, filmed in a government-subsidized school (public school) in Santiago, Chile:

> ((The teacher starts the lesson with the depiction of a video, emotively charged, in which a Chilean TV actress gives her testimony of the torture suffered in two centers of detention during the dictatorship))
>
> T 2 Ok (2) what did you notice regarding the video (2) principally from the part where it
>
> 3 says that for a long time the matter of the torture or of the Detained Disappeared was
>
> 4 denied, that no (1) they were in Europe that they were here they were there and that even
>
> 5 today there are people who have doubts about the torture and those things

References

Achugar, M. (2009) 'Constructing the past and constructing themselves: The Uruguayan military's memory of the dictatorship', *Critical Discourse Studies*, 6(4): 283–95.

Achugar, M. (2016) *Discursive Processes of Intergenerational Transmission of Recent History*, New York: Palgrave Macmillan.

Achugar, M., Fernández, A. and Morales, N. (2013) 'Re/constructing the past: How young people remember the Uruguayan dictatorship', *Discourse and Society*, 24(3): 265–88.

Coffin, C. (2006) *Historical Discourse: The language of time, cause and evaluation*, London: Continuum.

Correa, S., Figueroa, C., Jocelyn-Holt, A., Rolle, C. and Vicuña, M. (2001) *Historia del siglo XX Chileno*, Santiago, Chile: Editorial Sudamericana.

Halliday, M.A.K. and Matthiessen, C. (2004) *An Introduction to Functional Grammar*, London: Edward Arnold.

Jelin, E. (2002) *Los trabajos de la memoria*, Madrid: Siglo Veintiuno de España Editores, S.A.

Lechner, N. (2006) *Las sombras del mañana. La dimensión subjetiva de la política*, Santiago de Chile: LOM.

Lechner, N. and Güell, P. (1998, November) 'Construcción social de las memorias en la transición chilena', Paper presented at *Taller del Social Science Research Council: Memorias colectivas de la represión en el Cono Sur*, Montevideo, 15–16.

Lira, E. (2013) 'Algunas reflexiones a Propósito de los 40 años del Golpe Militar en Chile y las Condiciones de la Reconciliación Política', *Psykhe*, 22(2): 5–18.

Loveman, B. (2001) *Chile: The Legacy of Hispanic Capitalism*, Oxford: Oxford University Press.

Martin, J. R. (2003) 'Introduction', *Text – Interdisciplinary Journal for the Study of Discourse*, 23(2):171–81.

Martin J. R. (2004) 'Sense and sensibility: Texturing evaluation', in J. A. Foley (ed.) *Language, Education and Discourse: Functional Approaches*, London: Continuum, 142–75.

Martin, J. R. (2014) 'Evolving systemic functional linguistics: Beyond the clause', *Functional Linguistics*, 1(3): 1–24.

Martin, J. R. and White, P. (2005) *The Language of Evaluation: Appraisal in English*, New York: Palgrave Macmillan.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014a) 'Building powerful knowledge: The significance of semantic waves', in B. Barrett and E. Rata (eds) *Knowledge and the Future of the Curriculum*, London: Palgrave Macmillan, 181–97.

Maton, K. (2014b) *Knowledge and Knowers. Towards a realist sociology of education*, London: Routledge.

Matruglio, E., Maton, K. and Martin, J. R. (2013) 'Time travel: The role of temporality in enabling semantic waves in secondary school teaching', *Linguistics and Education*, 24: 38–49.

Moulian, T. (1997) *Chile actual. Anatomía de un mito*, Santiago: Arcis y LOM.

Oteíza, T. (2014) 'Intertextualidad en la recontextualización pedagógica del pasado reciente chileno', *Discurso & Sociedad*, 8(1): 109–36.

Oteíza, T. (2017) 'The APPRAISAL framework and discourse analysis', in T. Bartlett and G. O'Grady (eds) *The Routledge Handbook of Systemic Functional Linguistics*, London: Routledge, 457–72.

Oteíza, T. (2018) 'Prácticas de la memoria en clases de historia: Construcción de la evidencia multimodal e intertextual del pasado reciente chileno', *Discurso & Sociedad*, 12(1): 112–60.

Oteíza, T. and Pinuer, C. (2012) 'Prosodia valorativa: Construcción de eventos y procesos en el discurso de la historia', *Discurso & Sociedad*, 6(2): 418–46.

Oteíza, T. and Pinuer, C. (2013) 'Valorative Prosody and the symbolic construction of time in historical recent national discourses', *Discourse Studies*, 15(1): 43–64.

Oteíza, T. and Pinuer, C. (2016) 'Appraisal framework and critical discourse studies: A joint approach to the study of historical memories from an intermodal perspective', *International Journal of Language Studies*, 10(2): 5–32.

Oteíza, T., Henríquez, R. and Pinuer, C. (2015) 'History class interactions and the transmission of recent Chilean memory of human rights violations', *Journal of Educational Media, Memory, and Society*, 2(7): 44–67.

Ricoeur, P. (2010) *Memoria, historia y olvido*, México: Fondo de Cultura Económica.

Stern, S. (2006) *Remembering Pinochet's Chile: On the Eve of London 1998*, London: Duke University Press.

Stern, S. (2013) *Luchando por mentes y corazones. Las batallas de la memoria en el Chile de Pinochet*, Santiago: Ediciones Universidad Diego Portales.

Thompson, G. and Hunston, S. (2000) 'Introduction', in S. Hunston and G. Thompson (eds), *Evaluation in Text*, Oxford: Oxford University Press, 1–27.

Valech Report (2004/2011) *Informe Comisión Nacional sobre Prisión Política y Tortura (I/ II)*. Santiago: Instituto Nacional de Derechos Humanos, Gobierno de Chile.

White, P. R. R. (2003) 'Beyond modality and hedging: A dialogic view of the language of Intersubjective stance', *Text*, 23(2): 259–84.

Wodak, R. (2011) 'La historia en construcción/La construcción de la historia. La "*Wehrmacht* alemana" en los recuerdos colectivos e individuales de Austria', *Discurso & Sociedad*, 5(1): 160–95.

APPENDIX: CLASSROOM INTERACTION IN SPANISH

P 1 por el estado de sitio (1) la idea de ciudadanía queda restringida (1) ee es lo
2 normal de un estado democrático (2) en un estado democrático un ciudadano si lo arrestan
3 tiene el derecho de saber por qué lo están arrestando (1) en un estado democrático a un ciudadano no
4 lo pueden deportar (1) no lo pueden mandar a otro país o a su país de origen a menos que
5 cometa un delito grave y decidan juzgarlo en su país de origen (1)
6 todo eso queda ee suspendido, por lo tanto, las garantías ciudadanas (1) quedan eliminadas (1) se provoca
7 arresto arbitrario (1) deportación a las personas extranjeras (1) las pueden mandar a su país de
8 origen desaparición de personas, asesinato de personas por agentes del Estado y torturas por
9 agentes del Estado (2) ¿por qué digo ahí agentes del Estado? porque la junta militar en su
10 proceso de institucionalización va a crear organismos de
E 11 la DINA
P 12 policía secreta, por ejemplo la DINA y la CNI, que van a realizar este tipo de
13 acciones (2) si esto era público, si decían vamos a torturar y a desaparecer
14 personas (1) Chile internacionalmente y públicamente para la ciudadanía iba a
15 quedar en una situación de mucha crítica hacia el gobierno, por lo tanto, van a haber
16 organismos policiales secretos que van a actuar (1) con este tipo de ejemplos
17 ((la profesora señalando el power point proyectado)) hacia la ciudadanía: arresto arbitrario

18 deportación tortura desaparición y asesinato. No solo en Chile (1) porque
19 van a tener una red internacional y vamos a tener operaciones internacionales militares para
20 asesinar a algunas personas que el gobierno militar no quería que intervinieran a
21 futuro o que trataran de desestabilizar su gobierno (1) ¿cuál es el objetivo (1) que
22 siempre van a utilizar y que utilizan un eufemismo (1) una palabra que no suene tan
23 fuerte para decir vamos a matar a todos los que estén en contra: neutralización (1) la idea
24 de neutralizar ((la profesora escribe neutralizar la oposición en la pizarra)) la
25 oposición significa para el gobierno militar en Chile, matar (2) no significó
26 en la mayoría de los casos el exilio, porque los altos personeros tuvieron la oportunidad del exilio (1) pero
27 los que no tenían contactos (1) los que no tenían acceso a las embajadas y ese
28 tipo de cosas se quedaron en Chile vivieron o la clandestinidad o la ((señalando a la
29 pizarra)) tortura o la desaparición y el asesinato o la tortura y no alcanzaron a que los
30 asesinaran una serie de cosas (2) por lo tanto eso esta neutralizar la oposición (1) se
31 ejemplifica (1) ¿sí?

E 32 sí (1) entonces (1) ¿pero igual todos saben de la existencia de la CNI y de estas policíaaa?

P 33 es que van a ocupar distintas labores (1)
34 la CNI y la DINA son oficialmente existen pero la CNI y la DINA no van a estar diciendo que
35 están tomando arbitrariamente presas a las personas

E 36 osea pero internacionalmente (1) sí se sabía la existencia de campos de concentración en Chile

P 37 sí [internacionalmente]

E 38 [entonces]

P 39 y algunos sectores de la sociedad chilena también (1) pero hay otros sectores que dicen que ellos
40 no tenían idea

PART IV

Academic discourse in the classroom

8

LIVE LECTURES

The significance of presence in building disciplinary knowledge

Susan Hood

Introduction

Both the practices of teaching and learning in higher education and the way they are talked about in policies of host institutions are in a period of rapid transformation. One favoured model, branded as *flipped learning* or the *flipped classroom*, privileges the 'delivery of content' online. On the assumption that students have acquired relevant specialized uncommon-sense knowledge independently, they then have opportunities to collaborate with peers in its creative application. The successful promotion of these practices relies at least in part to the dismissal of those they replace. Face-to-face lectures are typically positioned in a 'constellation' of negatively evaluated terms (see Maton 2014b: 148–70). The descriptor 'traditional' almost always features as does the attribute 'teacher-centred', the implication being that lectures constitute old-fashioned methods featuring a lack of interaction. By way of contrast, a swirl of positively charged but loosely defined constructs such as *interaction*, *collaboration*, and *creativity* promote the counter-practice of 'flipped learning'.

Any radical changes in modes of pedagogic practice necessarily raise important questions about intellectual and social impact, including the potential to support the apprenticeship of a broad base of students into the specialized and uncommon-sense knowledge of their respective disciplines. While there is a growing research base that broadly attends to questions of pedagogy and outcomes, we find an over-reliance on small-scale opinion survey data collected in the immediate contexts of singular teaching programs (e.g. Pierce and Fox 2012; Galway *et al.* 2014; Roman 2010 in Hamden *et al.* 2013). Students are frequently asked to self-report their affectual responses and perhaps perceived knowledge gains – a practice shown to be unreliable in recent research by Jaeger and Wiley (2015). Fewer studies take a more comprehensive and comparative approach to questions of pedagogic practice and outcomes (as in, e.g.,

Johnston *et al.* 2013; Edwards and Clinton 2018). Edwards and Clinton (2018) point to non-attendance at face-to-face lectures as reducing 'engagement', referring to a general lack of effort, and an inability to ask for clarification, and found that an overreliance on lecture capture as a replacement for attendance had a general 'negative impact on attainment'. Nonetheless as a general rule, descriptions of promoted or critiqued practices reveal little of what actually goes on in interaction among peers. Rarely do research papers include data or analysis of exemplary practice for scrutiny, and/or address questions to do with who thrives and who fails with respect to particular pedagogic models (see, e.g., Cilesiz 2015, on different experiences of 'non-traditional' students and 'traditional' undergraduate students in this respect). It is clear that a great deal more analysis of practice is needed before confident claims can be made about the potential for particular pedagogic practices to effectively and democratically introduce students to the uncommon-sense knowledge of specialized fields. This study aims to take a small step in that direction – to tease apart mediating technologies in play, the modes of communication they afford, the pedagogic models enacted, and the disciplinary knowledge structures they serve.

The research presented in this chapter responds in the first instance to what is currently being portrayed as the 'traditional' practice of face-to-face lectures. The data comprise videos of live undergraduate lectures in science and the humanities in an Australian university. The chapter presents on data from a larger project that additionally explores differences in ways in which knowledge is presented and negotiated in contrasting disciplines. Here, the focus is on science, in particular a Health Science lecture on the urinary system. We focus in particular at the lecturer's spoken language, with reference made to collaborating systems of meaning making in body language, the images and written text displayed on presentation slides. The aim is to explore the texturing of knowledge in this mode and how this might function to scaffold students into the high stakes written texts of their field.

The data is explored from a transdisciplinary perspective. The two informing theories are those of systemic functional linguistics (SFL) (Martin 1992; Halliday 1994; Martin and Rose 2007), and Legitimation Code Theory (LCT) (Maton 2014b). The transdisciplinary nature of the study thus involves a social semiotic exploration of patterns of meaning in live lectures alongside a sociological perspective on lectures as a kind of academic knowledge practice.

SFL theory underpins a significant number of studies of academic practice. Much of that work has focused on written texts, including student writing for assessment purposes (e.g. Hao and Humphrey 2012; Lee 2010), textbooks (e.g. Hao 2015), academic research writing (e.g. Coffin and O'Donohue 2014; Hood 2010), and online asynchronous discussion threads (Lander 2013, 2014; Hood and Lander 2016). A number of recent studies of face-to-face teaching of academic knowledge have focused on schools (Martin and Maton 2013; Rose 2014) and pre-tertiary support programs (Hood 2011; Macnaught 2015). Nonetheless, the mode of lecturing in tertiary contexts remains a relatively under-represented field of research, although one that can be well-supported by work in systemic functional semiotics and multimodal discourse analysis (e.g. Kress and van Leeuwen 2006; Martinec 2002; Nascimento 2012; Painter *et al.* 2013).

In this chapter we draw on the shared interest of SFL and LCT in the notion of 'context dependency'. In SFL context dependency has primarily been explored as an issue of mode, realized through the textual metafunction of language (Martin 1992; Halliday 1994). Martin and Matruglio (Chapter 4, this volume), responding to the concept of 'semantic gravity' from LCT (Maton 2009, 2013, 2014a, 2014b; Chapter 3, this volume), revisit earlier discussions (e.g. Martin 1984, 1992; Cloran 1999, 2000) to interpret the concept of 'context dependency' more comprehensively on a metafunctional basis. The term *presence* is proposed as an encompassing construct to account for 'context dependency' from the perspective of field, tenor and mode. Presence from the perspective of mode, in other words textual presence, concerns the relative *implicitness* of discourse. From the perspective of tenor, interpersonal presence concerns relative *negotiability*. From the perspective of field, ideational presence concerns relative *iconicity*. In each specific metafunctional realm, presence puts at risk choices with respect to relevant metafunctionally organized systems in discourse semantics (Martin 1992; Martin and Rose 2007), themselves realized across systems in the lexicogrammar. The implicated systems are introduced and exemplified at later points in the chapter.

Analyses of patterns of choices are interpreted in the first instance as realizing degrees of iconicity, negotiability and implicitness in the discourse of the lecture. Findings are then re-interpreted in LCT terms with reference to the dimension of Semantics – in particular the principle of *semantic gravity* (SG) (Maton 2009, 2014b; see Martin *et al.*, Chapter 1, this volume). The principle is explained in the following terms:

> When semantic gravity is stronger, meaning is more closely related to its social or symbolic context of acquisition or use; when it is weaker, meaning is less dependent on its context of acquisition or use.
>
> *(Maton 2014b: 110)*

(The complementary principle of 'semantic density' (SD), or condensation of meanings, is not discussed here; see chapters by Martin and by Maton in this volume). The relative strength or weakness of semantic gravity is encapsulated in the notation SG↑/↓ and when tracked over time, or across the flow of meanings in a text in the profile of a wave. The concept of semantic profiles (as SG↑/↓ and/or SD↑/↓) has provided a useful visualization tool for mapping the dynamics of pedagogic practices in the service of knowledge-building (Martin and Maton 2013; Maton 2013, 2014a, 2014b).

The social semiotic context of the lecturer's spoken language

The first step in the analysis of the data was to segment approximately 60 minutes of audio-visual lecture recording. The segmentation was done on the basis of thematically differentiated slide segments, in this lecture typically indicated in subtopic headings, then the individual slides within those segments. The transcription

of the spoken language was segmented in accordance with this part–whole structuring of projected slides.

Slide images

A majority of the slides include technical images alongside written text. Those with written text alone regularly appear in segment-initial and/or segment-final position where they function to predict or consolidate thematically coherent units of meaning. Analyses reported in this chapter focus on the longest slide segment of the lecture. This is composed of eight slides, the first seven of which include both image and written text. The subfield in focus in this segment is 'URINE FORMATION: (1) FILTRATION'. The discourse in and around two of the slides is presented in this chapter as indicative of the larger set.

From the perspective of field, one dominant feature of the images in the slides is their technicality, as illustrated in Figures 8.1 and 8.2. Features of magnification, a cross-sectional perspective, sharpness of focus and labelling all contribute to a technical representation of the phenomena displayed. These resources interact to display classificatory and/or compositional relations; and arrows internal to the images indicate activity related to the formation of urine.[1]

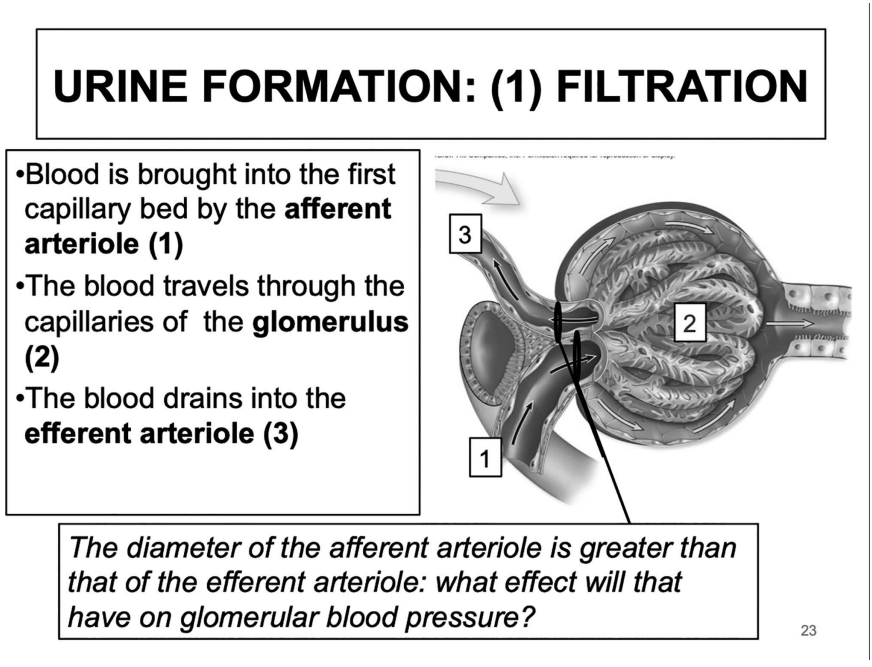


FIGURE 8.1 Slide image and text (1) (reproduced from McKinley *et al.* 2013 with permission)

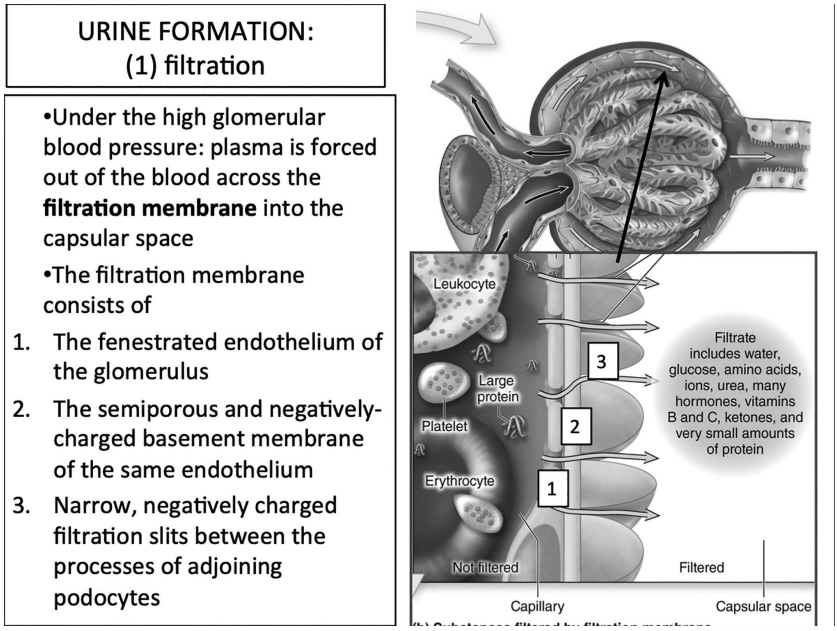


FIGURE 8.2 Slide image and text (2) (reproduced from McKinley *et al.* 2013 with permission)

Written text on slides

Sequence is also a feature of the written texts on the slides in Figures 8.1 and 8.2. If we consider the relations between the two slides in Figures 8.1 and 8.2, the visual and verbal texts present sequence on two levels. Figure 8.1 articulates a higher-level tier for the system of 'filtration' as a whole:

> *Blood is brought into…*
> *The blood travels through . . .*
> *The blood drains from…*

In Figure 8.2, a second more specific tier of sequencing is articulated in the written text as:

> *Under the high glomerular blood pressure: plasma is forced out of the blood across the filtration membrane into the capsular space*

This is made visible in the magnified section of the image. A hierarchy of sequences is thus inter-modally construed in the slides.

The segments of talk explored here correspond to the appearance and disappearance of each of the slides on a large projection screen at the front of the lecture

theatre. The space the lecturer occupies is in front of and below the screen. He interacts with the slides both verbally and through embodied identification, pointing with the hand or a laser pointer. The focus in this chapter is his spoken language, however reference is made to some aspects of his body language where it is critically relevant to what is said.

Phasing field in the spoken language of the lecture

The discourse of the lecture is first analyzed from a dynamic perspective. For each slide-related segment of talk, phases in the logogenesis of the lecturer's talk are identified (Gregory 1985; Malcolm 2010). Gregory (1985: 127) refers to phases as 'stretches of text in which there is a significant measure of consistency in what is being selected ideationally, interpersonally and textually'. In a more recent study of phases in relation to stages in genres Rose (2006: 187) refers to 'waves of information carrying pulses of field and tenor' (see also Martin and Rose 2008; Macnaught 2015). In these accounts a shift in metafunctional consistency indicates a phase boundary. In this study, phase shifts are identified initially on the basis of field, that is in the discourse semantic patterning of representations of entities, occurrences and sequences (Martin, Chapter 5, this volume; Hao 2015).

Tables 8.1 and 8.2 present the transcribed talk accompanying the slides in Figures 8.1 and 8.2, respectively. Line breaks separate ranking clauses and student contributions are bracketed to distinguish them from the teacher talk that is the focus. Phase boundaries are shown with segmenting lines, and the different kinds of phase are identified in the left-hand column and further explained below. The underlined wordings in the opening phases in each table indicate text read aloud from the slides. A thumbnail representation of the relevant slide is included as a point of reference. In the tables below, *explaining* phases focus on sequences of occurrence in the field, *reporting* phases focus on entities taking part in those sequenced occurrences and *describing* phases focus on qualities of entities visible on the images in the slides or in some cases tracking back to talk (the nature of these types of phases is discussed in more detail below).

The spoken language in Tables 8.1 and 8.2 is shown to unfold as iterations of phases of *explaining*, *reporting* and *describing*. These three phase types are dominant in the spoken discourse of the lecture as a whole and are characteristic of other science lectures analyzed in the project. Features of each phase type from the perspective of field are discussed below.

Phases of reporting

Phases of reporting in the spoken discourse present information on generic categories of experiential meaning. In the extract below, for example, the field is configured as taxonomic relations of both classification and composition. Instances of each are shown below with realisations of taxonomic relations underlined:

TABLE 8.1 Phases in the lecturer's spoken language corresponding to Figure 8.1

Phases	*Spoken language*
explaining	All right.
	Blood is brought to the first capillary bed via an afferent arteriole – afferent for going inwards.
	The blood travels through the capillaries of the glomerulus.
describing	You can see them underneath this.
	It's not this brown structure, it's the red pipes underneath.
	And the blood drains out of the efferent arteriole.
	But look at this.
	Who can tell… who can see that there's a difference between the efferent and the afferent arteriole?
	(Sts: *It's bigger*)
	Not bigger.
	What's the word?
	(St: Wider)
	Wider.
	This is much wider than this.
explaining	So the inlet is wider than the outlet.
	So what must the hydrostatic pressure be like in here?
	(*Sts: High*)
	It's high.
reporting	The hydrostatic pressure in the glomerulus is something like four times what you see in a normal capillary bed – in a capillary bed outside the kidneys.
	There's nothing abnormal about that, in the kidneys.
	But in capillary beds outside the kidney, the hydrostatic pressure is much lower.
	So that's the first thing which is unusual about this capillary bed.

Classification:
and the endothelium is an example of a simple squamous epithelium.
Composition:
The filtration membrane comprises of the fenestrations,
Every epithelium has a basement membrane.

Phases of explaining

Phases of explaining configure sequences of occurrences that construe the activities of the field of urine formation. Since we are construing scientific knowledge here, these sequences concern logical relations of cause and effect (i.e. if 'a' happens then 'b' happens and if 'b' happens then 'c' happens; cf. Halliday and Martin 1993; Martin and Rose 2008). A causal relation is implied between each sequential occurrence in:

Blood is brought to…
The blood travels through . . .
The blood drains from…

TABLE 8.2 Phases in the lecturer's spoken language corresponding to Figure 8.2

Phases	*Spoken language*
explaining	So, under the high glomerular blood pressure, plasma is forced out of the blood across a filtration membrane.
reporting	The filtration membrane comprises of the fenestrations, and the endothelium is an example of a simple squamous epithelium.
	Every epithelium has a basement membrane.
	It's the thing that sticks it to the next surface.
explaining	So things have got to get through the filtration slits, through the basement membrane and then through… sorry through the fenestrations, through the basement membrane, and through the filtration slits of the podacytes before they can get into the capsule.
describing	So yeah, it is like a sieve.
explaining	But as you can see [cognition],
	part of the Bowman's capsule contributes to that sieve-like effect as well.
	Do you see [cognition] that?
	Good.
reporting	The basement membrane is strongly negatively charged – as are the walls of the slits.
describing	Hopefully you can see [perception] that they're small, but they're not too big, because look at what is much bigger than the slits.
	(*St: White blood cells*)
	White blood cells, red blood cells, and platelets, and big proteins.
explaining	They're too big to go through the slits.
	So you shouldn't find in a normal person cells in their urine.
	Okay?
	They stay in the blood.

Cause can also be implied where sequence is explicitly encoded as temporal, as underlined in:

> *things have got to get… through the filtration slits of the podacytes before they can get into the capsule*

It can also be implied by abstract locative circumstantial phrasing, as underlined in:

> *under the high glomerular blood pressure, plasma is forced out of the blood across a filtration membrane.*

Causal relations in sequences of occurrences are also configured as explicit causal relations.

> *They're too big to go through the slits. So you shouldn't find in a normal person cells in their urine.*

For the following phase:

> *… the inlet is wider than the outlet. So what must the hydrostatic pressure be like in here? (Sts: High)*
> *It's high.*

to be interpreted as a causally related sequence featuring explicit causal relations, we would need to assume an elided step in the reasoning; something along the lines of:

> *the inlet is wider than the outlet*
> [which causes blood to flow more freely through the inlet of the glomerulus than it does through the outlet]
> *So what must the hydrostatic pressure be like in here?*

Phases of describing

Phases of describing present information about the features and qualities of a specific entity (Martin and Rose 2008; Hao 2015; Hood and Hao forthcoming). In these data the specific entity (or part thereof) is visually identified on a slide image, as indicated by the exophoric reference underlined in:

> *You can see them underneath this.*
> *It's not this brown structure, it's the red pipes underneath.*

> *Hopefully you can see that they're small, but they're not too big, because look at what is much bigger than the slits.*

The entity and its parts are described here in terms of location (*underneath*), colour (*not… brown… red*), and size (*small*, *big*, *bigger*).

The next step in analysis refocuses attention on the key distinguishing feature of the lecture as a pedagogic mode, namely its unfolding in a shared material setting in real time for lecturer and students. This second level of analysis outlines how a shared you-and-me, here-and-now experience is configured in the spoken discourse of the live lecture.

Phases and presence

Presence as a metafunctional theorization of context dependency

The concept of *presence* was introduced earlier as generalizing an interpretation of context dependency across three metafunctions (ideational, interpersonal and textual). It thereby implicates the field, tenor and mode dimensions of register (Martin and Matruglio, Chapter 4, this volume; Hood and Lander 2016).

From the perspective of field, presence concerns degrees of ***iconicity*** in the expression of ideational meaning. Iconicity is analyzed as the relative congruence of language and the activities and items of a specific field. The discourse semantic systems at risk are those of IDEATION and CONNEXION (Hao 2015). In terms of IDEATION we are concerned with congruent vs experientially metaphoric realizations of meaning (e.g. *the blood drains* vs *blood drainage*). In terms of CONNEXION, at issue is the extent of logical metaphor, so for example from congruent in, e.g.

> *things have got to get… through the filtration slits of the podacytes before they can get into the capsule*

to logically metaphoric in, e.g.

> *their passage through the slits enables entry into the capsule*

CONNEXION also concerns the degree to which the text is structured in terms of field-time (external conjunction) or text-time (internal conjunction) (Martin 1992:178–81; Hao 2015).

From the perspective of mode, presence is interpreted as relative ***implicitness***. This concerns the extent to which language relies on recoverability of meaning 'from the shared sensible material environment of the utterance' (Martin 1992; Martin and Matruglio, Chapter 4, this volume). The discourse semantic systems at risk are IDENTIFICATION and PERIODICITY. In terms of IDENTIFICATION relative implicitness is indicated by the extent to which meaning is reliant on exophoric reference to sensible entities beyond the text. In terms of PERIODICITY, the less a text can be interpreted as accompanying or recounting embodied actions, the more likely it is to be organized with hierarchies of PERIODICITY (i.e. layers of higher level Theme and New; Martin and Rose 2007).

From the perspective of tenor, presence is interpreted as ***negotiability***. This concerns the degree to which meanings are made more or less arguable in the you-and-me, here-and-now. The systems at risk are NEGOTIATION, to do with the 'interaction as an exchange between speakers' (Martin and Rose 2007: 17), and APPRAISAL, to do with systems for expressing evaluation. Within NEGOTIATION, relative immediacy is expressed, for example, in the choice of first or second person rather than third person for the nub (Subject) of a proposition. In the Finite element of the clause, tense is implicated – with primary present tense offering more immediacy than past or future. The subjective or objective stance of modality can also come into play, with subjective modalization more engaging than objective (e.g. *it might happen* vs *there's a possibility it will happen*). With respect to APPRAISAL, Martin and Matruglio (Chapter 4, this volume) suggest that affect is more significant than judgement or appreciation as far as the immediate exchange of attitude is concerned. It is the only kind of attitude that can be inscribed in facial expression, and available in that sense in the shared here-and-now of interaction. For a more detailed account of

discourse semantic systems at risk in the metafunctional construal, enactment and composition of presence, see Martin and Matruglio (Chapter 4, this volume) and Hood and Lander (2016). In the accounts to follow I discuss the profile of presence characterizing each phase type in the lecture.

Reporting and presence

Analyses of the discourse of each phase reveal that reporting phases configure limited presence. Although they are relatively congruent in the construal of field as entities, figures and sequences, as far as interpersonal negotiability and textual iconicity are concerned the discourse is removed from the you-and-me, here-and-now of the lecturer's talk. The linguistic evidence is set out below.

Reporting and ideational iconicity

Reporting phases display a varied profile in terms of iconicity in their representation of field. Experientially, an analysis of IDEATION reveals considerable technicality, but the representation of occurrences and relations does not involve grammatical metaphor (Halliday 1998; Hao 2015). The construal of experiential meaning remains largely congruent. So, for example, we find constructions such as:

> *Every epithelium has a basement membrane. It's the thing that sticks it to the next surface.*

rather than:

> *The surface adhesion function of the basement membrane of the epithelium…*

Logically, an analysis of CONNEXION in the representation of urine formation reveals reporting phases to be largely devoid of sequences of occurrences linked as causal relations, realized either congruently or metaphorically. The organization of information involves text-time rather than field-time, thus reducing the degree of iconicity between the spoken text and what is visualized as unfolding on the slide. The distinction is illustrated below. The underlined sequence marker (*first*) refers to the sequencing of ideas within the presentation, not the sequenced occurrences in urine formation; and the connector 'so' realizes the lecturer's justification for taking this step in his presentation rather than a cause-effect relation in the urine formation sequence.

> *There's nothing abnormal about that, in the kidneys. But in capillary beds outside the kidney, the hydrostatic pressure is much lower. So that's the <u>first</u> thing which is unusual about this capillary bed.*

Reporting and textual implicitness

From a textual perspective reporting phases display minimal implicitness and so reduced presence with respect to mode. In terms of IDENTIFICATION, we find a much higher proportion of endophoric (tracking an entity within the text) than exophoric reference (to the sensible material situation). Endophoric reference is underlined in:

> *Every epithelium has a basement membrane. It's the thing that sticks it to the next surface.*

> *The hydrostatic pressure in the glomerulus is something like four times what you see in a normal capillary bed – in a capillary bed outside the kidneys. There's nothing abnormal about that, in the kidneys. But in capillary beds outside the kidney, the hydrostatic pressure is much lower. So that's the first thing which is unusual about this capillary bed.*

Generalized rather than specific reference is also relevant to the degree of implicitness. Generalized reference makes explicit the categories of entity referred to in reporting phases, as exemplified in:

> *Every epithelium*
> *a normal capillary bed*
> *the kidneys*
> *capillary beds outside the kidney*

In terms of PERIODICITY, the relative explicitness of the reporting phases helps them play a role in higher-level periodic structures that organize longer segments of the talk (as hyper- or macro-Theme; hyper- or macro-New). They are regularly used to structure the higher-level organization of the discourse. An example of a reporting phase functioning as a consolidating hyper-New for the preceding explaining, describing and explaining phases of talk in Table 8.1 is:

> *The hydrostatic pressure in the glomerulus is something like four times what you see in a normal capillary bed – in a capillary bed outside the kidneys. There's nothing abnormal about that, in the kidneys. But in capillary beds outside the kidney, the hydrostatic pressure is much lower. So that's the first thing which is unusual about this capillary bed.*

Reporting and negotiability

An analysis of negotiability implicates the discourse system of NEGOTIATION, and grammatical systems of PERSON, TENSE and MODALITY. In English, the Mood element of the clause is a focal point for negotiability (Martin and Matruglio, Chapter 4, this volume). The choice of TENSE in the Finite element adjusts the temporal grounds of negotiability, from the here-and-now of present tense to the relatively removed past

or future. If MODALITY is chosen then a range of more or less subjective assessments can be encoded. Choices in the pronominal system of PERSON in Subject position (*I*, *you*, *we*, *he/she/it*) can also ground negotiability (in speaker/addressee roles) or distance it from the you-and-me of the immediate context (in non-interlocutor pronouns).

Reporting phases typically display minimal negotiability. Primary present tense is a feature shared across all the phase types; but with respect to other relevant systems, there is an absence of modal choices that would encode subjective positioning, and an absence of *I* or *you* in Subject position in clauses. The single occurrence of a pronominal 'you' in the illustrated data is arguably a generic reference (and is in fact part of a non-negotiable embedded clause):

> *The hydrostatic pressure… is something like four times what you see in a normal capillary bed*

Explaining and presence

The profile of presence in explaining phases is one of relatively high ideational iconicity – the text is relatively congruent with respect to the material reality. Interpersonal presence is higher than in reporting phases, with more subjective assessments of modality – although negotiability is still relatively removed from the immediacy of the you-and-me of the lecture theatre. Textually the profile of implicitness is mixed, with differences in the discourse within and across specific phases. Linguistic choices are explained below.

Explaining and iconicity

Explaining phases, like reporting ones, display considerable technicality but experiential meaning again remains largely congruent with respect to field. Causal relations, a defining feature of this phase type, are also realized relatively congruently. This is illustrated in the underlined example of conjunctive relations in:

> *They're too big to go through the slits. So you shouldn't find in a normal person cells in their urine.*

Implied causal relations are also realized congruently, as discussed above, for:

> *Blood is brought to the first capillary bed via an afferent arteriole (….)*
> *The blood travels through the capillaries of the glomerulus.*
> *So, under the high glomerular blood pressure, plasma is forced out of the blood across a filtration membrane.*

There are no instances of logical metaphor in the explaining phases analyzed for this paper; an invented example would be:

> a *change in blood pressure results in a change in the amount of filtrate production by the kidneys*

Explaining and implicitness

Textually, explaining phases reveal a mixed profile with respect to implicitness. In some instances they contain wordings read from slides, where entities are identified explicitly. This is the case in the first explaining phases in both Tables 8.1 and 8.2. Explicitness is also realized in the endophoric reference in bold in the following example, where it refers back to '*like a sieve*' in the preceding describing phase.

> *[Describing: So yeah, it is like a sieve.]*
> *But as you can see, part of the Bowman's capsule contributes to* ***that*** *sieve-like effect as well.*

In other phases exophoric reference is the dominant pattern. The exophoric reference underlined in the following examples relies on the visibility of the lecturer's embodied deixis or pointing gestures for the full meaning to be available to students. Each underlined wording couples with a pointing gesture (mediated with a laser pointer) to a part of the image visible on the slide.

> *So things have got to get through (…) the fenestrations, through the basement membrane, and through the filtration slits of the podacytes before they can get into the capsule.*

> *So the inlet is wider than the outlet. So what must the hydrostatic pressure be like in here?*

An analysis of IDENTIFICATION also reveals shifts within phases between exophoric (implicit) and endophoric (explicit) reference. In the following example the initial reference (underlined) is identified as exophoric on the basis of the visual data since it couples with gestural points to the image). Then there is a shift to endophoric reference (in bold) in the subsequent talk.

> *White blood cells, red blood cells, and platelets, and big proteins.* ***They****'re too big to go through* ***the*** *slits. So you shouldn't find in a normal person cells in their urine. Okay?* ***They*** *stay in the blood*

From the perspective of PERIODICITY, the explaining phases, like the reporting ones, may assume positions of textual prominence as higher-level Theme or New in longer segments of talk. They initiate segments in this way in Tables 8.1 and 8.2 and consolidate them in Table 8.2. While not included in the tables above, a phase of explaining which consolidates the whole section of the lecture on Urine formation: filtration is included below.

> *Any changes in blood pressure/blood flow, the integrity of the filtration membrane, or the amount of fluid in the capsule at any time will have an impact on the GFR* [GFR = Glomerular Filtration Rate]

Explaining and negotiability

From the perspective of presence, we are also concerned with the extent to which meanings in explaining phases are made negotiable in terms of you-and-me in the here-and-now. Focusing on the Finite element of clauses we find that in explaining phases, as in other phase types, primary present tense is the main selection. This constitutes a generalizing present which serves to ground negotiability in the temporal here-and-now, although less so than present-in-present would. So, for example, '*Blood travels through the capillaries*' enacts less negotiability than does '*Blood is travelling through the capillaries'*.

Explaining phases also mobilize subjective assessments of modal obligation, as underlined in:

> *So what must the hydrostatic pressure be like in here?*
> *things have got to get through the filtration slits*
> *So you shouldn't find in a normal person cells in their urine*

There are some instances of second person pronoun as Subject which serve to ground negotiability in the you-and-me of lecturer and students:

> *Part of the Bowman's capsule contributes to that sieve-like effect as well.*
> *Do you see that?*
> *Good.*

In the example above, the visual data reveals that what is made negotiable in the checking move (*Do you see that?*) is the students' understanding of the explanation provided, not their ability to locate an exophoric referent ('see' instantiates a process of mental cognition here, not visual perception).

In other instances, the referent is ambiguous and interpretable as a generalized reference to health professionals in the field, as in:

> *So you shouldn't find in a normal person cells in their urine*

A contrast is evident with the following instance where the underlined Subject clearly refers to the students who are present in the lecture:

> *But as you can see, part of the Bowman's capsule contributes to that sieve-like effect as well*

However, here it occurs in a dependent clause, and is thus removed from modal responsibility in relation to the arguability of the proposition concerning Bowman's capsule.

Describing and presence

The profile of describing phases shows a relatively high degree of presence with respect to field (iconicity), tenor (negotiability), and mode (implicitness), as evidenced below.

Describing and iconicity

The phases of describing, as with other phases in the lecturer's talk, display considerable presence as ideational iconicity. There is very little experiential grammatical metaphor. Only a single instance is evident in Tables 8.1 and 8.2. The quality of an entity is reconfigured as a participant in the transitivity system, as underlined in:

> *who can see that there's a difference between the efferent and the afferent arteriole?*

whereas in a more congruent construal it would be expressed as an attribute, as underlined in:

> *who can see that the efferent and the afferent arteriole are different?*

Congruent realizations of the qualities of entities expressed as attributes are more common, as in:

> *look at what is much bigger than the slits.*

From the perspective of CONNEXION there are very few causal relations in describing phases. In the example below from Table 8.2, a causal relationship is congruently realized between clauses:

> *Hopefully you can see that they're small, … because look at what is much bigger than the slits.*

However, this example of a causal relation (of what can be seen and why) has to do with the field of pedagogic practice, not that of urine formation.

Describing and implicitness

Phases of describing (see Table 8.1) are distinguished from the other phase types by a significant degree of textual *implicitness*. This is encoded in multiple instances of presuming exophoric reference, as underlined in:

> *You can see them underneath this. It's not this brown structure, it's the red pipes underneath.*
>
> *This is much wider than this. Do you see that?*

The ratio of exophoric to endophoric reference is high, and instances are mostly located in Theme or New in clauses. In other words, what is made most textually prominent in these phases is what needs to be recovered from the shared sensory environment of the discourse. We can also note that describing phases do not take up segment-initial or segment-final positions in the spoken discourse, and so do not

function as higher-level Theme or New in longer segments of talk. Higher-level Theme and New typically require a degree of elevation from the here-and-now if they are to function effectively to predict or consolidate meanings across multiple phases of text (Martin and Rose 2007).

Describing and negotiability

In describing phases, meanings are made negotiable in the you-and-me, here-and-now in a number of ways. Within the Mood component of the clause, the Finite element is dominantly primary present tense, thereby grounding negotiability of propositions in temporal immediacy.

It's not…
This is…
Do you…

In the Subject, second person is found in commands (realized metaphorically in declarative mood), as underlined in:

You can see them underneath this.
Hopefully you can see that they're small

In the examples of congruent commands below, second person *you* (bracketed) is the implied or 'understood' subject (Halliday 2004: 152).

But (you) look at this.
(you) look at what is much bigger than the slits.

Elsewhere, there are instances of interrogative mood such as the following:

Who can tell… who can see that there's a difference between the efferent and the afferent arteriole?
(Sts: It's bigger)

Grammatically, it is the Subject itself that is at risk here (*who can*) rather than a proposition about urine formation (cf. *there's a difference between the efferent and the afferent arteriole*). Note that the anticipated response to the query above would be something like '*I can*'. However, the students' response indicates that they have interpreted the meaning they should be negotiating as '*what (can you see) is a difference between the efferent and the afferent arteriole?*

The instances of '*can*' in the above examples encode potentiality or ability rather than probability. Halliday (1985: 339) suggests that this is "strictly not a kind of modality" as it does not have the full subjective/objective profile; there are no intermediate degrees in polarity (as with *possibly*, *probably*, *certainly*, for example).

Phases and comparative presence

Analyses of phase type and presence in the Health Science lecture reveal patterns of similarity and difference. All phase types display features of ideational presence; the field of Health Science is construed congruently. The lack of metaphoric abstraction in the representation of uncommon-sense scientific knowledge is consistent with the fact that the lecturer in these data speaks by-and-large without reading from written notes or source texts. However, the phase types do present contrasting profiles with respect to negotiability and implicitness. Reporting phases typically remove negotiability from the you-and-me, here-and-now of the lecture theatre; they thus display the least negotiability. In explaining phases meanings are made somewhat more negotiable. Describing phases display the highest degree of negotiability. Analyses of textual implicitness reveal a similar pattern of relative presence. Reporting phases are the least implicit, explaining phases are more so, and describing phases the most implicit.

Phases of describing are thus shown to rely most on meanings retrievable from the shared sensible environment of the talk. They rely in particular on the slides, especially the visual images therein, and the visibility of the lecturer's body as he gestures towards the images. It is this type of phasing that takes most advantage of the shared physical environment of the lecture theatre, a point I will return below with respect to knowledge-building.

Generalizing across the patterns and preferences of choices of the three phase types, we can identify a cline of relative presence in the spoken language of the lecture data analyzed, as illustrated in Figure 8.3.

Analysis of comparative presence reveals that collectively the phases extend the range of iconicity, negotiability and implicitness in the lecturer's talk. They move meaning into and out of the you-and-me, here-and-now of the shared lecture theatre, and into and out of more generalized and abstracted representations of knowledge that are independent of the immediate environment – the latter associated more strongly with the high-stakes representations of field knowledge in written texts.

Our task at this point is to interpret the pedagogic significance of this generalized pattern in the spoken discourse of the science lecture, and additionally to

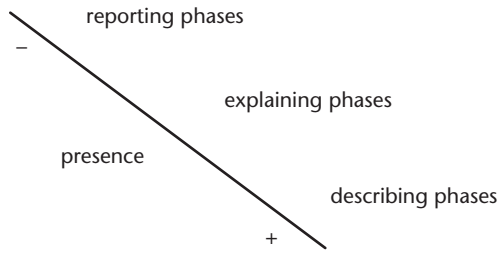


FIGURE 8.3 A cline of phase type and relative presence in the analyzed data

establish a base for comparative interpretations across other instances of pedagogic interaction. This might include other fields and disciplines, other modes and modalities in play in pedagogic encounters, and other pedagogic models. This suggests a need for a further step of theorization. Below I undertake a process of translation, from the linguistics of SFL into the sociology of LCT.

Presence in SFL and semantic gravity in LCT

The theoretical concept of *presence* in SFL emerged from ongoing dialogue with the sociological theory of LCT around the theorization of context dependency (see Martin and Matruglio, Chapter 4, this volume; Maton *et al*. 2016; Maton and Doran 2017c). Within LCT the dimension in focus is *Semantics,* specifically one of its underlying principles, *semantic gravity* (the other being *semantic density*). Semantic gravity refers to the degree to which knowledge or practices are context dependent, that is, the degree to which 'meaning is more [or less] closely related to its social or symbolic context of acquisition or use' (Maton 2014b: 110). Semantic gravity conceptualizes one organizing principle of the knowledge practices that are being enacted by actors. The concepts of presence and semantic gravity thereby provide complementary understandings of educational practices. Presence offers insights into the complexes of linguistic features that actors marshal; semantic gravity offers insights into the nature of the knowledge practices that actors undertake. These concepts from different fields can be related through a process of interpretation to explore how the linguistic features 'play out' in knowledge practices or, vice versa, how the knowledge practices are generated through language choices. From the latter perspective, then, we can interpret 'presence' as a means of translating between 'semantic gravity' and language. What would be the value in such a step?

Central principles of LCT, such as that of semantic gravity, conceptualize the organizing principles of practices; practices that may be realized differently in different objects of study (Maton and Chen 2016). As Maton and Doran (2017a) explain, what therefore becomes 'a key task for LCT informed research is to establish the empirical realizations of the concept within a particular object of study'. The empirical realizations are made explicit through the creation of a 'translation device', where the 'translation' is between the concept and features of the data. In other words, a concept such as semantic gravity may be operationalized differently with respect to different objects of study, on the basis of different translation devices (see, for example, Wolff and Luckett 2012). In this study linguistic choices and patterns are first analyzed with respect to systems of meaning in SFL, interpreted within that theory as construing relative presence. In turn, the SFL concept of presence operates as a means of translating between linguistically realized meanings in data and kinds of knowledge practices as identified through the organizing principle of semantic gravity.

The patterns of presence according to phase type identified above (relative iconicity, negotiability and implicitness) are interpreted into LCT as involving changes in the relative strength of semantic gravity. Stronger SG and weaker SG are each

associated with a complex of settings of the three SFL variables.[2] This makes it possible to visualize changes over time as a profile. In Figures 8.4 and 8.5, the profiles correspond to the duration of talk of single slides (Figures 8.1 and 8.2 above) as transcribed in Tables 8.1 and 8.2 above.

The semantic profiles show both segments of talk as highly dynamic with respect to context dependency. They also reveal something of the overall range of semantic gravity that is traversed in each timeframe. The phases of describing, the most dependent on the shared physical context (+iconicity, +implicitness and +negotiability), extend the semantic range maximally towards stronger semantic gravity (SG+). The phases of reporting (+iconicity, but −implicitness and −negotiability) extend the range maximally towards weaker semantic gravity (SG−).

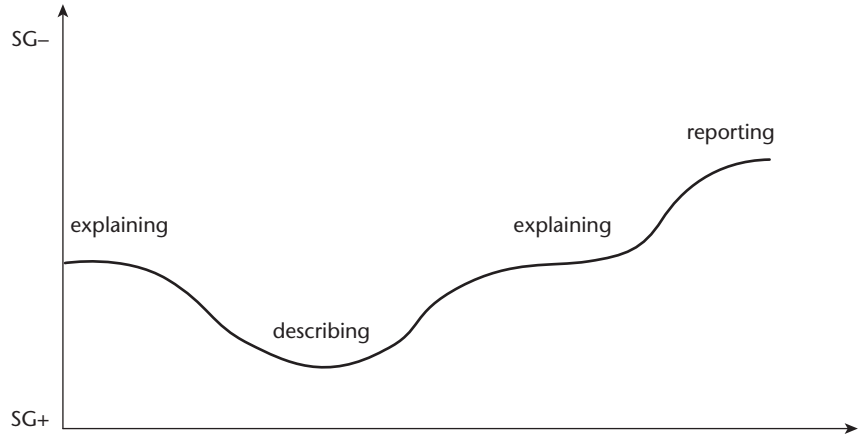


FIGURE 8.4 Lecturer's talk in Table 8.1 as a semantic gravity profile

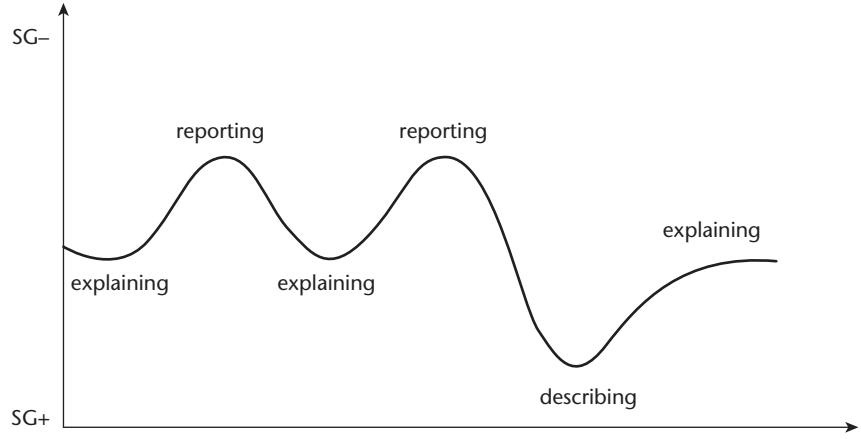


FIGURE 8.5 Lecturer's talk in Table 8.2 as a semantic gravity profile

At points of strongest semantic gravity, the discourse of the lecture construes and negotiates knowledge of the field in the immediate here-and-now of the material situational setting, and in the immediate you-and-me of the interaction. From the perspective of pedagogy and knowledge-building, one consequence of this extension to the range of semantic gravity (from SG+ to SG−) is that it expands the space available for the *scaffolding* of students into new knowledge. The metaphor of scaffolding is an important one in all contexts of education. It traces back to Wood *et al.* (1976) and connects to Vygotsky's 'zone of proximal development' (1978: 86) and Martin's 'guidance through interaction in the context of shared experience' (Martin 1999 after Painter 1986). Critical to all is the recognition of an asymmetry of knowledge or expertise as the basis for learning, and that interaction on this basis allows learners 'to achieve outcomes that they would otherwise not be able to achieve on their own' (Derewianka and Jones 2012: 280). The range of semantic gravity evident in each segment of the lecture analyzed in this paper enables the lecturer to scaffold students from their varied points of entry towards the more decontextualized level required for mastery of their specialized literate disciplinary knowledge. Importantly, such opportunities are likely to prove significant in relation to the widening socio-cultural profile of students now entering higher education.

Embracing diversity

LCT also enables us to make meaningful comparisons across a diversity of specific practices, perhaps involving different translation devices. From an analysis of the profiles of semantic gravity in a single lecture in science, we have a basis for comparison of variation along many fronts. Given the problematic that has motivated the current study, one important direction for research is the dynamics of meaning-making and knowledge-building in live vs online pedagogic modes, especially where apprenticeship into new disciplinary knowledge is at stake. Initial research (Hood and Lander 2016) suggests significant differences in profiles of presence in live lectures and voiced PPT slides, where each is matched for content, lecturer and cohort group. However, there is much more to be understood about the mode of face-to-face lecturing. More comparative studies are needed to explore similarities and variations in profiles of semantic gravity, especially with respect to how discipline/field impact on the phasing of discourse and the traversal into and out of the you-and-me, here-and-now. This issue of discipline remains largely invisible in current discourses of a one-size-fits-all model of change in pedagogic modes. Studies of variation might also attend to the relative field expertise and/or experience of the lecturer, whether the context is one of introductory or advanced levels of study, and whether the lecture is largely spoken or largely read aloud, and so on.

A further front is the development of additional translation devices to account for relative presence and/or relative semantic gravity in modalities other than language. These will include body language (drawing for example on Martinec 2002; Hood 2011; Lambrinos 2015; Hao and Hood 2019; Ngo *et al.* forthcoming), image (e.g. Kress and van Leeuwen 2006; Painter *et al.* 2013), and potentially space (e.g. Stenglin 2009; McMurturie 2012).

Finally, it is important to note that both the linguistic concept of *presence* and the sociological concept of *semantic gravity* are each part of conceptual frameworks that include other complementary concepts that would be useful to employ in more comprehensive explorations of knowledge-building in pedagogic practices. These additional concepts address the distillation or condensation of knowledge. In this regard, *presence* is complemented by the concept of *mass* in SFL (Martin, Chapter 5, this volume), and *semantic gravity* is complemented by the principle of *semantic density* in LCT (Maton 2011, 2013, 2014a, 2014b; see Maton and Doran 2017a, 2017b).

Conclusion

This study makes a contribution to much-needed research into the potential for building field knowledge in different modes of pedagogic encounter in tertiary sectors. It demonstrates the ways in which the spoken language of a live lecture provides multiple perspectives on the field of disciplinary knowledge, and in doing so both exploits the here-and-now, you-and-me of the immediate and shared setting to provide points of entry into specialized fields – in tandem with elevating the interaction in the direction of the decontextualized representations of knowledge constructed in written text.

The aim in this research is to reveal what can be gained from a close study of lecture talk. There are, as noted above, other modalities to be explored in lecture mode, other pedagogic modes and other kinds of disciplinary knowledge. It is hoped that the questions asked in this study and the approach taken in their exploration will inform related research. With respect to the mode of face-to-face lectures, I suggest that a clearer understanding of the long-evolved practice of lecturing can provide a valuable foundation for continuing evaluation, renewal or redesign of pedagogic practices. Given what is at stake, I would argue that such research is best undertaken as foundational to policy-making, rather than post hoc to the radical changes currently reshaping the nature of the pedagogic interaction through which students are apprenticed into the uncommon-sense knowledge of disciplines.

Acknowledgements

I am indebted to the generosity of the lecturers who allowed me to video and analyze their lectures, and especially to the lecturer whose lecture appears in examples in this paper. The depth of knowledge and dedication to teaching on the part of all the lecturers was inspiring. And thank you, Tiger, my recording film-maker cum technician, for your invaluable support.

Notes

1 There is also an upward pointing arrow in the right-hand slide indicating an inter-image relation of magnification.
2 Here I have analyzed from the linguistics and interpreted into LCT as SG. However, one could alternatively analyze the data as a profile of SG drawing on another translation device and then explore the SFL variables associated with changes in SG.

References

Cilesiz, S. (2015) 'Undergraduate students' experiences with recorded lectures: Towards a theory of acculturation', *Higher Education*, 69: 471–93.

Cloran, C. (1999) 'Context, material setting and text', in M. Ghadessy (ed.) *Text and Context in Functional Linguistics*, Amsterdam: John Benjamins, 177–217.

Cloran, C. (2000) 'Socio semantic variation: different wordings, different meanings', in L. Unsworth (ed.) *Researching Language in Schools and Communities: Functional linguistic perspectives*, London: Cassell, 177–217.

Coffin, C. and Donohue, J. (2014) *A Language as a Social Semiotic-based Approach to Teaching and Learning in Higher Education*, Oxford: John Wiley.

Derewianka, B. and Jones, P. (2012) *Teaching Language in Context*, Oxford: Oxford University Press.

Edwards, M. R. and Clinton, M. E. (2018) 'A study exploring the impact of lecture capture availability and lecture capture usage on student attendance and attainment', *Higher Education*, 77(3): 403–21.

Galway, L. P., Corbett, K. K., Takaro, T. K., Tairyan, K. and Frank, E. (2014) 'A novel integration of online and flipped classroom instructional models in public health higher education', *BMC Medical Education*, 14(181): 1–9.

Gregory, M. (1985) 'Towards "communication" linguistics: A framework', in J. D. Benson, M. J. Cummings and W. S. Greaves (eds) *Linguistics in a Systemic Perspective*, Amsterdam: John Benjamins, 301–29.

Halliday, M. A. K. (1985) *An Introduction to Functional Grammar*, London: Edward Arnold.

Halliday, M. A. K. (1998) 'Things and relations: Regrammaticising experience as technical knowledge', in J. R. Martin and R. Veel (eds) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge, 185–235.

Halliday, M. A. K. (1994) *An Introduction to Functional Grammar* (second edition), London: Edward Arnold.

Halliday, M. A. K. and Martin, J. R. (1993) *Writing Science: Literacy and discursive power*, London: Falmer.

Hamden, N., McKnight, P., McKnight, K. and Arfstrom, K. M. (2013) *Review of Flipped Learning*, Flipped Learning Network. http://www.flippedlearning.org/review

Hao, J. (2015) *Construing Biology: An ideational perspective*, unpublished PhD Thesis, University of Sydney.

Hao, J. and Hood, S. (2019) 'Valuing science: The role of language and body language in a health science lecture', *Journal of Pragmatics*, 139: 200–215.

Hao, J. and Humphrey, S. (2012) 'The role of "coupling" in biological experimental reports', *Linguistics and the Human Sciences*, 5(2): 160–94.

Hood, S. (2010) *Appraising Research: Evaluation in academic writing*, London: Palgrave.

Hood, S. (2011) 'Body language in face-to-face teaching: A focus on textual and interpersonal metafunctions', in S. Dreyfus, S. Hood and M. Stenglin (eds) *Semiotic Margins: Meaning in multimodalities*, London: Continuum: 31–52.

Hood, S. and Hao, J. (Forthcoming) 'Grounded learning: Telling and performing in the language and paralanguage of a science lecture', in K. Maton, J. R. Martin and Y. J. Doran (eds) *Studying Science: Knowledge, language, pedagogy*, London: Routledge.

Hood, S. and Lander, J. (2016) 'Technologies, modes and pedagogic potential in live versus online lectures', *International Journal of Language Studies*, 10(3): 23–42.

Jaeger, A. J. and Wiley, J. (2015) 'Reading an analogy can cause the illusion of comprehension', *Discourse Processes*, 52: 376–405.

Johnson, L., Adams Becker, S., Estrada, V., and Freeman, A. (2015) *NMC Horizon Report: 2015 higher education edition,* Austin, T.X.: The New Media Consortium.

Kress, G. and van Leeuwen, T. (2006) *Reading Images: The grammar of visual design*, London: Routledge.

Lambrinos, E. (2015, June) 'Embodied knowledge and body knowledge: Using LCT to explore dance and gesture in education', paper presented at First International Legitimation Code Theory Colloquium, Cape Town, South Africa.

Lander, J. (2013) *Negotiating Community and Knowledge in Asynchronous Online Discussions in Higher Education*, unpublished PhD thesis, University of Technology, Sydney, Australia. http://epress.lib.uts.edu.au/research/handle/10453/21828

Lander, J. (2014) 'Conversations or virtual IREs? Unpacking asynchronous online discussions using Exchange Structure Analysis', *Linguistics and Education*, 28: 41–53.

Lee, S. H. (2010) 'Attribution in high- and low-grade persuasive essays by tertiary students', *Journal of Functions of Language*, 17(2): 181–206.

Macnaught, L. (2015) *Classroom Talk and the Negotiation of Academic English: A linguistic analysis of collaborative text creation*, unpublished PhD thesis, University of Technology Sydney, Australia.

Malcolm, K. (2010) *Phasal Analysis: Analysing discourse through communication linguistics*, London: Continuum.

Martin, J. R. (1984) 'Language, register and genre', in F. Christie (ed.) *Children Writing: A reader*, Geelong, Vic.: Deakin University Press, 21–30.

Martin, J. R. (1992) *English Text: System and structure*, Amsterdam: John Benjamins.

Martin, J. R. (1999) 'Mentoring semogenesis: "Genre-based" literacy pedagogy', in F. Christie (ed.) *Pedagogy and the Shaping of Consciousness: Linguistic and social processes*, London: Continuum, 123–55.

Martin J. R. and Maton, K. (eds) (2013) 'Cumulative knowledge building in secondary schooling', *Linguistics and Education*, 24(1): 1–74.

Martin, J. R. and Rose, D. (2007) W*orking with Discourse: Meaning beyond the clause*, London: Equinox.

Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.

Martinec, R. (2002) 'Rhythmic hierarchy in monologue and dialogue', *Functions of Language*, 9(1): 39–59.

Maton, K. (2009) 'Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building', *British Journal of Sociology of Education*, 30(1): 43–57.

Maton, K. (2011) 'Theories and things: The semantics of disciplinarity', in F. Christie and K. Maton (eds) *Disciplinarity: Functional linguistic and sociological perspectives*, London: Continuum, 62–84.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

Maton, K. (2014a) 'Building powerful knowledge: The significance of semantic waves', in B. Barrett and E. Rata (eds) *Knowledge and the Future of the Curriculum*, London: Palgrave Macmillan, 181–97.

Maton, K. (2014b) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.

Maton, K. and Chen, R. T-H. (2016) 'LCT in qualitative research: Creating a translation device for studying constructivist pedagogy', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 27–48.

Maton, K. and Doran, Y. J. (2017a) 'Semantic density: A translation device for revealing complexity of knowledge practices in discourse, part 1 – wording', *Onomázein Special Issue*, March: 46–76.

Maton, K. and Doran, Y. J. (2017b) 'Condensation: A translation device for revealing complexity of knowledge practices in discourse, part 2 – clausing and sequencing', *Onomázein Special Issue*, March: 77–110.

Maton, K. and Doran, Y. J. (2017c) 'SFL and code theory', in T. Bartlett and G. O'Grady (eds) *The Routledge Systemic Functional Linguistic Handbook*, London: Routledge, 605–18.

Maton, K., Martin, J. R. and Matruglio, E. (2016) 'LCT and systemic functional linguistics: Enacting complementary theories for explanatory power', in K. Maton, S. Hood and S. Shay (eds) *Knowledge-building: Educational studies in Legitimation Code Theory*, London: Routledge, 93–113.

McMurtrie, R. J. (2012) 'Feeling space dynamically: Variable interpersonal meanings in high-rise apartment complexes', *Visual Communication*, 11(4): 1–24.

Nascimento, R. (2012) *Research Genres and Multiliteracies: Channeling the Audience's Gaze in PowerPoint Presentations*, unpublished PhD thesis, Universidade Federal de Santa Catarina and University of Sydney.

Ngo, T., Hood, S., Martin, J. R., Painter, C., Smith, B. A. and Zappavigna, M. (Forthcoming) *Modelling Paralanguage Using Systemic Functional Semiotics*, London: Bloomsbury Academic.

Painter, C. (1986) 'Writing to Mean: Teaching genres across the curriculum', *Applied Linguistics Association of Australia (Occasional Papers)*, 9: 62–97.

Painter, C., Martin, J. R. and Unsworth, L. (2013) *Reading Visual Narratives: Image analysis of children's picture books*, London: Equinox.

Pierce, R. and Fox, J. (2012) 'Vodcasts and active-learning exercises in a "flipped classroom" model of a renal pharmacotherapy module', *American Journal of Pharmaceutical Education*, 76(10): 196–201.

Rose, D. (2006) 'Reading genre: A new wave of analysis', *Linguistics and the Human Sciences*, 2(1): 185–204.

Rose, D. (2014) 'Analysing pedagogic discourse: An approach from genre and register', *Functional Linguistics*, 1(11): 1–32.

Stenglin, M. (2009) 'Space odyssey: Towards a social semiotic model of three-dimensional space', *Visual Communication*, 8(1): 35–64.

Vygotsky, L. S. (1978) *Mind in Society: The development of higher psychological processes*, Cambridge, M. A.: Harvard University Press.

Wolff, K. and Luckett, K. (2013) 'Integrating multidisciplinary engineering knowledge', *Teaching in Higher Education*, 18(1): 78–92.

Wood, D., Bruner, J. and Ross, G. (1976) 'The role of tutoring in problem-solving', *Journal of Child Psychology and Psychiatry*, 17: 89–100.

Slides sourced to:

McKinley, M. P., O'Loughlin, V. D. and Bidle, T. S. (2013) *Anatomy and Physiology: An Integrative Approach*, New York: McGraw Hill.

9

BUILDING A PEDAGOGIC METALANGUAGE I

Curriculum genres

David Rose

Introduction

This is the first of two papers that offer suggestions for providing teachers with knowledge about language that they can use in their practice. This paper focuses on analysis of curriculum genres; its companion paper (Rose, Chapter 10, this volume) focuses on knowledge genres. The suggestions derive from a long-term, large-scale project in teacher education, known as *Reading to Learn* (*R2L*) (Rose 2015, 2017, 2018a; Rose and Martin 2012). *Reading to Learn* is a genre-based pedagogy, that includes the widely known genre writing approach (Christie and Martin 1997; Cope and Kalantzis 1993; Rose 2008, 2011a; Rothery 1994, 1996), but starts with reading as a central skill for learning in school. Key elements of the R2L pedagogy include: 1) carefully designed teacher-class interactions that enable all students, to 2) engage in curriculum texts that may be well beyond their independent reading capacities, 3) interrogate passages of text with detailed comprehension, 4) recognize the language choices that authors have made, 5) appropriate these language resources into their own writing, and 6) construct texts with effective organisation and language choices to achieve their purposes.

However, *Reading to Learn* is more than a classroom pedagogy; it is also a professional learning programme that gives teachers the knowledge about pedagogy and language to apply confidently with their students. Key elements of this knowledge include: a) the written genres that students must control for success in school (knowledge genres), and patterns of language that realize these genres at the levels of texts and sentences, and b) genres of classroom practice through which students acquire school knowledge (curriculum genres), and patterns of classroom discourse that realize these curriculum genres at the levels of lessons and teacher/student exchanges.

The classroom pedagogy and professional learning programme constitute an integral whole, one embedded in the other. The programme has developed in the

context of hundreds of inservice teacher training programmes across education sectors, internationally. It is delivered through a series of face-to-face workshops interspersed with classroom practice over six months to a year. To be effective and appreciated by teachers, the knowledge presented must be relevant and consumable for all, and immediately appliable in diverse classrooms, producing significant gains for students. These constraints, together with limited time for presentation, and the wide range of previous experience and training amongst teachers, have shaped a pedagogic design that is effective and efficient. In line with action research principles, the design has been negotiated with teachers through continual cycles of design, presentation, application, evaluation and re-design, over two decades.

This paper first sets out general metalanguage design principles, including relations between academic and pedagogic knowledge, the SFL model of genre, register and language, and the genres of schooling. It then outlines principles for designing and teaching curriculum genres, first for classroom practice, and secondly for teacher education. The methodology designed for the R2L teacher training programme is then described in three stages, building metalanguage step by step. The first stage describes the teaching/learning and language models, followed by the core R2L curriculum genres, and finally options for sequencing curriculum genres in a teaching programme. The second stage focuses on teacher/learner interactions in classroom discourse, bringing the patterns of interactions to consciousness, and using a metalanguage for detailed lesson planning that engages and supports all students. The third stage describes four phases in the R2L teacher training programme and the curriculum genres designed for teacher training in each phase. The paper concludes by outlining the full suite of curriculum genres that have been designed in the R2L programme for teaching, planning and evaluating reading and writing lessons.

Design principles

Recontextualization

The design of pedagogic metalanguage is informed by SFL descriptions of language and learning in social contexts, but is deliberately recontextualized, from the context of linguistic and educational research to the contexts of classroom teaching and teacher education. In doing so it uses principles from SFL and Bernstein's sociology of education. Bernstein approaches 'recontextualization' from two perspectives. As a region of institutional practice, the 'recontextualizing field' (education faculties, boards of studies, educational publishers) mediates the production of knowledge in academia, and its reproduction in schools, 'appropriating discourses from the field of production and transforming them into pedagogic discourse' (2000: 113). In terms of pedagogic activity, 'recontextualizing principles' mediate the distribution of resources in society and evaluation of learners in schools. They are 'a principle which removes (de-locates) a discourse from its substantive practice and context and relocates that discourse according to its principles of selective reordering and

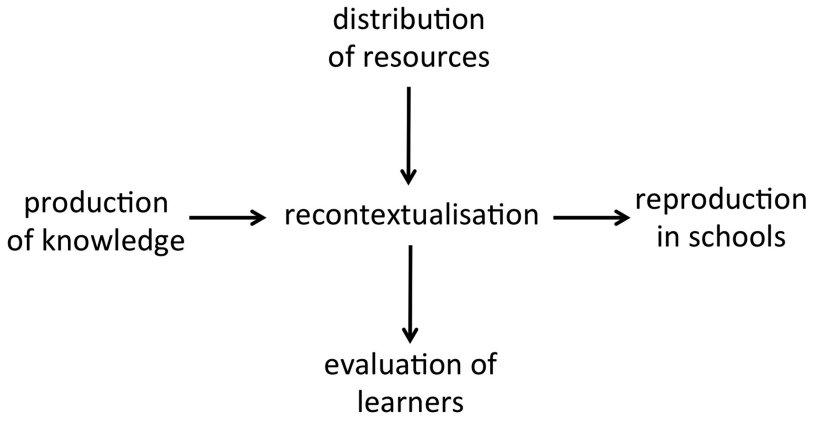


FIGURE 9.1 Recontextualization of resources and knowledge

focusing' (2000: 173). The recontextualizing field determines what knowledge and values are to be recontextualized for the classroom, from which academic fields; recontextualizing principles determine how they will be reordered and focused. The two perspectives are brought together in Figure 9.1.

Genre and register

In SFL terms, recontextualization can be described at two levels of context – as variation in register (field, tenor, mode) and as variation in the genres configuring these register variables. This assumes the stratified model of discourse in context in Figure 9.2. Each of these strata consists of systems of resources for meaning that are instantiated as patterns of meaning in actual texts, i.e. as instances of meaning.

Seen in these terms, recontextualization involves re-instantiating patterns of meaning from one text to another (Martin 2006a). A pedagogic metalanguage 'reorders and refocuses' knowledge about language produced in the academy for educational applications. The academic texts may include courses and textbooks in linguistics and education. Their patterns of meaning are re-instantiated in the classroom as reading and writing lessons and the texts that are written and read, so the new contexts involve major shifts in genre, field, tenor and mode.

As the social goal of genre pedagogy is redistribution of semiotic and hence economic resources to less advantaged groups, a general recontextualizing principle is to aim for equality in educational outcomes. This principle can be specified for tenor, where the aim is to engage and support all students to achieve success; for field, where equality is afforded by giving students equal access to the curriculum knowledge on which they are evaluated and their progress determined; and for mode, where access is opened by giving students equal control over the modalities in which curriculum knowledge is encoded, particularly acquiring knowledge through reading, and demonstrating its acquisition in writing.

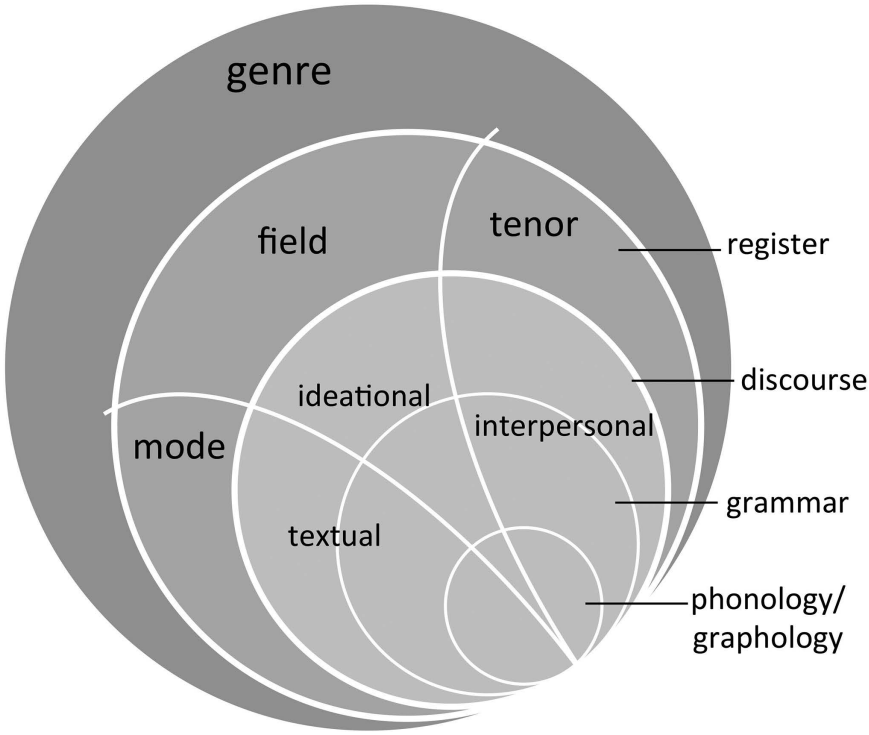


FIGURE 9.2 Strata of language in context

Knowledge genres and curriculum genres

These selections in register shape the design of pedagogic metalanguage, above at the level of genre and below at the levels of discourse, grammar and phono/graphology. Globally, teachers and students need to control two families of genres that constitute the culture of schooling. One is the genres of school knowledge (stories, chronicles, explanations, reports, procedures, arguments, text responses) – 'knowledge genres' in short (Martin and Rose 2008). The other is the multimodal genres of classroom practice, in which knowledge is exchanged between teachers and learners – 'curriculum genres' (after Christie 2002).

In terms of metalanguage, teachers and students should be able to recognize and name the knowledge genres they are reading and writing, and the curriculum genres in which they are engaged. Control of knowledge genres is critical for recognizing the types and organisation of knowledge and values presented in reading, and for organizing knowledge and values appropriately in writing. Control of curriculum genres is necessary for teachers to plan and deliver effective lessons, and for students to engage in them successfully.

At the levels of discourse and grammar, the focus of pedagogic metalanguage is different for the two genre families. For knowledge genres, the focus is on patterns

of written discourse in which knowledge and evaluation unfold through a text, and on patterns of grammar through which discourse is realized in written sentences. For curriculum genres the focus is on patterns of spoken discourse in which knowledge and values are negotiated between teachers and learners.

Curriculum genres may be relatively complex, as they involve two registers. One is a pedagogic register of learning activities, modalities and teacher/learner relations. The other is a curriculum register of knowledge and values that are exchanged through the pedagogic register and abduced by learners (Rose 2018b). Curriculum knowledge includes specialized registers and genres. Knowledge abduced by learners varies with their positioning in hierarchies of authority, access, success, inclusion and autonomy. This positioning constitutes the curricular values that are enacted in the pedagogic relations, activities and modalities of a pedagogic register.

Pedagogic relations include interactions between teachers and learners, such as presentation of knowledge, evaluation and learner participation. Pedagogic activities are organized as sequences of lessons, each composed of series of lesson activities that are negotiated in cycles of interaction between teachers and learners. Pedagogic modalities include spoken, written, visual and gestural modes of communication. These dimensions of curriculum genres are schematized in Figure 9.3 and summarized in Table 9.1.

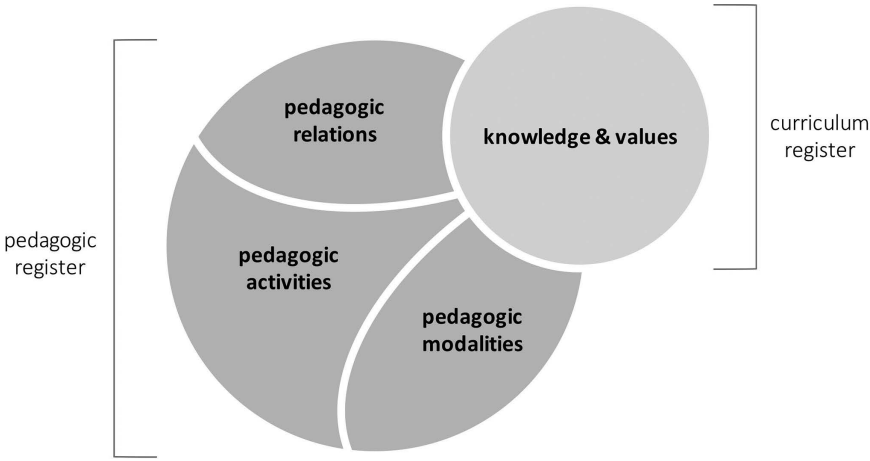


FIGURE 9.3 Dimensions of a curriculum genre

TABLE 9.1 Features of pedagogic register

curriculum knowledge	specialized registers and genres
curricular values	hierarchies of authority, access, success, inclusion, autonomy
pedagogic activity	learning tasks in series
pedagogic relations	teacher/learner interactions and learner participation
pedagogic modalities	sources and sourcing of meanings

Curriculum genres in schools and teacher training

For both knowledge and curriculum genres, the metalanguage that teachers need (for text selection and analysis, lesson planning and assessment) is different from the metalanguage that their students need (for participating in classroom activities and applying to learning and assessment tasks). Pedagogic metalanguage involves two steps in recontextualization, once for teacher education and again for classroom practice.

Recontextualizing registers and genres

Recontextualizing theory for both training and teaching entails reducing the density of technical fields and grounding them in familiar contexts. To this end, Martin offers a potentially fruitful re-analysis of technicality and context dependency in discourse, as 'mass' and 'presence' respectively (Martin, Chapter 5, this volume; Martin and Matruglio, Chapter 4, this volume) – inspired by Maton's analysis of 'semantic density' and 'semantic gravity' (see Chapter 3, this volume). Martin's analyses are specified for field, tenor and mode (Table 9.2 below).

Mass (density) is concerned with how technical the field is, how values are condensed into iconic wordings and images, and how meanings are previewed and reviewed, and thus 'aggregated' in words and images as a text unfolds. Presence (context dependency) is concerned with whether the field is grounded in everyday experience or abstracted from it, whether knowledge is presented as negotiable or authoritatively 'factual', and whether meanings are presented implicitly (presumed from a shared environment) or explicitly (construing their own field).

With respect to recontextualizing metalanguage, we can use mass as a measure of what is re-instantiated from theory to practice and presence as a measure of how it is taught in teacher training and the classroom. From the perspective of mass, knowledge about language is re-arranged into structures that are most relevant for classroom learning, it is re-valued according to its relevance for these tasks and aggregated to focus attention on what matters. With presence, teaching language knowledge involves cycling between common sense and abstraction, between asserting knowledge and values and negotiating them with students, and between shared experience and new knowledge. These dimensions of recontextualization are summarized in Table 9.3.

Recontextualization thus re-instantiates registers of academic theory, teacher education and the classroom – reordering and refocusing knowledge about

TABLE 9.2 Mass, presence and register variables

	field	*tenor*	*mode*
mass	technicality of knowledge	iconization of values	aggregation of meanings
presence	everyday/abstract	negotiable/factual	implicit/explicit

TABLE 9.3 Recontextualizing metalanguage for teacher training

	field	*tenor*	*mode*
mass: re-instantiating KAL:	re-organizing knowledge structures	re-valuing knowledge categories	re-aggregating knowledge to focus attention
presence: cycling between:	common sense and abstraction	negotiating and asserting knowledge and values	shared experience and new information

language and learning, how it is valued and negotiated, and its modes of presentation. But more abstractly, it also re-instantiates knowledge and values from one genre to another. The canonical knowledge genre of linguistic theory is the taxonomizing report, that sub-classifies language features, exemplifies and describes their functions; so a linguistics course or textbook is a macro-report. Its value for students derives from the authority of the textbook, the author, the institution and the expectation of evaluation and professional qualifications. But the genre through which this knowledge is re-instantiated as pedagogic activity in the classroom is a macro-procedure, setting out steps to follow in series of activities, including the multimodal resources to be used, and principles for negotiating activities with learners. Its value for teachers derives from its practicality, appliability in the classroom and potential improvements in student evaluations. So whereas reports re-instantiate research activity as classification and description, procedures re-instantiate taxonomic knowledge as classroom practice.

Designing procedures for curriculum genres

One way to learn procedures is to participate in the activity, observing how it is done – perhaps being guided by an expert to practice its steps. Another is to study the procedure as a text before practicing it. This is the function of recipes, instructions and technical training. In general, ostensively learnt procedures have evolved in a culture, while studied procedures are designed. Professional training in many fields includes study of procedures for designed activities, from engineering to surgical operations. But in certain fields, procedures have low status, not least in teacher education where they are often dismissed as rote learning and constraining individual creativity. Nevertheless all professional fields involve both taxonomies and activities, principles and procedures, knowledge and skills. Fields that are most closely involved with economic activity explicitly design and teach their procedures to students and practitioners – for example the physical and biological sciences, engineering, medicine, law. Those less directly concerned with material production may be less explicit about practical procedures – for example sociology and social control, literary theory and discourse analysis, teacher education and classroom activities.

One consequence of leaving procedures implicit is that they must then be learnt ostensively, by observation and practice. This is precisely the practice of contemporary teacher education, where academic courses focus on knowledge, principles and values. How to teach is learnt in the 'practicum', by observing practicing teachers and practicing oneself, with some degree of guidance. A further consequence is that implicit procedures cannot be collectively designed and taught; without a shared metalanguage for naming and analyzing them, they can only be shaped by the practitioner. This is in fact the ideal expectation of teacher education, namely that by providing students with appropriate knowledge, principles, values, they will be prepared to recontextualize these themselves into appropriate teaching practices. A growing international literature and rounds of public debate question this assumption (Nuthall 2005).

In practice, teachers acquire their procedures partly from their practicum observations, partly from advice and materials they come by when they start teaching, and partly from their own experience as students. A handful of school curriculum genres have common names, such as 'guided reading' or 'science experiments'; but in general, intuitive acquisition means that teachers can put few names to the curriculum genres they use, or readily describe their activities.

Genre pedagogy, and R2L in particular, deliberately set out to confront this problem, by designing teaching procedures for each of the tasks in learning to read and write the curriculum (Axford *et al*. 2009; Rose *et al*. 1999; Rose and Martin 2012; Rothery 1994, 1996). These are procedures for designing and managing the curriculum genres of the classroom. They are not simple recipes, but complex conditional procedures with multiple choice points. They are adapted and sequenced into variable macro-procedures designed to meet the varying needs of teachers, students, fields of knowledge, institutional and classroom contexts. As with technical procedures in other professional fields, their designs simultaneously recontextualize taxonomic knowledge of their informing disciplines and the complicated conditions of their practical applications. They are also designed, not only to be teachable in classrooms, but learnable in teacher education. And for explicit learning, a metalanguage is needed for classroom curriculum genres, just as it is for knowledge genres.

Designing procedures for teacher training

In addition, professional learning is also needed for teaching the classroom genres. A professional learning programme consists of what may be termed 'training curriculum genres'. Through training curriculum genres, teachers acquire both the procedures for classroom curriculum genres and the metalanguage for discussing them. Training curriculum genres are no less complex than the classroom activities they are designed to teach, but their complexity can be interpreted in terms of mass and presence.

In terms of technicality and abstraction (field), knowledge about language and pedagogy must be re-technicalized for classroom practice, and pedagogic activities

must be designed to abstract this knowledge, from teachers' intuitive practice to technical design. In terms of negotiation and iconization (tenor), teachers are expected to let go of familiar practices in favour of new ones, so the new knowledge must be negotiated and charged with values that they recognize – so that its authority becomes their authority (so that they 'own it'). In terms of explication and aggregation (mode), the goal is teaching literacy through multiple modalities; so the training must model the deployment of these modalities, showing teachers how to teach through reading and how to guide writing, by participating in the practices themselves. This involves using metalanguage to shunt between activities in the here and now of training, and their future application in their classrooms – continually previewing and reviewing so the functions and structuring of the methodology don't get lost in the detail.

Accordingly, R2L classroom methodology includes a series of classroom curriculum genres, that have been designed for teaching knowledge genres. But the R2L professional learning programme also involves a sequence of curriculum genres – a curriculum macrogenre that has been designed to train teachers in pedagogic metalanguage, for both knowledge genres and classroom curriculum genres. Whereas the metalanguage for knowledge genres is organized around their relevant features (Rose, Chapter 10, this volume), the metalanguage for curriculum genres is organized around the procedures for teaching them. The remainder of this paper describes these procedures. It is itself a meta-procedure for teaching these procedures to teachers.

In terms of the model developed in Figure 9.3 above, knowledge is symbolized with speech bubbles in Figure 9.4.[1] Each genre in the sequence projects knowledge about the next genre, building up pedagogic metalanguage as the sequence unfolds. This paper presents a macro-procedure for a sequence of training curriculum genres. Each curriculum genre presents knowledge about macro-procedures for

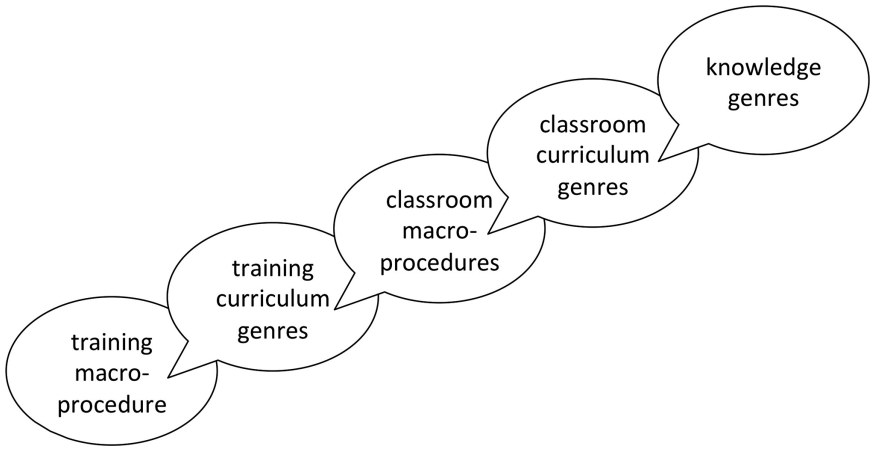


FIGURE 9.4 Procedures for curriculum genres for teaching knowledge genres

implementing classroom curriculum genres, whose function is teaching knowledge genres. The meta-procedure in this paper is designed for researchers and teacher educators to design training curriculum genres that will give teachers the pedagogic metalanguage they need.

Teacher training: integrating theory with practice

The professional learning programme continually models the multimodal teaching practices of its classroom curriculum genres. As in the classroom methodology, training activities centre on joint reading of textbooks that present the theoretical components of the programme, together with procedures for curriculum genres, and activities for analyzing and designing curriculum genres and knowledge genres. Teachers are guided to read, discuss, mark and annotate the textbooks, with a data projector modelling these activities and videoed lessons to analyze. Writing activities are practiced by teachers adopting student roles to scribe on whiteboards, guided by the presenter and class. They write in their own copies of the books as texts are jointly constructed, and mark and annotate their copies before practicing with their own curriculum texts. The programme thus integrates study of language and pedagogic theory with practice in classroom curriculum genres. In teacher education, by contrast, these activities are more often 'dis-integrated' between academic study and the practicum.

Introducing the learning model

Curricular values

The training programme opens with a discussion of social values – the goals of democratizing education outcomes. This theme is negotiated by inviting teachers to present the issues that brought them to the programme. These typically revolve around the problems of the low literacy skills of many of their students, difficulties in managing a wide range of student 'abilities' in a class and their lack of training to address these problems. These issues are re-focused by pointing out that closing the learning gap in schools and classrooms requires weaker students to improve their skills at much faster rates than more successful students. The value of the programme is then promoted with data and writing samples that show how it accelerates literacy growth for all students, but faster for lower achieving students – while simultaneously addressing the needs of all. This theme is reiterated throughout the programme in order to counter the common view that students should learn at their assessed 'ability' or 'instructional levels', a practice that Hattie (2009) reports is less than half as effective as teaching all students at the same level.[2]

Structuring of pedagogic activity

Building a pedagogic metalanguage then begins with discussion of the structuring of pedagogic activity, as this is the first principle for designing curriculum genres.

Technically, each pedagogic activity has an orbital structure, with a learning Task at the core; this nucleus is preceded by a Focus that specifies the Task and followed by an Evaluation (Rose 2014; Rose and Martin 2012). The Task may also be preceded by a Prepare phase, optionally providing support for the Task, and followed by an Elaborate phase, that can extend knowledge from the Task. This orbital structuring is schematized in Figure 9.5.

As with knowledge genre descriptions, this analytical model originated in pedagogic applications (Rose 2004) and the terms Prepare, Focus, Task, Evaluate, Elaborate are designed to be sensible, learnable and appliable for teachers. However, the orbital model of pedagogic activity is a technical representation, comparable to other types of semiotic structure described in SFL theory (Martin 1996). Instead, teachers are introduced to these concepts through the popular image of learning cycles. The model is simplified to just three terms for an initial presentation, Prepare-Task-Elaborate (as in Figure 9.6).

This cyclic model provides an interactional perspective on learning that is modelled ideationally in Maton's (2013, 2014) metaphor of semantic waves. In Maton's terms, values in semantic density and semantic gravity (Martin's mass and presence) tend to alternate between Prepare, Task and Elaborate phases. A Prepare phase with low mass and high presence may be used to support learners with a relatively massive Task. The Elaborate phase may then take a step up in mass, to more technical knowledge, or a step down to relate to learners' experience. However many

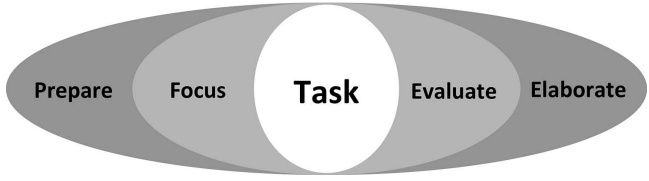


FIGURE 9.5 Orbital structuring of pedagogic activity

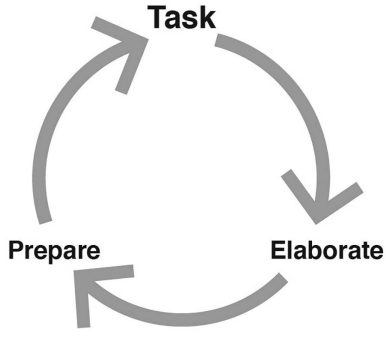


FIGURE 9.6 Structure of pedagogic activity as a learning cycle

combinations are possible. Martin (2016) offers an accessible bridge between the models of learning cycles and semantic waves, using the metaphor of 'powering up and down' in semantic density (mass), between Prepare, Task and Elaborate phases.

This image of the learning cycle is continually re-iterated as an icon in R2L. It is first valorized as the means by which the methodology's outcomes are achieved. Its phases are then brought to consciousness as follows. Teachers' assumption that learning occurs through tasks is readily invoked, with examples from manual activities to reading textbooks or following lectures. Their intuition that learning is most effective if the task is done successfully is also invoked, by discussing the emotional effects of failure in reducing the capacity for learning. It then becomes obvious that a learning task is most likely to be successful if the learner is first prepared by a teacher (or author), countering the individuating constructivist view that learning emerges independently from within the learner. Once the task is done successfully and is affirmed by the teacher, it opens up the capacity for a further step in learning; this may be the next step in a learning sequence, or a higher level of understanding of the task.

The discussion is then distilled into the learning cycle icon *Prepare-Task-Elaborate*. Familiar lesson activities are invoked to demonstrate that teachers already follow this model intuitively, reinforcing its value as a representation of their own practice. In fact this lesson activity itself follows the same model – the task is for teachers to recognize the structuring of their own pedagogic practice; it is prepared by bringing their intuitive knowledge to consciousness, negotiating the experience they share; and it is elaborated by naming what they have recognized and abstracting it as a technical structure that is valorized as a shared icon. In semantic wave terms, the task is prepared with high presence and elaborated with higher mass.

Introducing the language model

Language strata and language tasks

The discussion of learning cycles paves the way for the introduction of SFL's stratified model of language in context, which forms the second principle for the design of curriculum genres. Language learning is reframed as a learning task, for which effective preparation requires teachers to have a coherent understanding of the task. The language model is accordingly valorized as essential knowledge for teachers and becomes the next icon in the programme.

As the focus is on the complexity of the language task, the pathway from everyday to technical knowledge focuses on patterns of patterns of patterns, or metaredundancy, across language strata (Lemke 1995), and on the functionality of social contexts (Martin, Chapter 5, this volume). To this end, the strata of language are first introduced in common sense terms as words, sentences and texts in social contexts. Social contexts are framed as the people involved (tenor), the subject matter (field), the ways that meanings are made (mode) and the global social purpose (genre). These variables are illustrated with the tenors, fields and modalities of the training

curriculum genre (presenter/participants; literacy teaching/language knowledge; spoken, written, visual, manual modalities), at once grounding them in shared experience and generalizing them beyond written texts. Language strata are then complexified, as texts consisting of phases of meaning expressed as paragraphs in writing, sentences consisting of word groups expressing chunks of meaning (*who or what it's about, what doing, where, when*) and written words consisting of syllables and their letter patterns. The strata are then technically named: patterns in texts as discourse, patterns in sentences as grammar and patterns of letters in words as spelling.

The language task is then re-considered in terms of this model. Reading and writing, speaking and listening involve processing all these patterns of patterns of patterns simultaneously and automatically, so that struggling at any level can impede learners' capacity to comprehend or produce coherent texts. This strategy reconstrues the pathology ('deficit') model of learning difficulty as a pedagogic issue of knowledge about language. Teachers' existing metalanguage for reading tasks is then re-defined in this technical framework. What teachers commonly term 'decoding' means recognizing patterns of letters in words; 'literal comprehension' is recognizing words in sentences; 'inferential comprehension' is recognizing semantic relations in discourse; and 'interpretive comprehension' means recognizing field and tenor, or interpreting meanings in relation to readers' knowledge and values. These re-technicalized understandings become part of the programme's metalanguage.

Sequencing of language learning tasks

The model is also used to position the activities that teachers currently use for literacy teaching. For example, 'shared book reading' engages children in the fields of texts (as does topic teaching in curriculum subject areas); 'text type' writing models the stages of texts; 'composition' teaches the structures of paragraphs; grammar exercises practice rules for sentences and word groups; vocabulary and spelling activities commit words and their letter patterns to memory; phonics programmes drill patterns of sounds and letters. Such collections of activities dis-integrate the tasks of reading and writing into separate activities using different texts, words, sounds and letter patterns (as mentioned above for the activities of teacher education). These dis-integrated practices widen the achievement gap, as they advantage children with extensive experience of relevant reading practices in the home (who can thus recognize and synthesize the functions of each activity) and disadvantage children without comparable experience (who often perceive the different activities as a collection of meaningless school tasks (Rose 2006, 2011b)).

An alternative approach is then presented, that integrates the literacy learning process as a planned sequence of activities informed by the language model (Figure 9.7). The sequence unfolds from reading to writing. Reading begins at the level of context, drawing on the background knowledge students need to access a text and a summary of how the field unfolds through the text – which is then read aloud. The teacher then guides students to read the text or a passage in detail, sentence by sentence, by discussing each word group in turn. Certain words may then be selected to practice spelling their letter patterns. The sequence thus unfolds

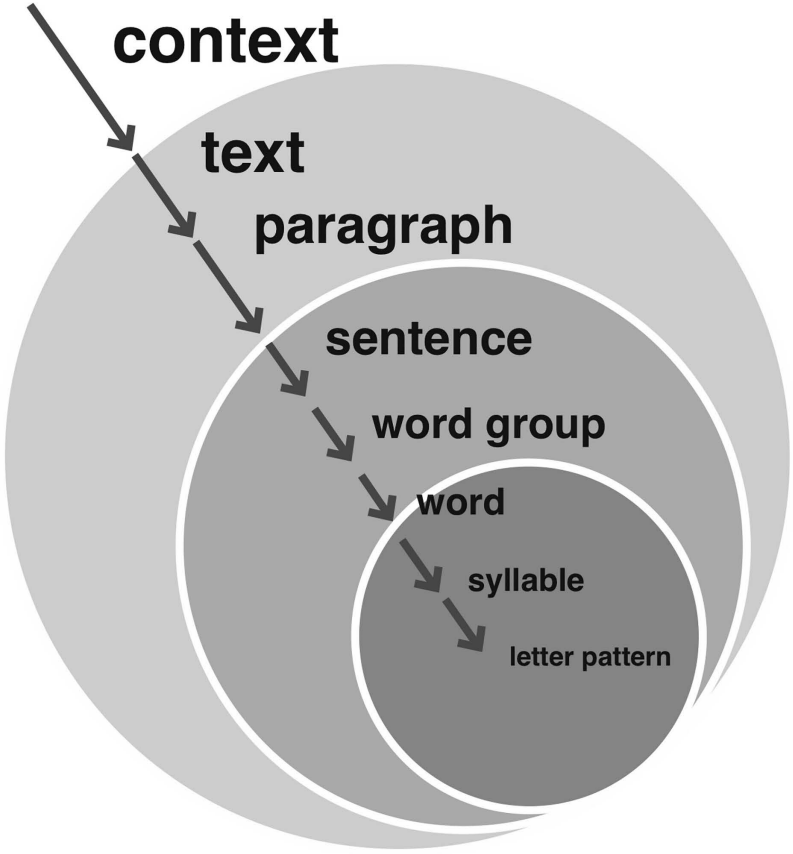


FIGURE 9.7 An integrated sequence for literacy teaching

through a hierarchy of integrating practices that are each meaningful to all learners. The field is the context of the text, which is the context of each sentence, which is the contexts of each word, which is the context of their letter patterns (described by Firth 1935). Writing builds back up, first with rewriting the language patterns studied in detailed reading and then by constructing a whole text. This re-technicalizing of the language model re-aligns teachers' intuitive assumptions about language learning into an explicit framework, countering the implicit bricks-and-mortar language model on which much language teaching is based.

Designing curriculum genres

Core R2L curriculum genres

Once the design principles for the learning and language models have been negotiated, explicated, abstracted, technicalized, aggregated and iconized, they can be used to describe the curriculum genres that constitute R2L methodology. The core of

the programme includes five key curriculum genres, known as Preparing for Reading, Detailed Reading, Sentence Making, Joint Rewriting and Joint Construction. These genres can be shaped and sequenced in various combinations to construct curriculum macrogenres. Briefly, Preparing for Reading supports students to follow a text as it is read, by orally summarizing how it will unfold; Detailed Reading supports them to read a text or passage with detailed comprehension, by identifying and discussing the sequence of meanings in each sentence; Intensive Strategies deepen this support, by guiding students to manually manipulate word groups and words in sentences, practicing their spelling and writing the sentences; Joint Rewriting supports them to use the language patterns studied in Detailed Reading, to write new text passages; Joint Construction supports them to construct whole texts, using knowledge acquired from reading and structures of genre models (see lesson demonstration videos at NESA 2018a). These genres and the staging that realizes them are presented in Table 9.4.[3]

Designing curriculum genres around learning tasks

The staging of each genre in Table 9.4 follows the general pedagogic principle of *Prepare-Task-Elaborate*. This staging is briefly elaborated as follows. Preparing for Reading supports all students in a class to follow a text as it is read aloud, by first previewing the sequence in which the field unfolds through the genre. A relatively accessible text such as a short story or novel chapter may be read as a whole and aspects of its field and language features may then be discussed. A denser or more technical text may be read paragraph by paragraph, with each paragraph previewed and reviewed. Students may also be guided to mark key information, as each paragraph is reviewed.

Detailed Reading supports all students to read a passage from the reading text with detailed comprehension of its field and to recognize the author's language choices. The teacher previews a sentence, and reads it, and then prepares students to identify each wording, with a simple meaning cue. One student is asked to identify

TABLE 9.4 R2L core curriculum genres

curriculum genre	*basic staging*		
Preparing for Reading	Preview text	Read text	Review field
Detailed Reading	Preview, read sentence	Identify wordings	Review field, language
Intensive Strategies	Sentence making	Spelling	Sentence writing
Joint Rewriting	Plan field	Rewrite wordings	Review language
Joint Construction	Plan field, deconstruct model	Construct new text	Review genre, language

the wording aloud, moving from one student to another in turn, in order to engage and affirm all students, and its meaning is then elaborated. These cycles continue for each sentence in the selected text passage. This part of the generic structure is thus recursive.

Intensive Strategies is a macro-genre which includes three activities that strengthen students' control over the language patterns in the Detailed Reading passage and move towards writing. In Sentence Making, students are guided to cut up sentences written on cardboard or paper strips; the task is to mix up and re-order the words and word groups, elaborated by creating new sentences from the cards. In Spelling, students are guided to cut up words from these sentences into their letter patterns and practice writing them on small white or blackboards (this can be extended with other words that use the same spelling patterns). Sentence Writing builds on Spelling, as students practice writing whole sentences, using the words they have learnt to spell, to practice fluent writing. Intensive strategies are also used to teach early literacy in school, and for learning other languages and other challenging language tasks.

In Joint Rewriting, students are guided to appropriate what they have learnt from Detailed Reading to write a new passage. For factual genres, this begins with note making using the highlighted wordings from the passage. The teacher then guides the class to create a new text, sentence by sentence, drawing on the notes. For stories, arguments and text responses, this activity begins with planning a new field and then rewriting the same grammatical patterns as the Detailed Reading passage (with new characters, setting and events for a story, a new issue for an argument, or a new text focus for a response). In each case, the teacher is guiding the students to make complex language choices, interwoven at the levels of register, discourse and grammar. Typically students take turns to scribe both notes and new texts on the class board, with the teacher's guidance.

Joint Construction supports all students to organize their writing in appropriate genres for assessment tasks, so can they demonstrate what they have learnt from reading. For factual genres, this begins with note making from source texts, which the class then uses to construct a text with appropriate organisation, guided by the teacher. For stories, arguments and text responses, it begins with deconstruction of a model text in the target genre, labelling its stages and phases. The same stages and phases are then used to construct a new text with a new field. For procedures, an activity is demonstrated and jointly practiced, then its steps are jointly constructed.

Sequencing curriculum genres

Options for programming

These sets of options in curriculum genres are the components through which teachers construct curriculum programs. They are presented to teachers as a set of nested teaching/learning cycles providing three levels of support, as in Figure 9.8.

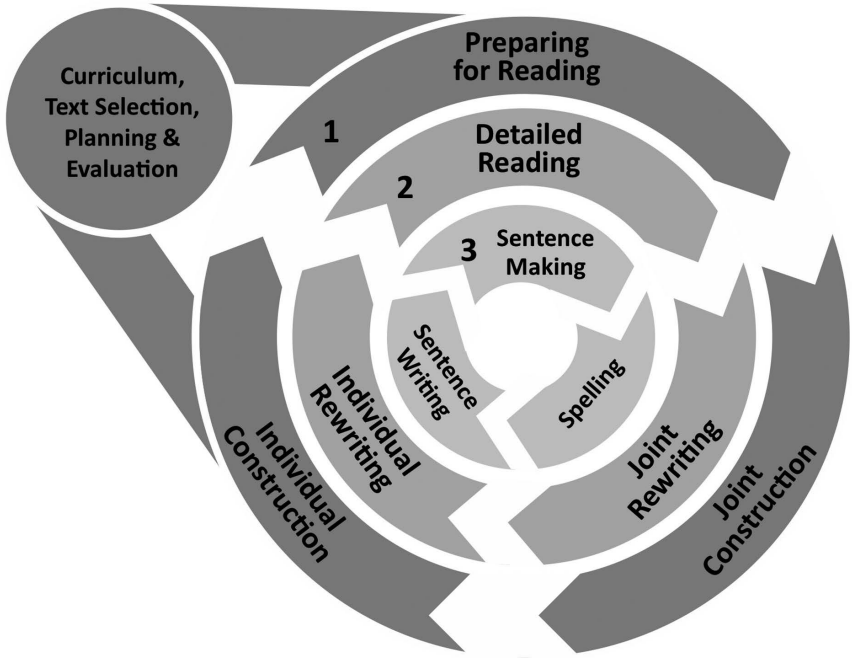


FIGURE 9.8 R2L curriculum genres as teaching/learning cycles

The outer cycle in Figure 9.8 relates directly to the teaching contexts of curriculum, text selection, lesson planning and assessment. The curriculum is taught through reading and determines what texts will be selected for teaching it. The selected texts must then be analyzed in order to plan reading lessons. The curriculum also determines what genres will be selected for evaluating learning through writing. These must be analyzed in order to plan writing lessons.

One option for a lesson sequence is to stay in the outer cycle (1), moving from Preparing for Reading to Joint Construction, followed by Individual Construction.[4] Once a text has been jointly constructed, students can practice the same task themselves, or extend the text from the joint construction task, with the teacher circulating and supporting as necessary. Individual Construction provides additional supported practice before independent writing for assessment, allowing the teacher to give further support as feedback according to each student's needs. Another lesson sequence option is go from Preparing for Reading to the middle cycle (2) – to Detailed Reading and Rewriting. These curriculum genres provide students with intensive practice with the field and language features of reading texts, before applying them to writing a whole text in Joint Construction. Joint Rewriting is followed by Individual Rewriting, to provide additional supported practice. Typically multiple detailed readings and rewrites are practiced before returning to the outer circle for Joint Construction.

Options for building metalanguage

In terms of the language task, the primary focus of attention in Preparing for Reading is on comprehending the field of the reading text. In Detailed Reading, the field is explored in detail, together with the patterns of grammar and discourse that realize it; and metalanguage for these patterns is introduced. In Joint Rewriting, the primary focus becomes these language patterns, using and extending the metalanguage introduced in Detailed Reading. In Joint Construction, the primary focus is on genre, together with field. Deconstruction introduces the terms for stages and phases, which are applied in writing the new text, along with the developing metalanguage for grammar and discourse patterns.

The Joint Construction genre was designed by Joan Rothery and colleagues (Rothery 1994; Rose and Martin 2012) to guide students to appropriate the staging and language features of model texts. This knowledge about language is accumulated in the manner of natural language learning, described in Halliday's (1975) and Painter's (1984, 1991) early language research – by experiencing instances in context with a teacher's guidance. The pedagogic power of Joint Construction comes through students' joint participation in the activities of deconstructing and constructing texts, before they attempt to write their own. They learn by doing the activity, which provides a meaningful context for studying the language patterns made explicit by metalanguage.

Detailed Reading and Rewriting are designed on the same principle, for students to instantially acquire detailed knowledge about grammar and discourse patterns characteristic of the genre under focus. They provide meaningful contexts to explore and appropriate instantial language patterns. As Joint Construction is the genre through which a metalanguage for the staging of knowledge genres is acquired, so Detailed Reading and Rewriting fulfil the same function for grammar and discourse. These designed curriculum genres are thus more effective for both learning language and learning <u>about</u> language, than are familiar grammar teaching activities.[5] Crucially they are embedded in the context of learning <u>through</u> language, so they are neither separate nor in conflict with curriculum learning.

A further lesson sequence option is to follow Detailed Reading with Intensive Strategies (3), before beginning Rewriting. Sentence Making intensifies students' control over instantial discourse and grammar patterns and provides opportunities for reinforcing metalanguage. As clauses are cut into word groups, and groups are cut into words, their instantial functions in the sentence are discussed. They can also be labelled with their systemic functions, at clause and group rank (discussed in Rose, Chapter 10, this volume). Repeated practice with different texts teaches students to consciously recognize and select systemic functions in instantial contexts, and to use the systemic labels as metalanguage. This technique is also used with teachers in the training programme. Finally, as Detailed Reading and Sentence Making support students to acquire discourse and grammar patterns, the Spelling activity then supports them to learn spelling patterns, with their associated metalanguage, such as syllable, Onset and Rhyme. Again these patterns are learnt

as instances in the context of meaningful texts, which is more effective than traditional spelling exercises.

Frequency of practice

Multiple macrogenres can thus be constructed from the R2L curriculum genres. The macro-procedure for doing so, presented in the training, is a conditional procedure with multiple choice points. This complexity is negotiated with teachers as jointly constructed options for lesson programming, further linking their everyday practice with the abstract principles of curriculum genre design. Preparing for Reading is presented as a daily activity, as it becomes the standard starting point for teaching the curriculum in most lessons. Teachers then decide how often they expect independent writing for assessment, which determines the frequency of Joint and Individual Constructions. Teachers' daily and weekly timetables, and their students' needs, then determine how much time they can allocate to Detailed Reading, Rewriting and Intensive Strategies.

Analyzing and designing classroom discourse

Dimensions of classroom discourse

The designed metalanguage for curriculum genres, outlined above, gives teachers conscious control over the global patterns of their own pedagogic practice. However there is a deeper layer of teachers' pedagogic discourse which can be harder to bring to consciousness, because it is acquired tacitly and applied intuitively, moment by moment in the classroom. This is the level of classroom exchanges through which teachers interact with their students to guide and build their knowledge and skills. In order to engage students in learning, teachers continually ask questions of their classes and use students' responses to elaborate with new knowledge. This ubiquitous classroom discourse pattern is widely described as 'initiation-response-feedback' or IRF cycles (Alexander 2000; Gibbons 2002; Mercer 2000; Sinclair and Coulthard 1975; Wells 2000).

From an SFL perspective, teacher/learner interactions have been described in terms of exchange structure and pedagogic activity structure (Martin 2006b; Martin and Rose 2005, 2007a, 2007b; Rose 2004, 2014, 2018a, 2018b; Rose and Martin 2012). Typical learner tasks in teacher/learner interactions are to respond to focus questions. Responses are usually evaluated by teachers, and also may be prepared and evaluated.

These micro-structures of pedagogic activity are realized in discourse as exchanges between speakers. The teacher evaluation is the primary knower (K1) role in this type of exchange. The learner response is thus a secondary knower (K2) role and the focus question is a delayed primary knower (dK1) role. Prepare and elaborate phases may be additional K1 roles. This pattern is schematized in Figure 9.9, where phases of learning cycles are realized as exchange roles.

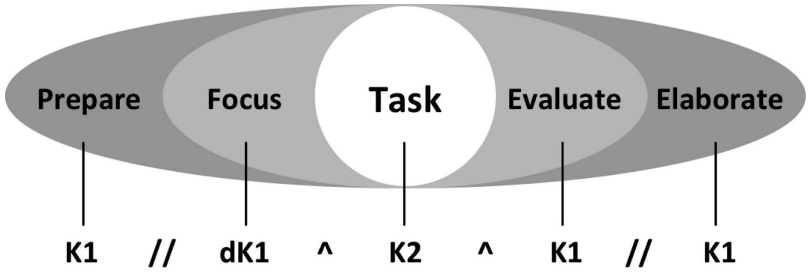


FIGURE 9.9 Phases of learning cycles enacted by exchange moves

Recently this description has been expanded to other dimensions of pedagogic register (Rose 2014, 2018a, 2018b). Classroom teaching/learning is a complex intermodal practice, in which meanings are brought into the discourse from various sources, including teacher and learner knowledge, records such as books, screens, copies or class boards, or the environment. Close analysis of classroom discourse shows rapid move-by-move switching of modalities using various means of sourcing, such as speaking, reading, writing, drawing, pointing, gesturing. Furthermore, pedagogic relations are enacted through various roles adopted by teachers and learners. Teachers present knowledge, evaluate learners and direct activities, while learners display their knowledge, values or perceptions for evaluation. Both teachers and learners may also solicit responses. Each move in an exchange enacts one or another of these functions in pedagogic relations. Learner participation is also a crucial dimension of pedagogic relations, determining which learners are addressed, speak, and are affirmed or not.

Bringing classroom discourse to consciousness

Managing such pedagogic interactions to achieve teaching/learning goals with classes of 20, 30 or more students is an immensely complex skill. Teachers develop these skills primarily through experience, first as a school student and later as a classroom teacher. Teacher preservice training offers some guidance and general protocols such as 'engaging' students, using 'open questions', encouraging 'inferencing' and 'managing behaviour', but it seldom analyzes and designs the structure of classroom exchanges in detail. Rather teachers acquire this complex of skills tacitly and deploy them intuitively. The R2L programme harnesses these skills, by bringing the structuring of pedagogic exchanges to consciousness, technicalizing them and re-designing them to engage whole classes in learning through reading and writing.

One major problem with the standard intuitive practice is that only a minority of students in any class consistently actively participate in teacher/class exchanges (Nuthall 2005). Teachers typically report that just two to three or four to five students consistently respond to their questions. These are often the more successful students, who understand the teacher's questions, can infer appropriate responses,

consistently receive teacher affirmations, and are thus both ideationally and emotionally prepared for each elaboration of new knowledge. Teachers hope that some other students receive passive benefits from the exchanges, but also know that many others are disengaged and receive little benefit. The problem is exacerbated because teacher questions typically demand interpretive responses based on students' own knowledge, a practice that is often promoted in teacher training to encourage 'inferencing' or 'critical thinking', but which functions socially to create and sustain hierarchies of exclusion (Rose 2010).

This problem can be resolved if the source of answers to questions is a text shared by the class, rather than individual students' prior knowledge. R2L thus uses a common shared text to teach reading and writing to whole classes. It shows teachers how to prepare all students in their classes to successfully identify elements in texts, with semantic cues. Focus questions are then directed at particular students to identify an element, so that each student can be affirmed in turn. All students then highlight the element. As all students successfully identify each element from the meaning cue, all benefit from the elaboration of meaning that follows.

The issue of unequal engagement and its solution is negotiated with teachers through a series of focus questions, responses and elaborations, mimicking classroom patterns. How do you interact with your students? What's the learning task when you ask a question? What's the first thing you do when you get the answer you are after? ('praise'). How many students consistently answer with the responses you want? This is elaborated by discussing the functions of elaborations, using students' responses to build knowledge in steps (Gibbons 2002; Martin and Maton 2013; Maton 2014; Wells 2002). What are the other students doing? What do you do when you get a response you don't want, or no response? This is elaborated by pointing out the extraordinary skill that teachers possess, as they work to engage all students – continually planning how to phrase questions to get the answers we need to elaborate on, and if an appropriate answer is not forthcoming, reconsidering how to prepare students to give the response required. Where did we all learn to do this? A common response is 'not in teacher training'.

A metalanguage for analyzing and designing classroom discourse

This negotiation around patterns of classroom interaction prepares teachers to acquire a technical metalanguage for analyzing and designing classroom discourse. It begins with guided analyses of learning cycles in parent/child reading, early years of school and upper primary. These analyses show how parents consistently prepare and affirm children, and how teachers use successful responses to elaborate with new knowledge; they also show how teachers' focus questions are often unprepared, so that student responses are often unsuccessful. The analyses are labelled with technical terms for learning cycles, *Prepare*, *Focus*, *Elaborate*. Response tasks are further specified as *Identify* an element in a text or *Propose* from own knowledge, and evaluations are specified as *Affirm* or *Reject*. Transcripts of Detailed Reading lessons

are then examined to show how learning cycles can be carefully designed to teach reading, while engaging and affirming all students and continually elaborating with deeper understanding. Teachers then watch a video of such a lesson and practice analyzing its transcript using the metalanguage.

In the following simple example (Table 9.5), a class of young children is reading Roald Dahl's *Fantastic Mr Fox*. The teacher previews and reads a sentence, prepares students to identify an item and asks one student to say it. After affirming, the teacher directs the class to highlight the exact words, so that all students actively read and understand their literal meaning. The elaboration extends this understanding to interpret the field. Here the teacher prepares again by restating the co-text and asks a student to propose an answer, which is affirmed and further elaborated (from Rose and Martin 2012).

Planning Detailed Reading lessons

Such close interrogation of a text, while engaging every student in the class, requires careful planning – for which the metalanguage of learning cycles is essential. Detailed Lesson Planning is a further curriculum genre developed in the R2L programme. It is presented to teachers, first with an example of a completed lesson plan and a demonstration of its use in the classroom, and then as a procedure for writing the plan. Steps in writing such lesson plans include: 1) selecting an ideal passage, according to the field of study, the genre of the students' ultimate writing task and the level of written language appropriate for their year grade; 2) marking the wordings for students to identify; 3) planning meaning cues to guide identification

TABLE 9.5 Extract from Detailed Reading lesson

Teacher	Prepare sentence	*In the next sentence Mr Fox checks for danger before he creeps all the way out. I'll read it. 'He took a last careful look around.'*
	Prepare	*So he took a look.*
	Focus	*[student name] What kind of look was it?*
Student	Identify	*A last careful look.*
Teacher	Affirm	*Brilliant.*
	Direct	*Let's highlight last careful look.*
Elaboration		
Teacher	Prepare	*So he's just about to creep right out of his hole.*
	Focus	*Why do you think it's a last look? [student name]*
Student	Propose	*He's going to go outside.*
Teacher	Affirm	*That's right.*
	Elaborate	*He's about to creep right out of his hole and go off to steal the ducks for dinner, so he's having a last careful look around.*

TABLE 9.6 Extract from Detailed Lesson Plan

Sentence prep	checks for danger
Prepare cues	*what kind of look*
Sentence	He took a last careful look around.
Elaborations	• *Why a last look?*

of the wordings; 4) planning elaborations, to define, explain or interrogate their meanings; and 5) planning sentence preparations so students will understand the sentence as it is read. (Note this is not the sequence of classroom implementation, which was exemplified in Table 9.5 above.)

Lesson plans are written as notes, briefly summarizing what will actually be said in the lesson. Each sentence is annotated with the sentence preparation, the wordings to highlight, cues for preparing each element and notes for elaborating. What the notes don't include is information about the context, the position of the words in the sentence, the focus question, the affirmation and much of the elaborating discussion. Table 9.6 is an extract from such a detailed lesson plan, for the sentence negotiated in Table 9.5 above.

For most teachers, Detailed Lesson Planning is their first experience of detailed text analysis. It is doubly complex as it involves analyzing both the interaction cycles of classroom curriculum genres and the discourse patterns of knowledge genres which they negotiate. The preceding practice with analyzing learning cycles, using an explicit metalanguage, provides an essential framework to manage this complexity. The knowledge genre features under focus are then analyzed by guiding teachers' intuitions to: 1) identify relevant elements of meaning in each sentence; 2) reinstantiate these as prepare cues that are accessible to their students; 3) reinstantiate them again as elaborations relevant to their teaching goals; and 4) reinstantiate the whole sentence in terms accessible to their students. In training workshops, a lesson plan is jointly constructed with guidance, its use is then modelled and teachers practice using it together, taking turns in teacher and student roles.

Sequencing the training curriculum macrogenre

Teachers cannot be prepared for the complexity of these analysis, design and teaching tasks by training in grammatical systems. Indeed, grammatical categories can be positively distracting for teachers who have received functional grammar training, but are inexperienced with Detailed Reading. Rather the focus here is on register; teachers must identify wordings in the text that realize elements of register, and then choose other wordings to recontextualize them in terms of students' knowledge (preparing) and teacher's goals (elaborating). Knowledge of grammar and discourse systems is ultimately useful for experienced teachers, to guide their text selection, analysis and planning; but it needs to be built on their prior knowledge of pedagogy.

Four macro-phases in the training programme

For these reasons, the training curriculum macrogenre is sequenced from the 'top down' in four macro-phases: 1) analyzing register and genre in whole texts for teaching reading and writing; 2) analyzing register in short passages for Detailed Reading lessons; 3) analyzing the grammatical structures through which patterns of register are realized; and 4) analyzing patterns of discourse that realize register and genre.

Phase one: working with whole texts

The first phase guides teachers to plan and implement Preparing for Reading and Joint Construction, using the recursive pedagogic principle of the learning cycle and the 'top-down' sequencing principle of the language model. They are guided into these curriculum genres by participating in their activities: 1) preparing and reading a technical text, making notes of its key information, and jointly constructing a new text from the notes; 2) preparing and reading a narrative, and discussing its features; 3) deconstructing a model narrative, labelling its stages and phases, and jointly constructing a new story; 4) deconstructing a model argument and/or text response, and jointly constructing a new one; 5) jointly constructing a procedure for teaching a maths algorithm (described in Rose 2018a, 2018b, Chapter 10 of this volume).

After participating in this lesson practice, teachers are then guided to identify and analyze the knowledge genres they expect their students to read and write. Text selection and analysis is also proceduralized in a further training curriculum genre. First the whole set of school knowledge genres is presented as a system network (Rose, 2017, 2018a, Chapter 10 of this volume) that teachers are guided to interpret in relation to their professional experience, according to each genre's functions in the school curriculum. They are then guided to identify texts within each genre family (stories, chronicles, explanations, reports, procedures, arguments, text responses) and to identify and label their stages and phases.

In addition to these teaching and lesson planning procedures, a further procedure is practiced for assessing their students' writing development, using 14 criteria at the levels of genre, register, discourse, grammar and graphic features. Students' writing samples are compared with exemplars provided for each school stage; these are scored and annotated for each criterion, and the samples are scored accordingly. The assessment functions, not only to evaluate students' growth (and hence the programme's effectiveness), but also to introduce teachers to metalanguage and procedures for analyzing register and discourse patterns in knowledge genres. It refocuses SFL technicality for teachers' assessment tasks, iconizes the metalanguage as teachers find it effective for these tasks, and aggregates the complexity of language into useful tables with numerical scores. It does so by abstracting technical categories from actual student writing and negotiating their factuality, thereby bringing teachers' implicit judgements to consciousness with the metalanguage.

Phase two: Detailed Reading and Rewriting

The second phase of the programme introduces Detailed Reading, Joint Rewriting, Detailed Lesson Planning and Intensive Strategies. Ideally, teachers have spent a month or more practicing the curriculum genres introduced in phase 1 – gaining experience in selecting and analyzing texts, negotiating reading and writing with their students and analyzing their writing. The training curriculum genres for Detailed Reading and Lesson Planning were outlined above. Joint Rewriting is modelled, as for Joint Construction, by teachers taking turns to scribe, as the class contributes ideas, guided by the presenter. The difference for Joint Rewriting is that the focus is on language patterns within and between sentences, in contrast to re-constructing the stages and phases of a whole text in Joint Construction. Again, explicit grammatical knowledge is useful although not essential for this activity, as the practice brings teachers' intuitive language knowledge to consciousness. For stories and arguments, the rewrite follows precisely the same grammatical patterns as the Detailed Reading passage, but using a new field. For factual texts, detailed notes of the wordings highlighted in the Detailed Reading passage are written and the teacher guides students to write new sentences using these notes. A key procedural step in planning both Joint Construction and Joint Rewriting is for teachers to practice the task before the lesson, so they can guide the activity purposefully and predict potential opportunities and difficulties.

Phase three and four: knowledge about grammar and discourse systems

The third phase introduces explicit grammatical metalanguage. Again, teachers have ideally repeatedly practiced the whole suite of curriculum genres in the classroom. Their experience with detailed text analysis, and negotiating detailed reading and writing with their classes, prepares them for understanding and interpreting the categories of functional grammar, in ways that are directly appliable to their professional tasks. The fourth phase then introduces explicit metalanguage for discourse systems, including patterns of information, reference, conjunction, lexical relations and appraisal. The training curriculum genres for grammar and discourse systems are described in Rose (Chapter 10, this volume).

Four types of training curriculum genres

The four phases of the programme are summarized in Table 9.7, cross-classified with the four general types of training curriculum genres used in each phase. These genres include: 1) preparing and reading the training textbooks; 2) text analysis of knowledge genres and lesson transcripts; 3) lesson practice with the R2L curriculum genres; and 4) lesson planning practice. Table 9.7 specifies the focus of each of these genres in each phase of the programme.

Preparing and reading is used in phases 1 and 2 for introducing the language and learning models, the set of R2L curriculum genres and pedagogic exchanges

TABLE 9.7 Four types of curriculum genres for professional learning phases

	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*
Preparing and reading	Learning model Language model Programming model	Pedagogic exchanges		
Text analysis	Knowledge genres Writing assessment	Detailed reading lesson planning	Grammar patterns: clauses, elements, groups/phrases, grammatical metaphor	Discourse patterns: information, reference, conjunction, lexis, appraisal
Lesson practice	Preparing for reading Joint construction	Detailed reading Intensive strategies	Sentence making with grammar labels	Detailed reading
Planning practice	Preparing for reading Joint construction	Detailed lesson planning	Detailed lesson planning	Detailed lesson planning

in home and school. These are followed by activities in text analysis, lesson and planning practice. In contrast, phases 3 and 4 focus on text analysis for building knowledge about grammar and discourse. A metalanguage is built up through these training curriculum genres which facilitates their discussion in the programme and teachers' application in planning and evaluation. This metalanguage includes: 1) the language and learning models, and names for their elements (i.e. the strata of language in context and the phases of learning cycles); 2) the procedures for lessons, planning and evaluation, and names for these curriculum genres and their stages; 3) the structures of learning cycles in classroom discourse, and names for their phases. In classroom teaching, only a fraction of this metalanguage requires explicit naming for students. The names of the curriculum genres are important, so that students know what to expect. But beyond these, students learn the structures of the activities and teacher/student relations ostensively, within a few repetitions. This predictability enables them to focus attention on the knowledge they are acquiring, including the metalanguage used to discuss it. This metalanguage is the topic of the companion paper to this one (Rose, Chapter 10, this volume).

Curriculum genres and metalanguage for teaching tasks

Designing classroom curriculum genres

What has been described to this point is the core of the training curriculum macrogenre in the R2L programme. It has been developed in work with teachers, recontextualizing their tasks as designed curriculum genres and recontextualizing

theory to inform the design. Beyond this core, a suite of further genres has been designed for a variety of teaching tasks, student groups and curriculum fields – each informed by the language and learning cycle models. For example, Beginning Reading in early years is prepared with shared book reading (a variant of Preparing for Reading), followed by activities of word recognition, elaborated by sentence making. In Beginning Writing, sentence making prepares for the tasks of letter formation and spelling, elaborated by sentence writing. In addition a variation of Joint Construction is designed for teaching procedures, in particular for maths algorithms. It is prepared by the teacher demonstrating the activity, using a planned oral procedure. The task is then for the class to practice the activity two or more times with guidance and then jointly construct the procedure in writing (NESA 2018b; Rose 2019). A variation of Detailed Reading is also used with maths word problems, prepared by teaching the relevant algorithm. The task is to identify three elements of the problem: the data given, the solution expected and the operations required, elaborated by using the operations to solve the problem.

The range of curriculum genres developed for teachers is presented in Table 9.8, which displays the repertoire of explicitly designed and named teaching practices in the professional learning programme. They are classified most generally in terms of teachers' professional tasks – of teaching lessons, planning lessons and evaluating students' progress. Each of these general tasks include curriculum genres for planning, teaching and evaluating both reading and writing. While most genres are focused on either reading or writing, Intensive Strategies involve both reading and writing.

Each curriculum genre is sub-classified by types of lesson focus, for which teaching strategies vary. These teaching strategies are specified for each stage of the curriculum genre. As the design principle for curriculum genres is preparing and elaborating learning tasks, the staging of each genre is analyzed as a sequence of stages that prepare for a core learning task and elaborate on the knowledge focus. Exceptions include Intensive Strategies and Beginning Writing, which involve a sequence of genres: Sentence Making, Spelling and Sentence Writing, each of which involve preparing for tasks (presented as the inner cycle in Figure 9.9). Most of these curriculum genres are described in detail in Rose (2018a) and outlined in Rose (2017).

Building a metalanguage for curriculum genres

In sum, designing a metalanguage for classroom practice begins with principles for recontextualizing knowledge about language and pedagogy – from theory and research to teacher training and the classroom. The principles are drawn from Bernstein's model of recontextualizing fields and practices, and from the systemic functional model of social context as genre and register. The contexts of schooling can then be distinguished between knowledge genres and curriculum genres.

Recontextualization involves two steps – to teacher training and then to the classroom. In terms of register, both steps involve changes in mass (e.g. reducing

TABLE 9.8 Curriculum genres for teaching tasks

teaching activity	*curriculum genre*		*lesson focus*	*staging: Prepare*	*Task*	*Elaborate*
reading lessons	preparing for reading	1	whole text	Preview text	Read text	Review key points
		2	paragraph by paragraph	Preview paragraph	Read paragraph	Review paragraph, mark key info
	detailed reading	3	passages in reading texts	Preview sentence Preview wordings	Read sentence Identify wordings	Review wordings
		4	maths word problems	Review maths process	Identify data, solution, process	Solve problem
	sentence making	5	sentences in reading texts	Preview wordings	Cut up, re-order	Rearrange into new sentences
	beginning reading	6	early years	Shared book reading	Word recognition	Sentence making
		7	older students	Preview text	Repeat shared reading	Sentence making
writing lessons	joint construction	8	factual texts	Note making from sources	Construct from notes	Review field, genre
		9	stories, arguments, responses	Deconstruct model, plan new field	Construct with new field	Review genre, language features
		10	procedures	Demonstrate activity	Joint practice of activity	Construct procedure
		11	maths processes	Demonstrate process	Joint practice of process	Construct procedure
		12	procedural reports	Deconstruct model, plan new field	Construct with new field	Review genre, language features
	joint rewriting	13	factual texts	Note making from passage	Rewrite from notes	Review field, language
		14	stories, arguments, responses	Plan new field, review passage	Rewrite wordings with new field	Review language patterns
	spelling	15	letter patterns in words	Display letter pattern	Practice writing pattern	Propose other words with pattern
	sentence writing	16	writing practice	Memorize sentences	Write sentences from memory	Rewrite sentences
	beginning writing	17	all beginning students	Sentence making	Spelling, letter formation	Sentence writing

technicality) and presence (e.g. increasing negotiability). In terms of genre, a major shift is from the classifying reports of linguistic description to procedures for classroom activities. It is insufficient to recontextualize language knowledge for teachers, merely by adjusting mass and presence, without also recontextualizing it from linguistic classification to its applications in teaching reading and writing. It is also insufficient to provide teachers with metalanguage for knowledge genres, without an equally important metalanguage for curriculum genres. Furthermore, curriculum genres must be designed, not only for embedding reading and writing in classroom learning, but for training teachers in these tasks. To this end, this paper presents a meta-procedure for building a pedagogic metalanguage with teachers.

The first steps in this curriculum macro-genre for teacher training are to introduce the model of learning, the model of language, the classroom curriculum genres and the model for programming teaching sequences. The learning model involves cycles of analyzing and preparing for learning tasks; the language model is SFL's stratified model of text in context; the programming model starts with reading whole texts, followed by detailed practice with selected paragraphs and sentences, culminating with writing whole texts. The constituent curriculum genres are learnt through guided practice, beginning with Preparing for Reading and Joint Construction of whole texts. Metalanguage is introduced for the structuring of these curriculum genres and of the knowledge genres they are designed to teach. The second step focuses on detailed analysis of classroom discourse – in order to redesign teacher/learner interactions to engage all students equally in Detailed Reading and Rewriting of text passages. The structuring of teachers' classroom discourse is brought to consciousness, analyzed and its components are named. This detailed metalanguage is a necessary foundation for planning discussion of text features in Detailed Reading lessons.

These training curriculum genres are designed a) to give teachers control of the classroom curriculum genres for teaching reading and writing, b) to analyze the knowledge genres under focus, at the levels of generic structures and detailed patterns of register, and c) to apply these analyses in their teaching. Once teachers have control over these genres and analyses through repeated practice, they are introduced to explicit metalanguage for analyzing grammar and discourse patterns in knowledge genres. Hence the curriculum genres of the classroom shape how teachers construe linguistic knowledge, replacing the ancient tradition of linguistic theory shaping classroom teaching. The metalanguage teachers are given for knowledge genres differs significantly from the priorities of linguistic theory. The design and teaching of this metalanguage for knowledge genres is set out in the accompanying paper (Rose, Chapter 10, this volume).

Notes

1 Figure 9.4 reconfigures Martin's (2006b) model of metalanguage as 'social semiotic instructional discourse', or SSID, projecting Bernstein's regulative discourse, projecting instructional discourse.

2 Hattie (2009: 89) reports that ability grouping is a very common practice in primary classes, but has very low benefits for the learning of any group (d = 0.16, where d = 2.0 is considered a small improvement). He also reported 'individualized instruction to be barely more effective than the traditional lecture approach (d = 0.08)' (2009: 198). For separating classes based on ability, he found that 'tracking has minimal effects on learning outcomes and profound negative equity effects… the effects on self-concept were close to zero… The overall effects for the three major ability levels across the studies were d = 0.14 for high-tracked, d = -0.03 for middle-tracked and d = 0.09 for low tracked students – no one profits' (2009: 90).
3 Whereas the SFL convention is to use lower case for class labels, such as names of genres, and initial capitals for function labels, such as genre stages, the R2L programme uses initial capitals for the names of curriculum genres, in order to emphasise their significance for teachers.
4 The outer circle in Figure 9.8 is related to the teaching/learning cycle for genre writing, which includes the activities of Deconstruction, Joint Construction and Independent Construction (e.g. Rothery 1994). However in this earlier model, the activities for 'building the field' for the Joint Construction are left unspecified. In the R2L model, the field is accumulated through reading activities. Also in the R2L model, independent writing is the evaluation task that follows the teaching/learning activities. Instead, Individual Construction provides a further step of guided practice before independent writing. Thirdly, deconstruction of model texts is treated in R2L as a stage within the Joint Construction genre.
5 Detailed Reading needs to be distinguished from an activity sometimes used to teach functional grammar, in which students identify transitivity functions in clauses, using coloured highlighters, or by cutting them up in paper strips (e.g. Derewianka 2011; Williams 2004). The focus of Detailed Reading is first on comprehending the field of a text, rather than teaching grammar functions. Systemic features of grammar and discourse are only discussed where they are relevant and do not distract from the reading task.

References

Alexander, R. (2000) *Culture and Pedagogy: International comparisons in primary education*, Oxford: Blackwell.

Axford, B., Harders, P. and Wise, F. (2009) *Scaffolding Literacy: An integrated and sequential approach to teaching reading, spelling and writing*, Camberwell, Vic.: ACER.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique*, Oxford: Rowman & Littlefield.

Christie, F. (2002) *Classroom Discourse Analysis*, London: Continuum.

Christie, F. and Martin, J. R. (eds) (1997) *Genre and Institutions: Social processes in the workplace and school*, London: Cassell.

Cope, W. and M. Kalantzis (eds) (1993) *The Powers of Literacy: A genre approach to teaching literacy*, London: Falmer.

Derewianka, B. (2011) *A New Grammar Companion for Teachers*, Marrickville, N.S.W.: Primary English Teaching Association.

Firth, J. R. (1935) 'The technique of semantics', *Transactions of the Philological Society*, 34: 36–73.

Hattie, J. A. C. (2009) *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement*, London: Routledge.

Gibbons, P. (2002) *Scaffolding Language, Scaffolding Learning: Teaching second language learners in the mainstream classroom*, Portsmouth, N. H.: Heinemann.

Halliday, M. A. K. (1975) *Learning how to Mean: Explorations in the development of language*, London: Edward Arnold.

Lemke, J. L. (1995) *Textual Politics: Discourse and social dynamics*, London: Taylor & Francis.
Martin, J. R. (1996) 'Types of structure: Deconstructing notions of constituency in clause and text', in E. H. Hovy and D. R. Scott (eds) *Computational and Conversational Discourse* (NATO ASI Series F: Computer and Systems Sciences, Vol. 151), Berlin, Heidelberg: Springer, 39–66.
Martin, J. R. (2006a) 'Genre, ideology and intertextuality: A systemic functional perspective', *Linguistics and the Human Sciences*, 2(2): 275–98.
Martin, J. R. (2006b) 'Metadiscourse: Designing interaction in genre-based literacy programs', in R. Whittaker, M. O'Donnell and A. McCabe (eds) *Language and Literacy: Functional approaches*, London: Continuum, 95–122.
Martin, J. R. (2016) 'Exploring content: Building knowledge in school discourse', in L. T. Lai, A. Mahboob and P. Wang (eds) *Multiperspective Studies of Language: Theory and practice*, Beijing: Foreign Language Teaching and Research Press, 84–112.
Martin, J. R. and Maton, K. (2013) 'Cumulative knowledge-building in secondary schooling: Guest editors' preface', *Linguistics and Education*, 1(24): 1–3.
Martin, J. R. and Rose, D. (2005) 'Designing literacy pedagogy: Scaffolding asymmetries', in R. Hasan, C. M. I. M. Matthiessen and J. Webster (eds) *Continuing Discourse on Language*, London: Equinox, 251–80.
Martin, J. R. and Rose, D. (2007a) 'Interacting with text: The role of dialogue in learning to read and write', *Foreign Languages in China*, 4(5): 66–80.
Martin, J. R. and Rose, D. (2007b) *Working with Discourse: Meaning beyond the clause*, London: Continuum.
Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.
Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.
Maton, K. (2014) *Knowledge and Knowers: Towards a realist sociology of education*, London: Routledge.
Mercer, N. (2000) *Words and Minds: How we use language to work together*, London: Routledge.
NESA (2018a) *Learning through Reading and Writing*, NSW Education Standards Authority. http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/english-year-10/learning-through-reading-and-writing
NESA (2018b) *Planning for Success on Secondary Mathematics*, NSW Education Standards Authority. http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/planning-for-success-in-secondary-mathematics
Nuthall, G. A. (2005) 'The cultural myths and realities of classroom teaching and learning: A personal journey', *Teachers College Record*, 107(5): 895–934.
Painter, C. (1984) *Into the Mother Tongue: A case study of early language development*, London: Pinter.
Painter, C. (1991) *Learning the Mother Tongue*, Geelong, Vic.: Deakin University Press.
Rose, D. (2004) 'Sequencing and pacing of the hidden curriculum: How Indigenous children are left out of the chain', in J. Muller, A. Morais and B. Davies (eds) *Reading Bernstein, Researching Bernstein*, London: Routledge and Falmer, 91–107.
Rose, D. (2006) 'Literacy and equality', in A. Simpson (ed.) *Proceedings of Future Directions in Literacy Conference*, University of Sydney 2006, 188–203.
Rose, D. (2008) 'Writing as linguistic mastery: The development of genre-based literacy pedagogy', in R. Beard, D. Myhill, J. Riley and M. Nystrand (eds) *Handbook of Writing Development*, London: Sage, 151–66.
Rose, D. (2010) 'Meaning beyond the margins: Learning to interact with books', in S. Dreyfus, S. Hood and M. Stenglin (eds) *Semiotic Margins: Reclaiming meaning*, 177–208.

Rose, D. (2011a) 'Genre in the Sydney School', in J. Gee and M. Handford (eds) *The Routledge Handbook of Discourse Analysis*, London: Routledge, 209–25.

Rose, D. (2011b) 'Beating educational inequality with an integrated reading pedagogy', in F. Christie and A. Simpson (eds) *Literacy and Social Responsibility: Multiple perspectives*, London: Equinox, 101–15.

Rose, D. (2014) 'Analysing pedagogic discourse: An approach from genre and register', *Functional Linguistics*, 1: 11.

Rose, D. (2015) 'New developments in genre-based literacy pedagogy', in C. A. MacArthur, S. Graham and J. Fitzgerald (eds) *Handbook of Writing Research*, New York: Guilford, 227–42.

Rose, D. (2017) 'Languages of Schooling: Embedding literacy learning with genre-based pedagogy', *European Journal of Applied Linguistics*, 5(2): 1–31.

Rose, D (2018a) *Reading to Learn: Accelerating learning and closing the gap*, Sydney: Reading to Learn. http://www.readingtolearn.com.au

Rose, D. (2018b) 'Pedagogic register analysis: Mapping choices in teaching and learning.' *Functional Linguistics*, 5: 3.

Rose, D. (2019) 'Doing maths: (de)Constructing procedures for maths processes', in K. Maton, J. R. Martin and Y. Doran (eds) *Studying Science: New insights into knowledge and language in education*, London: Routledge.

Rose, D. and J. R. Martin (2012) *Learning to Write, Reading to Learn: Genre, knowledge and pedagogy in the Sydney School*, London: Equinox.

Rose, D., Gray, B. and Cowey, W. (1999) 'Scaffolding reading and writing for Indigenous children in school', in P. Wignell (ed.) *Double Power: English literacy and Indigenous education*, Melbourne: National Language and Literacy Institute of Australia (NLLIA), 23–60.

Rothery, J. (1994) *Exploring Literacy in School English (Write it Right Resources for Literacy and Learning)*, Sydney: Metropolitan East Disadvantaged Schools Program.

Rothery, J. (1996) 'Making changes: Developing an educational linguistics', in R. Hasan and G. Williams (eds) *Literacy in Society*, London: Longman, 86–123.

Sinclair, J. M. and Coulthard, R. M. (1975) *Towards an Analysis of Discourse: The English used by teachers and pupils*, London: Oxford University Press.

Wells, G. (2000) *Dialogic inquiry: Toward a sociocultural practice and theory of education*, Cambridge: Cambridge University Press.

Williams G. (2004) 'Ontogenesis and grammatics: Functions of metalanguage in pedagogical discourse', in G. Williams and A. Lukin (eds) *The Development of Language: Functional perspectives on species and individuals*, London: Continuum, 241–67.

10

BUILDING A PEDAGOGIC METALANGUAGE II

Knowledge genres

David Rose

> Language is unique among cultural processes in the extent to which it remains below the level of consciousness
>
> *(Halliday 2012: 78)*

> What isn't perhaps quite settled is the issue to what extent it's productive to formalize the kind of knowledge that everyone has – to make it overt, to make it explicit, to bring it into consciousness rather than leaving it somewhat beyond consciousness, and whether knowledge of that kind can help, let's say first of all, the teacher, who's charged with the responsibility of advancing the skills and knowledge of students, and secondly perhaps whether it can even be of use in helping students change their skills – their command and mastery of language
>
> *(Gunther Kress in Halliday 2012: 137)*

> what the school requires is for you to bring language back to consciousness. There's no way to avoid this, partly because you have to do this in learning to read and write. Becoming literate means reflecting consciously on your language
>
> *(Halliday 2012: 138).*

Introduction

This is the second chapter on building knowledge about language, developed in the teacher education methodology known as Reading to Learn (R2L) (Rose 2015, 2017, 2018; Rose and Martin 2012). This paper focuses on metalanguage for teaching and learning knowledge genres; its companion paper (Rose, Chapter 9, this volume) focuses on metalanguage for curriculum genres.

The chapter first outlines principles for designing metalanguage for knowledge genres, drawing on the systemic functional linguistics (SFL) model of genre, register and language, on principles for recontextualizing academic language knowledge as

language pedagogy, and on analysis of teaching/learning tasks as a design framework. The approach to metalanguage for knowledge genres then unfolds in four stages, following the curriculum sequence of the R2L teacher education program (Rose, Chapter 9, this volume). The first stage embeds metalanguage at the level of genre in curriculum genres for reading and writing whole texts. The second stage outlines metalanguage at the level of register for detailed reading and rewriting of text passages. The third stage introduces knowledge about grammar from the perspective of register. The fourth stage introduces discourse semantic systems from the perspectives of register and genre.

Designing metalanguage for knowledge genres

Realization and instantiation

A key theme in this paper is that a pedagogic metalanguage is doubly recontextualized – first from the contexts of linguistic and educational research to the contexts of teacher education, and secondly to the contexts of classroom teaching. In genre and register theory (Martin 1992, 2007, 2013; Martin and Rose 2007, 2008), social contexts are analyzed at two levels, as variations in register (field, tenor, mode) and in genres that configure these register variables (as modelled in Figure 10.1).

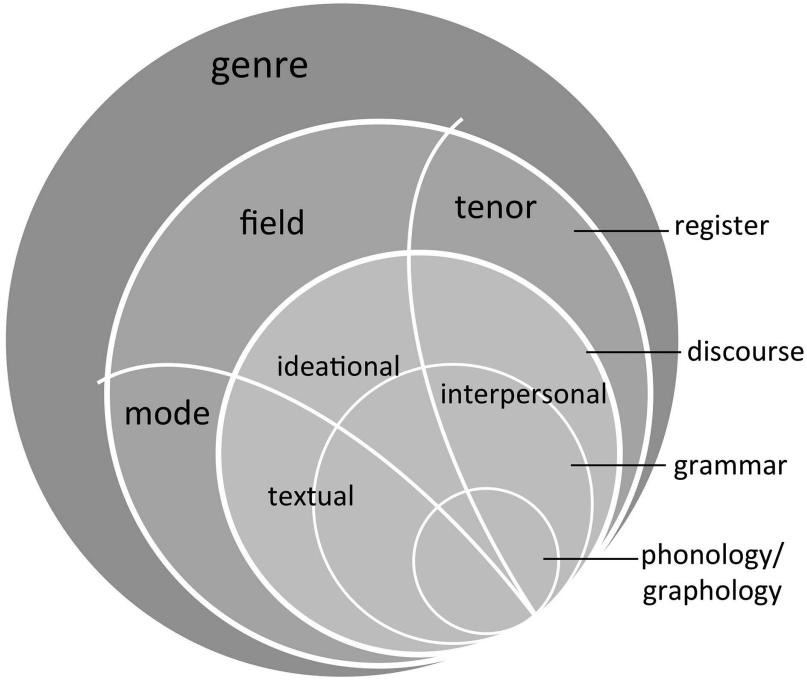


FIGURE 10.1 Strata of language in context

The nested circles in Figure 10.1 model a hierarchy of realization – of genre realized as register variables, realized in turn as discourse semantics, grammar and phonology or graphology. At the same time, each stratum needs to be interpreted both in terms of systems of potential resources for meaning and their instantiation as actual texts. These two perspectives (of inter-stratal realization, and intra-stratal instantiation of systems as text) must both be kept in view when designing effective language pedagogy.

Patterns of meaning at each stratum are co-instantiated in a text, with each stratum contributing a layer to the whole meaning of the text. The contribution of genre includes the global organization of texts oriented to distinct social goals, instantiated as sequences of text stages (Martin and Rose 2008; Rose 2006, 2019a). Generic organization weaves together patterns of register, including the fields that constitute curriculum knowledge (Martin, Chapter 5, this volume; Martin and Matruglio Chapter 4, this volume), patterns of tenor through which knowledge is negotiated and evaluated (Hood 2006, 2010) and patterns of mode that structure the school's curriculum sequence – from more spoken patterns in early years to highly written forms in the senior secondary (Christie and Derewianka 2008; Rose 2010), alongside other modalities (Dreyfus *et al.* 2010; O'Halloran 2005; Painter *et al.* 2013).

Discourse systems contribute semantic patterns that realize patterns of register in texts. In general terms, fields of activities are realized by configurations of lexical items that may be sequenced by conjunctions; tenor is realized by exchanges between speakers and prosodies of appraisal; and modes of meaning are realized by waves of information and strings of reference to identities (Martin 1992; Martin and Rose 2007). Grammar contributes patterns of wordings in clauses that instantiate grammatical systems, and simultaneously realize discourse semantic functions as wordings. Examples are transitivity structures of process and participants that construe semantic figures, mood structures that enact exchanges, and the organization of clauses as information structures (Halliday and Matthiessen 2014). Relations between the strata of discourse and grammar are both realizational and co-instantial.

Critically for language pedagogy, while discourse features realize register patterns, the relation between grammatical functions and register is less direct. For example, the experiential meanings of lexical items as people and things are more immediately recognizable than transitivity functions of nominal groups. The semantic speech functions of clauses as statement, question or command are more directly comprehensible than their grammatical functions as indicative or imperative mood. Because they directly realize register, discourse semantic meanings tend to be more accessible to common sense – whereas to identify grammatical functions one must first learn about the systems they are part of.

We can thus expand on Halliday's point in the preamble above, about 'the extent to which [language] remains below the level of consciousness'. It is the organization of grammatical systems and their features that lie furthest from consciousness. Discourse features are more accessible to consciousness because they directly realize the 'cultural processes' of which we are most consciously aware – fields of social

activity and the tenor of social relations. Because the aim of R2L is to teach reading and writing, the approach to metalanguage begins with patterns of register, and focuses on the discourse patterns that realize them. This is not the usual approach to recontextualizing SFL as metalanguage in literacy programmes, discussed as follows.

Recontextualizing knowledge about language

Varying mass and presence

In the terms developed above, recontextualization means re-instantiating patterns of meaning at each stratum, from one text to another (Martin 2006). Recontextualization is the process whereby academic metalanguage is re-instantiated from linguistics courses and textbooks to teacher training and again to lessons in schools. In terms of register, this involves major shifts in the density of meanings or 'mass' (technicality of knowledge, condensation of values and aggregation of meanings as discourse unfolds) and in context dependency or 'presence' (congruence with everyday experience, negotiability of knowledge and implicitness of meanings) – as aggregated in Table 10.1 (following Martin, Chapter 5, this volume; Martin and Matruglio, Chapter 4, this volume).

At the level of genre, knowledge and values are re-instantiated from one genre to another – from the knowledge genres of academic description and argument to the curriculum genres of teacher training and classroom practice. The curriculum genres of academic programmes are implicit in the design of their knowledge genres, including the textbooks and articles organized for independent reading, elaborated by oral interpretation in lectures and tutorials and assessed through independent writing. Although these pedagogic activities of academic study are actually highly proceduralized, they are evolved rather than designed anew by academic practitioners, who acquire them tacitly in institutional experience.

Recontextualizing academic metalanguage

When academic metalanguage is recontextualized for teacher training courses and textbooks, mass is reduced and presence increased; but similar knowledge and curriculum genres are used. The growing range of teacher textbooks about functional grammar re-instantiate the systems described in the academic canon, with less technicality, but similar organization of systems. For example, they may present systems of mood and modality, transitivity and theme, illustrated with text examples and

TABLE 10.1 Register variables and recontextualization

	field	*tenor*	*mode*
mass	technicality of knowledge	iconization of values	aggregation of meanings
presence	everyday/abstract	negotiable/factual	implicit/explicit

analysis activities. The systems are studied in teacher training courses and applied to the linguistic activity of parsing text examples, but with more support than in academic linguistics (i.e. more presence). These activities may then be recontextualized for the classroom, with still less mass and more presence. For example, one popular activity is guiding primary students to parse sentences by marking basic transitivity functions with coloured highlighters (Derewianka and Jones 2012), or cutting up sentences on paper strips into their transitivity functions (Williams 2004).

Like the grammar/register relation, the relation between these activities and the goals of teaching reading and writing is indirect. It is expected that knowledge about functional grammar will ultimately help children to learn and demonstrate curriculum knowledge through written language. A similar assumption underlies traditional language pedagogies – namely that by teaching the grammatical structures of classical and modern languages, linguistic analysis skills transfer to other learning tasks. Although grammar is explicitly taught, the transference depends on students' capacities to apply these skills to register and discourse patterns. The approach clearly works for many students, as attested by the longevity of the traditional practices; but it is less effective for other students. Teaching functional grammar takes a further step in explication, as grammatical functions are brought to consciousness, along with the structures that realize them. This functional metalanguage is then expected to be applied in reading and writing activities, for discussing selected language features in knowledge genres. The curriculum sequence begins with studying grammatical systems, that are then applied to text analysis, mirroring the evolved curriculum sequence of academic linguistic training.

Designing metalanguage from pedagogic practice

This type of recontextualization from linguistic theory and language teaching tradition to teacher training and classroom teaching contrasts with the design of genre writing pedagogy. Genre writing pedagogy started from the other direction, with the texts that are highly valued in schools; it then developed text analyses and a curriculum genre for teaching them – the 'teaching/learning cycle' or TLC (Martin 2000; Rose 2008, 2011, 2015, 2017; Rose and Martin 2012). This type of recontextualization integrates the analysis of knowledge genres with the design of new curriculum genres.

The sequence of analysis and design begins with identifying the types and organization of knowledge genres, and builds a metalanguage of terms for texts and their staging that is deliberately appliable for teaching in schools. These terms are then used in the classroom to deconstruct the staging of model texts, and applied again as the class jointly constructs texts with the same stages, and again as students independently construct texts of their own. The design of metalanguage is informed by linguistic analysis, but is shaped by pedagogic application. This was also the approach taken by Halliday and colleagues in designing the literacy programmes Breakthrough to Literacy and Language in Use in the 1960s. Halliday explains that at that time, 'no teacher would stand it for a moment if you said you had to teach

any grammar. It was out and that was it' (1986, in 2012: 121; cf. Halliday and Hasan 2006). Rather, teaching materials at that time were designed to focus on patterns of register in curriculum texts (cf. Doughty *et al*. 1971; Pearce *et al*. 1989).

Designing metalanguage for teaching tasks

Curriculum goals as design principles

As with genre writing pedagogy, the starting point for building a metalanguage for knowledge genres in the R2L programme is with the pedagogic tasks of reading and writing them. Alongside constructing successful texts for evaluation, these tasks include engagement with curriculum texts, detailed comprehension of their fields, recognition of authors' language choices and appropriating these resources for writing.

More specifically, engagement with written texts includes comprehension of their fields, pleasure in literature, interest in new knowledge, negotiating positions in arguments and facility in reading texts to make engagement possible. Detailed comprehension is necessary to recognize and engage with the intricacies of literary writing, to interpret technical and abstract fields and respond critically to persuasive devices in arguments. Recognition of authors' language choices depends on detailed comprehension, and is in turn necessary for appropriating these resources into one's own writing. In Table 10.2, knowledge genres are grouped in three clusters according to their primary social purposes: engaging readers in stories, informing readers in factual texts and evaluating issues, positions and texts in arguments and text responses. Curriculum fields are generalized for each cluster, along with the focus of tenor in readers' engagement and some discourse patterns focused on in reading and writing.

Although Table 10.2 is a crude summary, these are broad terms in which teachers commonly understand their curriculum goals. For stories, their goals include students comprehending the field, experiencing pleasure in reading and interpreting

TABLE 10.2 Foci of reading and writing tasks by genre, register and discourse patterns

genre	*field*	*tenor*	*discourse patterns*
stories	plots, settings, characters, themes	pleasure in literature, judgements of characters	literary devices for engaging readers and encoding themes
factual texts	knowledge of social and natural worlds	interest in knowledge	structuring of knowledge, using abstraction and technicality
arguments and text responses	issues, positions, analyses, critiques	negotiation of positions (critical evaluation)	structuring of arguments and evaluation

their moral themes, recognizing the diverse literary devices that authors use to engage readers and encode themes and appropriating these devices to write their own stories. For factual texts, their goals are for students to build knowledge of the social and natural worlds in their curricula, to be interested enough in new knowledge to study collaboratively and independently, to recognize the structuring of knowledge and patterns of technical and abstract language in curriculum texts and use these in their writing. With arguments and text responses, goals are for students to understand the issues discussed, positions taken, and analyses and critiques of texts – in order to critically evaluate them and negotiate their own positions, and to recognize and use the structuring of arguments and the evaluative language devices that authors use to negotiate.

The R2L programme includes a set of curriculum genres designed to teach these tasks. Preparing for Reading is designed to engage students in the field and tenor of curriculum texts; Detailed Reading and Joint Rewriting are designed for detailed comprehension, recognition and appropriation of language resources. Planning and teaching of these curriculum genres involves analysis of knowledge genres at the levels of genre, register, discourse and grammar. But these analyses are not independent of the pedagogic activities in which they are delivered. They are not merely linguistic analyses of features of texts, but of the conversation that teachers will have about them with their students. They are informed not only by the knowledge genres of linguistic theory, but by the curriculum genres of classroom practice.

Limits of academic metalanguage

Two issues arise from this approach. One is that current descriptions of register are insufficient to provide an adequate metalanguage for these analyses. Despite extensive research on grammatical, discourse semantic and genre systems, descriptions of register systems remain underdeveloped – even though they are central resources for teachers' analysis and teaching tasks. Along with systems of register across school curricula, descriptions are also needed of the common patterns in which registers are instantiated as discourse and grammar structures. Work in this direction has included Halliday and Martin 1993, publications flowing from the Write it Right project of the 1990s (e.g. Christie and Martin 1997; Cope and Kalantzis 1993; Iedema *et al.* 1994; Martin and Veel 1998; Rose *et al.* 1992), and more recent work (e.g. Christie and Derewianka 2008; Coffin 2006; Martin, Chapter 5, this volume; Martin and Matruglio, Chapter 4, this volume). However a systematized description of registerial patterns across school curricula remains a distant goal.

Secondly, only a fraction of SFL's rich descriptions of grammar and discourse systems are essential for teachers' practice. Much of their detail is only marginally useful for classroom teaching, despite the semiotic labour required for teachers to learn and recontextualize it for their practice (Macken-Horarik *et al.* 2011). This is a factor in the reduction of technicality in SFL books and courses for teachers; but these recontextualizations of linguistic theory reproduce the disjunctions between

theoretical descriptions and teachers' tasks. As a result, teachers who have studied such courses often have great difficulty recalling their detail, and applying it in their practice.[1]

In short, the metalanguage provided by current SFL theory is both too much for teachers to have to learn, and too little for teaching the registers of their curricula. Designing a pedagogic metalanguage that can be more effectively learnt and taught requires decisions about what needs to be brought to consciousness, and what to leave to teachers' and students' intuition – 'leaving it somewhat beyond consciousness' as Kress suggests in the preamble above. What must be brought to consciousness as far as possible are the patterns of register instantiated in curriculum texts, so that teachers can draw students' attention to them and discuss their significance. Useful linguistic knowledge for recognizing these patterns includes the grammar and discourse structures in which they are instantiated. What is less essential are the linguistic systems realized by these structures. These systems are the focus of conscious attention for linguists, while the registerial systems they realize are left in the background. In order to attend consciously to classification of language features, linguistic analysis requires register to be processed more or less unconsciously. Conversely, teaching curriculum registers requires linguistic classifications to be backgrounded – in order to attend to registerial patterns.

A professional learning programme for building metalanguage

Learnable metalanguage

Alongside being useful for their teaching, pedagogic metalanguage must also be designed for teachers to learn. Its design cannot be divorced from the classroom curriculum genres in which it is applied, but nor can it be divorced from the curriculum genres of teacher training in which it is learnt. The R2L literacy methodology is a system of classroom curriculum genres; but the R2L professional learning programme is also a sequence of curriculum genres – a curriculum macrogenre designed to train teachers in pedagogic metalanguage (Rose, Chapter 9, this volume). For these reasons, the description of metalanguage in this paper does not simply reproduce the classifying report genres of linguistic description. Rather it is organized as a meta-procedure for training teachers in the metalanguage. The organizing principles of this text and its constituent procedures are the stratified model of text in context in Figure 10.1 and the *Prepare-Task-Elaborate* cycles of pedagogic activity in Figure 10.2. In Bernstein's terms these are recontextualizing principles, i.e. 'principles of selective reordering and focusing' (2000: 173), by which knowledge about language is re-instantiated from linguistic classifications to pedagogic procedures. This recontextualization at the level of genre is intended to maximize the theory's appliability, not only for teachers designing classroom practices, but for teacher educators designing training programmes and for researchers designing pedagogic theories.

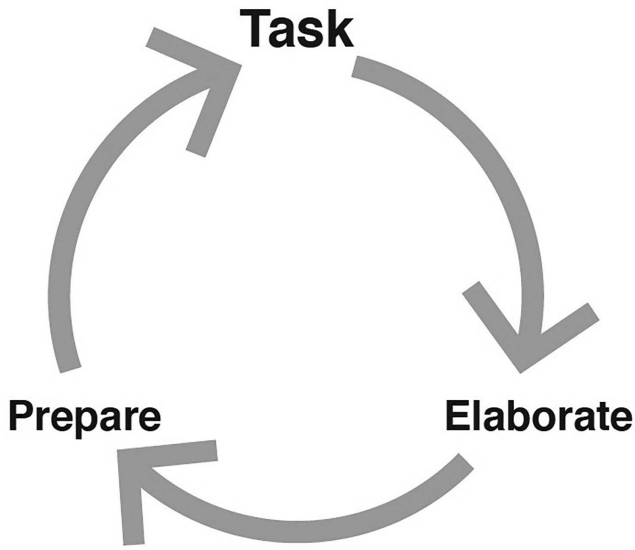


FIGURE 10.2 Structure of pedagogic activity as a learning cycle

Structure of the professional learning programme

The professional learning programme begins by negotiating the learning and language models with teachers, by technicalizing their common-sense intuitions about language and learning in cycles of interaction and elaboration (Rose, Chapter 9, this volume). It then unfolds in four macro-phases, each of which starts from register and builds new knowledge about language, upwards to genre and down to discourse, grammar and graphology (spelling, punctuation).

The first macro-phase leads teachers from register to genre, from the fields of curriculum texts to the genres they realize. Metalanguage introduced in this phase includes the names of genres, their staging and the phases in which a field unfolds through a genre – the plots of story genres, curriculum knowledge in factual texts, issues, positions and evidence in arguments. This phase prepares teachers to practice Preparing for Reading and Joint Construction with their students. The second macro-phase leads from genres and fields of curriculum texts to fine-grained analysis of register in text passages. The focus of explicit metalanguage in this phase is on designing learning cycles; but teachers are also guided in detailed analyses of the patterns in which register unfolds through reading texts. This prepares teachers to practice Detailed Reading and Joint Rewriting, along with Intensive Strategies. The third macro-phase then moves from this close reading of patterns of register to the grammatical structures that realize them. Practice with detailed analysis of reading texts prepares teachers for explicit grammatical analysis, using the metalanguage of functional grammar. This sequence maximizes the intelligibility and usefulness of grammatical knowledge for teachers. The fourth macro-phase once again leads

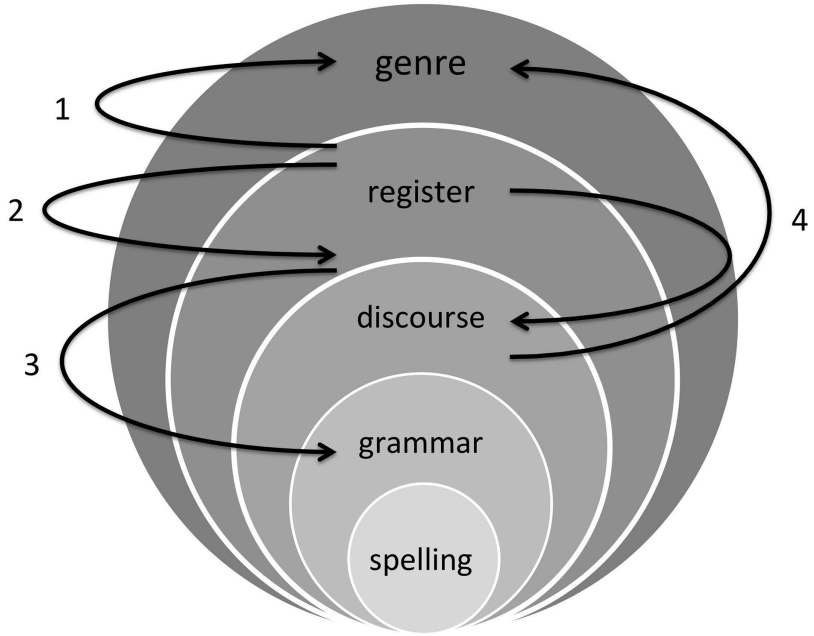


FIGURE 10.3 Steps in building metalanguage for knowledge genres in teacher training

from patterns of register in curriculum texts to the discourse patterns that realize them, and back up to the genre structures they realize. Teachers' prior experience with analyzing and teaching texts supports them to recognize patterns of information, reference, conjunction, lexis and appraisal, and the value in explicating them for students. Learning trajectories from register to other strata are diagrammed for each macro-phase of the programme in Figure 10.3.[2]

Learning knowledge genres by practicing curriculum genres

The first macro-phase of the teacher education programme introduces teachers to the classification and structuring of knowledge genres through guided analysis of register patterns. This is achieved by practicing a series of curriculum genres that involve deconstructing and jointly constructing knowledge genres. The focus of deconstruction is on how the register unfolds through a genre, culminating with naming its stages and phases, and using this metalanguage to construct a new text. Stages of a genre are stable patterns of organization, predictable from the primary social purpose of a text. Phases are more variable patterns in which the register unfolds through each stage, often expressed as paragraphs. Analysis and labelling of phases give teachers explicit tools for analyzing and teaching the register patterns of their curricula, connecting with their existing perspectives on their subjects and teaching goals.

Practicing Preparing for Reading and Joint Construction

Factual texts

The starting point for this macro-phase is with the structuring of register and genre in a section of a secondary school Science textbook. This text is chosen because the field challenges the existing knowledge of most teachers, and so demonstrates for them the effectiveness of Preparing for Reading and Joint Construction. On the other hand, the register and genre structures of this field are relatively predictable, which facilitates their generalization as metalanguage.

Preparing for Reading involves two steps from register to genre. The first step is an overview, that briefly summarizes the field of each sub-heading in the textbook section, supported by discussion of accompanying images. This brings to consciousness the overall structuring of the field in terms accessible for all students. The second step briefly previews each paragraph in turn, before it is read aloud, and then reviews the paragraph by highlighting and discussing key information. This paragraph-by-paragraph reading explicates the details of the field unfolding through each phase of the text. The spoken overview of the text and preview of each paragraph reduce mass and increase presence, thereby enabling students to attend to the field in manageable steps.

Joint Construction involves a further two steps from register to genre, including note making from the source text, and construction of a new text from the notes. Note making re-instantiates the highlighted information as notes that students take turns to scribe on the board and dictate from the text. This reinforces students' control of elements of the field and extends it through discussion of elements. The structuring of the field is then made fully explicit by labelling the functional phases of the notes (for example phases that classify or describe entities and their parts). Joint Construction re-instantiates the information in the notes as a new text that the teacher guides the class to construct, using the labels to structure the text. The genre is then formally named, and labelled with its stages and phases. Again, these activities reduce mass and increase presence thereby enabling students to attend to both register and language choices, as they write the notes and the new text.

The concepts of genre and staging thus emerge from the structuring of a curriculum field as it is negotiated multimodally, simultaneously modelling the practice for teachers to use with their students (see demonstration lesson videos at NESA 2018a). Throughout these activities, attention is continually drawn to discourse and grammar patterns through which the register is instantiated, but they are formally named only when essential, using words familiar to most teachers, such as sentence, noun, verb, conjunction, technical term.

Stories

Genre and register knowledge is then extended to types of stories, their stages and phases. Story phases, such as settings, problems, solutions, characters' reactions and descriptions, are the basic building blocks that authors use to construct imaginative,

engaging plots (Martin and Rose 2008; Rose and Martin 2012; Rose 2006, 2016). Teachers are generally familiar with the Orientation, Complication, Resolution structuring of narratives, but they are guided to recognize the phases in which the plot of a particular story unfolds. The plot is first re-instantiated as a brief oral summary of its phases and the story is read aloud. Teachers are then guided to deduce the technical names for each phase, by generalizing the particular steps in the plot. For example, phases presenting characters and settings are labelled 'setting', unexpected events are labelled 'problem', expressions of emotion are labelled 'reaction'. Tension may be built in a Complication through a series of worsening problems and reactions. Following this deconstruction, new characters, settings and events are discussed, and the same sequence of phases is then re-instantiated in a joint construction using this new field. Where joint construction of factual texts re-instantiates the same field in a new text, joint construction of story texts re-instantiates the same phasal structuring with a new field.

Borrowing the instantial phasal patterns of a story by an accomplished author is a first step in showing teachers and students how to appropriate sophisticated literary resources, from reading into their own writing. Naming story phases is the first step in building a metalanguage for these literary resources, making explicit what must otherwise be recognized and created intuitively. By negotiating general categories from concrete instances in model texts, the technical terms transparently denote recognized functions and are personally valued by teachers. It should be noted that this approach differs from earlier approaches to joint construction, which identified only the stages of model texts, along with selected grammatical features characteristic of the genre. This earlier approach focused on generalizing genre and grammar features from model texts, rather than borrowing their instantial patterning. This has proved effective for learning genres and their staging, but R2L's instantial approach provides more support for appropriating literary resources.

Arguments and text responses

Types of arguments and text responses, and their structuring, are then introduced using the same techniques of deconstruction and joint construction. Using the same strategy of generalizing from instantial register patterns in model arguments, teachers are guided to deduce functional names for their introduction, body and conclusion stages (Thesis, Arguments, Restatement; Issue, Sides, Resolution). They are then guided to identify the phases within these stages – introductions minimally include a position or issue statement and preview of the arguments; bodies include a sequence of arguments or sides of a debate, and each paragraph includes a topic and elaboration, with various options for elaborating; conclusions include a review of the text, and a restating or resolving sentence. New arguments are then jointly constructed following the same phases with new issues and positions. The technique is also practiced with text responses, deconstructing the stages and phases of model interpretations, and using the same phases to jointly construct new responses about different literary texts.

Maths procedures

Finally, genre/register relations are explicated for procedures. Teachers first identify various curriculum activities involving procedures. They are then guided to recognize the procedural structuring of mathematics teaching (whereby each type of maths algorithm involves sequences of steps, that teachers model by demonstrating with worked examples). The complexity of learners' tasks, in following and remembering these elaborate oral procedures, is thus brought to consciousness and teachers come to recognize why some students are less able than others to apply the procedures successfully with their maths problems. This counters the pervasive notion of innate 'maths abilities', which detracts attention from the development of more effective teaching practices (Lovstëdt and Rose 2015; Rose 2019b). The solution is for teachers to plan the precise wordings they will use to explain each step in the algorithm, and demonstrate it using these wordings. The activity is repeated with other worked examples, with the teacher asking students to say each step, and adjusting their responses to the planned wordings. The procedure is then jointly constructed on the board (see demonstration lesson videos at NESA 2018b). This is particularly effective for teaching maths algorithms, but may be used with any type of proceduralized activity.

The detailed structuring of the field unfolding through a procedure is made conscious for teachers by jointly constructing a lesson plan for a maths algorithm. The lesson plan consists of steps in the procedure, questions to ask of students at each step and steps in a worked example that will be written on the class board. Teachers are guided to precisely identify the wordings required for each step in the procedure, which are written as generalized commands. Questions are then designed for students to identify particular values in the example problem, for the general categories in each step. For example, a step may be 'Write the second number under the first number', for which the question will be 'What is the second number?' These values are written for each step in the third column.

Generalizing metalanguage from instantial patterns

Each of these teacher training curriculum genres uses the strategy of identifying instantial register patterns in a particular text, and then generalizing them to label the stages and phases of knowledge genres. The activities for factual texts, stories, arguments and text responses simultaneously introduce teachers to this knowledge about register and genre, and model the classroom curriculum genres that teachers will use with their own students. The activity for procedures models the lesson planning genre, but leaves the classroom curriculum genre for teachers to practice themselves. In terms of presence, the strategy cycles between here-and-now instances and abstract semiotic categories, between negotiated activity and factual knowledge, and between implicit reference to shared texts and explicit categories of theory.

Identifying knowledge genres

Mapping knowledge genres of school curricula

Introducing the concepts of genres, their stages and phases through negotiated practice prepares teachers to identify the primary knowledge genres across school curricula. They are presented with the taxonomy in Figure 10.4, which is presented as a map of the kinds of texts that students are expected to read and write in school. This diagram is the starting point for teachers' lesson planning, which entails identifying the types of text they have selected for reading or writing tasks.

Options for social purpose

This network of relations is re-instantiated orally ('unpacked') as a series of choice points or questions, prepared by increasing presence and decreasing mass. The key question for teachers is the primary social purpose of texts, from which the groupings, names and language focus of genres emerge. The purpose of stories is to engage and entertain readers, so the teaching focus is on language that authors use to engage the interest and emotions of readers. News stories are included because they engage readers with a 'lead' event and headline which are then discussed from various angles – so in fact these texts jump around in time. Some key questions include: If a story is sequenced in time, is it organized around a major complication? If so, is it resolved? If not, is its primary purpose to share feelings or judge character?

The primary social purpose of factual texts is to inform, so the teaching focus is on their patterns of information. Chronicles are sequenced in time, but time is punctuated as stages of a life or historical period, rather than the event-to-event unfolding of a story. Explanations introduce cause and effect, including cause/effect sequences, multiple causes for one outcome, multiple consequences from a single cause, and variable effects from various conditions. Reports classify and describe natural and social things, including single things, types of things and parts of wholes. The procedural family includes procedures, such as instructions and maths algorithms, protocols that are not time-sequenced such as rules and warnings, and recounts of procedures, such as experiment reports, case studies or research articles. Thirdly, the teaching focus for arguments and text responses is on the evaluative language that authors use to evaluate texts, issues and points of view. Arguments may argue for one position, or discuss two or more positions. Responses may express personal feelings, evaluate a text, or interpret its literary themes and artistic techniques.

Approached in this way, from fields that are familiar to teachers, each genre system is recognizable, so the initially daunting technicality of Figure 10.5 is reframed as simply organizing and naming what they already know and do intuitively. The task is then elaborated by teachers reading a brief description of the genre system, thus decreasing presence and increasing mass. By these means, teachers' intuitive knowledge about genres is brought to consciousness and technicalized using

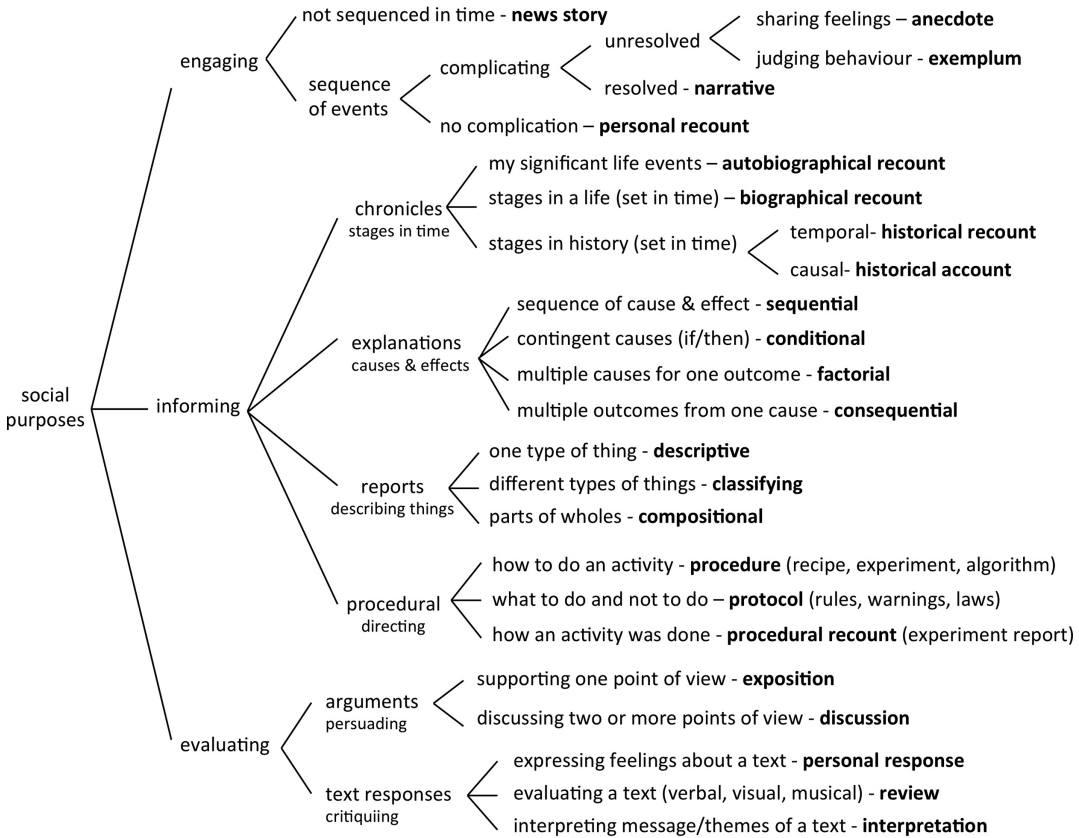


FIGURE 10.4 A typology of knowledge genres for teachers

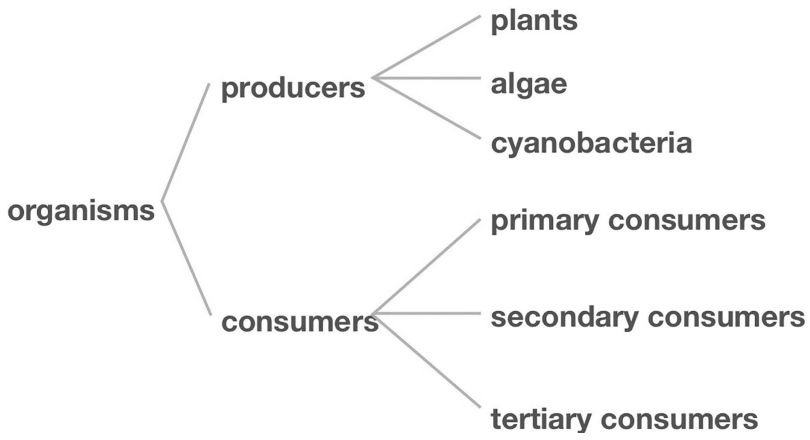


FIGURE 10.5 A taxonomy drawn from a classifying report in Biology

a visual text (preparing) and aggregated in a written text (elaborating). In terms of values, the genre network in Figure 10.4 is valorized as a map of their own practices and as their starting point for lesson planning. It becomes another bonding icon in the R2L programme and in their professional practice.

Analyzing genre and register

Register criteria to identify and analyze genres

Following this overview, teachers' genre knowledge is extended by identifying model texts in each genre family, using register criteria to prepare the tasks of identifying their stages and phases, elaborating the framework with technical terms and generalizing register patterns. The first group examined is stories. The analyses of story phases in a range of exemplars shows how authors deploy them as building blocks for constructing plots that are imaginative, engaging and potentially symbolic of underlying moral themes. Narrative exemplars illustrate variations in building tension through series of mounting problems, intensified with characters' reactions, suspended as people, things or places are described, and released with solutions. Other exemplars are extracted from adult novels to illustrate how moral themes are developed through evaluative phases (reactions, comments, reflections), providing explicit analyses for identifying and interpreting such literary themes. Children's picture books are analyzed to show how patterns such as setting, problem, solution are repeated and varied through a series of episodes, illustrating how authors use predictability as a springboard for novelty.

As the fields of factual texts tend to be the organized structures of academic knowledge, their phases are generally more predictable. The starting point is biographies, as their fields are specific and non-technical, and their structure is fairly

regular. An Orientation typically presents the person's birth date and place, their early life, family and fame; this is followed by a Record of their life, in which each text phase typically presents a life stage. Once this structuring is recognized in biographies, it is easy to see similar patterns in historical recounts, which begin with the historical Background of an event or institution, followed by a Record in which each text phase typically presents a temporal stage in the history. This analysis illustrates relations between the structuring of curriculum fields familiar to teachers, such as historical stages, and the structuring of genres, as generic stages and phases.

Genre/knowledge relations are then extended to the causal logic of explanations. In a sequential example, teachers identify the phenomenon being explained (which may be a technicalized process in natural or social sciences) and then label the steps in the explanation sequence. In the factorial example, they identify the outcome being explained and its causal factors. In the consequential example, they identify the cause and its various consequences. And in the conditional example, the various alternative conditions and effects are identified. The staging of each type is named simply as Phenomenon and Explanation, but with phases differing between each type.

Analysis of reports begins with a descriptive report about a type of an animal, in which phases such as appearance and behaviour are identified; this is then compared with typical phases in other fields, such as population and topography in geographical reports. Teachers then identify the types described in a classifying report and parts described in a compositional report – providing a platform for discussing the organization of school knowledge as classes and members, and as wholes and their parts. Relevant taxonomies are then jointly constructed from the texts, illustrating how to explicitly teach students about relations between oral common sense and written school knowledge (see example with the water cycle in NESA 2018a).

Analysis of arguments reprises the deconstruction practiced earlier, identifying opening statements, previews and reviews, topics and elaborations, and the internal conjunctions used to structure these text phases. Relations between arguments and curriculum fields are discussed in respect to lesson programming, as writing of arguments is planned to follow on from research on an issue, from which positions and evidence are drawn. Similar genre/field relations are also drawn on for text responses, that are written following the study of literary, artistic or musical texts. The structuring of arguments and text responses is compared, pointing out similar patterns of logical relations and evaluation. These factors are linked to teachers' existing perspectives, as these genres are traditionally subsumed as 'essays' (with familiar introduction-body-conclusion staging, and the topic-elaboration phasing of paragraphs).

Register criteria to identify and analyze genres

The analysis of phases across genres is more detailed than work on texts in the first generation of genre analysis which explicitly named only their stages. This was sufficient in early genre writing pedagogy, which was initially developed from

analyzing short texts written by primary school students. But since the recognition of phases was left to intuition, some indeterminacy in labelling arose. For example, Labov and Waletsky's 1967 description of short oral narratives recognized an Evaluation stage between Complication and Resolution stages. But analysis of written narratives reveals far more elaborate patterns of problem and reaction phases within Complications. Amongst explanations, factors and consequences were originally labelled as genre stages, whereas phasal analysis treats them as types of phases within the Explanation stage. Although the phases of arguments were often identified informally (for example position statement, preview, topic and elaboration), they were not formally recognized as phase types.

The R2L approach provides a higher level of support for students to recognize and appropriate instantial patterns of register and genre in curriculum texts. Phasal analysis is an essential component of this methodology. The associated metalanguage is also designed to be as learnable as possible – using the curriculum genres outlined above, generalizing phase types from register patterns in each genre, and using distinct labelling for phases (with lower case) and genre stages (with initial caps). Table 10.3 sets out some common terms for knowledge genres, their stages

TABLE 10.3 Some common terms for knowledge genres, stages and phases

family	*genre*	*stages*	*phases*
story	recount, narrative, anecdote, exemplum, news story	Orientation, Record of Events, Complication, Resolution, Evaluation; Lead, Angles	setting, problem, reaction, description, solution, comment, reflection
chronicle	biography, autobiography, history, recount/account	Orientation, Background, Record (Life Stages)	(life/history) stage
explanation	sequential, factorial, consequential, conditional	Phenomenon, Explanation	step, factor, consequence, condition
report	descriptive, classifying, compositional	Classification, Description	appearance, behaviour, habitat, type, part…
procedural	procedure, protocol, procedural recount	Aim, Method, Results, Discussion	ingredients, equipment, materials, hypothesis, steps…
argument	exposition, discussion	Thesis, Arguments, Restatement; Issue, Sides, Resolution	preview, review, topic, elaboration, evidence, example, point…
text response	review, interpretation	Context, Description, Evaluation; Evaluation, Synopsis, Re-evaluation	themes, technique, preview, review, topic, evidence, example…

and phases that are useful for schools. The names provided for phases are by no means exhaustive.

Analyzing student texts

The final step in this first macro-phase of the programme is to introduce a procedure for assessing students' writing. The assessment uses 14 criteria at the levels of genre: purpose/staging; register: field/tenor/mode; discourse: lexis/appraisal/conjunction/reference; grammar (accuracy and complexity); graphic features: spelling/punctuation/presentation. Each criterion is simply scored 0–3 (absent/weak/good/excellent). Teachers assess their students' writing by comparison with exemplars for each stage of school that have been assessed and scored at a high level for the stage. Exemplars are provided for stories, factual texts, arguments and text responses.

The previous guided experience with analyzing genres, stages, phases and register provides the foundation for this next step in analysis. The writing assessment is designed for teachers to start text analysis without formal training in linguistic systems. They can now readily evaluate students' control over genre and staging. Field, tenor and mode criteria are assessed for each genre, as outlined in Table 10.2 above. Teachers look for imaginative plots, engaging readers in stories; technical knowledge, presented objectively in factual texts; positions and evidence, persuading readers in arguments; themes and techniques, analyzed and evaluated in text responses. The realizations of these dimensions in discourse are physically highlighted in the text. With a little guidance, teachers can readily distinguish ideational lexis from appraisal items, conjunctions and reference items, and make rapid judgements about students' resources. The grammar criterion is not concerned with scoring specific types of grammatical structures, but with an overall score for their accuracy and variety – which teachers can readily judge by comparing writing samples.

Writing assessment is an effective pathway into text analysis for teachers. They are motivated by their interest in their own students' writing; it extends and explicates their existing assessment practices, which are often explicitly focused on lower level criteria, but leave genre, register and discourse criteria implicit; it fleshes out the stratified language model introduced at the start of the programme; and it gives teachers an explicit but relatively simple metalanguage they can use and share with their students. It also gives them an accurate tool for measuring the growth in their students' language resources, as units of work unfold.

Analyzing register in planning detailed reading lessons

The second macro-phase of the programme introduces teachers to the complex curriculum genres of Detailed Reading and Rewriting. Detailed Reading supports all students to read a passage from a reading text with detailed comprehension of its field and to recognize the author's language choices. The teacher previews a sentence, reads it and prepares students to identify each of its wordings in turn, with simple meaning cues. Students identify the wordings and their meanings are then

elaborated. These cycles continue for each sentence in the text passage. In Joint Rewriting, students are guided to appropriate what they have learnt from Detailed Reading in order to write a new passage. For factual genres, the teacher guides the class to create new sentences from notes taken from the passage. For stories, arguments and text responses, the same grammatical patterns as the Detailed Reading passage are rewritten with a new field, deepening students' skills in appropriating written language resources.

A metalanguage for register analysis

Analyzing language patterns in knowledge genres

The primary focus of metalanguage in this phase is on the analysis and planning of these pedagogic activities. It begins by analyzing pedagogic activities in a variety of contexts, building the metalanguage for analyzing and designing learning cycles (Rose, Chapter 9, this volume). This metalanguage is then used for planning Detailed Reading lessons. But this lesson planning also involves a close analysis of language patterns in the knowledge genres under focus. Rather than using the technical terms of SFL for labelling these patterns, they are approached from the perspective of register. As for the genre/register analyses described above, this connects directly with teachers' perspectives on their curricula and avoids overloading them with linguistic technicality while they grapple with designing their classroom discourse.

Analyses are framed in terms of 1) the pedagogic phases of preparing students to identify wordings and elaborating their meanings, and 2) levels of reading task related to language strata (namely 'literal comprehension' of items in sentences, 'inferential comprehension' of discourse semantic relations, and 'interpretive comprehension' of the register). Preparations tend to focus on literal meanings; elaborations focus on inferential and interpretive meanings.

Preparing and elaborating language patterns

With stories, the focus of Detailed Reading is on expansions of meaning that engage the reader in the story's plot – the 'literary language' of written stories. The analysis is briefly illustrated with the following passage from Roald Dahl's *Fantastic Mr Fox* (1998: 12). A few wordings to focus on are underlined.

> He crept a little further out of the hole… then further still. He was almost right out in the open now. He took a last careful look around. The wood was murky and very still. Somewhere in the sky the moon was shining.
>
> Just then, his sharp night-eyes caught a glint of something bright behind a tree not far away. It was a small silver speck of moonlight shining on a polished surface. Mr Fox lay still, watching it. What on earth was it? Now it was moving. It was coming up and up… Great heavens! It was the barrel of

> a gun! Quick as a whip, Mr Fox jumped back into his hole and at that same instant the entire wood seemed to explode around him. Bang-bang! Bang-bang! Bang-bang!

Two general types of preparation cues are used. If items are familiar to students, a 'wh-cue' may be used, giving a general category of meaning (*who, what, what doing, when, where, how*) from which students identify the particular wording. But if the words are unfamiliar, a more familiar synonym or paraphrase is given, so students can recognize the meaning.

The items *just then* are familiar, so the preparation cue is 'when' (Mr Fox saw the light). The elaboration then guides students to infer the temporal relation to the preceding setting, 'just when?', i.e. 'what was happening just then?' Likewise, *eyes* is a familiar item, so the preparation is 'what part' (of Mr Fox saw the light). The elaboration then guides students to interpret *sharp night-eyes*, in relation to both the setting (the murky wood) and foxes' abilities to see in the dark.

In contrast, *caught a glint* is a potentially unfamiliar idiom, so the preparation is its transferred meaning, 'he just saw a tiny light'. The elaboration then defines the word *glint*, and explains the idiom. *Something bright* is familiar so the preparation is 'a glint of what', and the elaboration then interprets whether Mr Fox knew what the *something* was. The locations *behind a tree* and *not far away* are familiar so the preparations are 'where' (the *something* and *tree* were). The elaborations interpret whether Mr Fox could see what it was, and how he would feel if it was close by. By these means, each item is made comprehensible within the unfolding register – including the setting and events, and the character's emotional reactions.

Useful perspectives on these pedagogic processes are provided by Maton's model of semantic waves (Chapter 3, this volume), which Martin (2016) re-interprets as 'powering up and down' in pedagogic interactions. Where Martin's focus is on the 'power words' and 'power grammar' of technical texts, the focus in *Fantastic Mr Fox* is on implicit connotations of the author's language choices, along with words and idioms that may be unfamiliar for students. As Martin shows for Detailed Reading of a science text, preparations tend to 'power down' in semantic density (mass), while elaborations may 'power up' to define words or interpret connotations, or 'power down' to relate to students' experience.

Detailed register patterns in stories, factual and evaluative texts

Detailed register patterns in stories

The *Fantastic Mr Fox* analysis just reviewed reveals the density of meanings in this apparently simple sentence, and the complexity of the reading task – although Dahl's target readership is 7–9-year olds. While some of these readers may be able to interpret the field with general comprehension, few would recognize the significance of each item; and others would struggle with items like *sharp night-eyes* and *caught a glint*.

Detailed Reading manages this density by preparing each item in turn, and then interpreting its contribution to the register of the text. In terms of presence, the field of preparation phases is congruent with students' everyday experience (*saw a tiny light*); while elaborations may unpack abstract wordings (e.g. the idiom *caught a glint*). Similarly, tenor is negotiated in preparation phases (*can you see the words?*) while elaborations may be factual (defining, *a glint is a tiny bit of light*, or explaining, *foxes have special eyes that can see in the dark*). For mode, preparations focus on the shared context of the shared page (*the first two words tell us when*) while elaborations focus on the register implied by the text (*what was happening just then*), thus making implicit fields explicit.

Preparations thus enable the weakest students to succeed with each task of identifying wordings, while elaborations provide detailed comprehension of the text's unfolding register, and the reasons the author has chosen each element of meaning. These understandings are well beyond the normal conscious recognition of any student, but Detailed Reading makes them accessible to all.

The complexity of this teaching activity, and the analysis required for its planning, is also far beyond the tools provided by functional grammar. What is perhaps relevant to grammar is the realization of each element of meaning as a word group or prepositional phrase; but a transitivity analysis of process, participants and circumstances is both too general and too abstract to be of any use for students comprehending the register. Furthermore, metaphors and idioms like *caught a glint* resist a simple grammatical parsing as their transferred meanings span across grammatical units. Rather, in planning and teaching a text, each element of meaning must be analyzed and interpreted from the perspective of register.

Register patterns in factual texts

For factual texts, the focus is on information about the field, and how it is built up and related lexically and logically – as in the following physics definition.

> Gravitational potential energy is the potential energy that an object has because of its height and mass. The higher the object is, the more gravitational potential it has. And the more mass an object has, the more gravitational potential it has.

Preparations for texts of this kind depend partly on prior knowledge, including previous lessons about the technical field; elaborations then define, explain and discuss new knowledge about the field. If *potential energy* had been previously defined as 'stored energy', the first preparation could be 'type of stored energy'. The elaboration then defines *gravitational*. As *height and mass* are familiar, they can be prepared as 'two conditions', and elaborated as 'how high the object is above the earth' and 'how much matter the object contains'. In the next sentences, *higher the object* and *more mass* can be prepared as 'first condition' and 'second condition', and *more gravitational potential* as 'effect'. The elaboration could then discuss possible

effects on objects of more or less gravitational potential energy, recontextualizing the technicality in students' sensory experience.

Register patterns in arguments and text responses

With arguments and text responses, the focus is on patterns of analysis and evaluation – as in the following interpretation of Steinbeck's *Of Mice and Men*.

> The literary power of *Of Mice and Men* rests firmly on the relationship between the two central characters, their friendship and their shared dream. These two men are so very different, but they come together, stay together and support each other in a world full of people who are destitute and alone.
>
> Preparations reconstrue abstractions in familiar terms, and elaborations unpack the abstractions. So *literary power* could be prepared simply as 'the book's strength', and elaborated as 'the effect on readers of its literary language and themes'. The logical metaphor *rests firmly* is prepared with a more familiar paraphrase like 'relies on', and elaborated by unpacking the metaphor as 'building on a foundation'. *Relationship* and *two central characters* are prepared with 'what it rests on', and 'whose relationship', which is then elaborated by recalling the characters' names. *Friendship* and *shared dream* are prepared as 'two parts of their relationship', and elaborated by discussing the importance of these two themes to the novel. *Two men, so very different* are prepared with 'which characters' and 'what like', and elaborated by recalling 'how they are different'. The sequence *come together, stay together, and support each* other is prepared with 'three things they do', and elaborated by discussing the contrast with the men's difference. A *world full of people* and *destitute and alone* are prepared with 'how many people' and 'what like', and elaborated by discussing this third theme in the novel, of social injustice, and the characters' struggle against it.

Guiding teachers to recognize register patterns

Again, knowledge about grammar offers limited guidance for analyzing and teaching these registerial patterns, beyond the clause and group structures that realize them. Systematizing these analyses would require detailed descriptions of register systems, and types of instantial patterning expected for various genres and curriculum fields. In lieu, teachers are guided to analyse sample passages, using the criteria for preparing and elaborating illustrated above, and using their subject knowledge and intuitions to identify patterns of meaning. Their analytic skills rely on their experience with the curriculum subject and texts, and build up through practice in planning and teaching Detailed Reading lessons.

Martin (2013, 2016) and Maton (2013) use the teacher-friendly terms 'power words' to denote technical terms like *gravitational potential* and abstractions like *literary power*, and 'power grammar' for the grammatical metaphor that constructs

and configures them in highly written discourse. Martin (2016) analyses learning cycles in Detailed Reading of technical texts as increasing and decreasing 'power' (in other words mass). Such terms valorize technicality in ways that are sensible and appealing to teachers, pointing to the kinds of metalanguage we need to build for analyzing register.

Grammar structures: from groups to clauses to grammatical metaphor

Priority has been given to register above. But functional grammar is also useful to teachers for four general purposes: 1) recognizing structural patterns of words, groups and clauses that realize patterns of register; 2) recognizing tensions between grammatical functions and lexical meanings in grammatical metaphors; 3) guiding students to use varieties of grammatical patterns in their writing; and 4) guiding language learners to recognize and use grammatical details of English or other target languages. However, the grammatical metalanguage they need is not the same as that designed for linguistics students in functional grammar textbooks. Rather its organization needs re-contextualizing for learning and application in classroom activities. To this end, the third macro-phase of the R2L programme is designed to build knowledge about grammar in four steps, focused on analyzing texts as 1) word groups and clauses, 2) elements of verbal and nominal groups, 3) grammatical metaphor, and 4) applying these analyses in lessons.

Word groups and clauses

Using register patterns to identify grammar patterns

The first step into grammar generalizes patterns of register to identify patterns of wordings. Using their experience with planning Detailed Reading, teachers first highlight items in an extract from a story and factual text. As in the examples above, what they highlight are primarily groups of lexical items, with adjoining grammatical words left unmarked. The lexical items realize the text's field. Each highlighted word group is then labelled with the general terms *people, things, process, place, time* and *quality* (described as semantic elements or message parts in Halliday and Matthiessen 1999; Martin 1992; Martin and Rose 2007). The analysis enables teachers to recognize that sentences are composed of word groups expressing a finite set of general meanings – that construe experience as processes involving people and things, in times and places. They also realize that these are universal semantic categories which even young children recognize intuitively, and which can be interrogated with wh-items.

The identification of word groups and phrases is then formalized by marking their boundaries with a slash – '/'. As these structures have been brought to consciousness through their semantic labelling, teachers have little trouble identifying their boundaries. Clauses are then identified, using the criterion of one process

per clause, and marked with an extra slash – '//'. Clauses can now be defined experientially as a process involving people and things, in places and times; this is a definition that makes sense to teachers and their students. Teachers can also readily distinguish independent and dependent clauses, giving us a set of basic systems for clauses (independent/dependent) and word groups (people/things/process/place/time/quality). These ten terms are immediately useful for guiding lesson planning, and reading and writing activities.

Process types and their limits

Some of teachers' questions that arise during these analyses are related to structural differences among process types, which provides an opportunity for introducing a basic system of process types.[3] Up to this point, teachers have been able to identify grammatical features with minimal guidance, using register to bring grammar to consciousness. With guidance they are also able to recognize basic functional distinctions between material, verbal, mental and relational process types. However, this step shifts the focus of attention from grammatical structures realizing register to the organization of grammatical systems. For many, the change from actively analyzing texts to studying a grammatical system approaches semiotic overload.

This is one factor in the limits of any application of functional grammar in classrooms. Although the process type system is a major feature in grammatical theory, it is not as significant for interpreting register.[4] For example in science, what is most significant are the kinds of relations between entities, classes and qualities, not whether or not a process is relational. In narrative, it is not distinctions among material, mental and verbal processes that are significant, but the events, problems, and characters' reactions and reflections that they realize. The value for literacy teaching of grammatical systems like process types can be outweighed by the semiotic labour required for teachers to learn, remember and recontextualize them for teaching. For this reason, the process type system is only introduced here briefly, but not dwelt upon.

Functions in word groups

Analyzing word groups from register

The second step into grammar focuses on functions within word groups. The patterns made conscious to this point form a platform for distinguishing nominal and verbal groups and prepositional phrases – by reference to the type of register elements they realize (*people, things, process, place, time*), and the word classes that compose them (*nouns, verbs, prepositions*). Each type is then analysed as far as necessary for teachers to recognize and discuss basic semantic functions.

Within each verbal group, teachers can readily identify lexical items that realize the process. This enables a general distinction to be made between lexical and grammatical items, that can be labelled as 'content' and 'helper' words in the

classroom. The functions of grammatical items are then briefly explored. Teachers are guided to identify and name the meanings of time, probability, usuality, obligation and inclination, and the basic values, past/present/future and high/median/low, as well as alternative adverbial and nominal realizations. The grammatical systems are named as TENSE (which most teachers know) and MODALITY (which a few can name); but once again, the details of these systems are not dwelt upon.

On the other hand, the potential of nominal groups for expanding meanings in writing is critical, so their structural functions are each examined and explicitly labelled. Presence is deployed by selecting an entity in the environment, writing its name on the whiteboard and labelling it as Thing. Its identity is then specified with a deictic item labelled Pointer; it is counted with a Number; its qualities are described with Describers; and it is classified with Classifiers. As for text phases, teachers are guided to offer these labels themselves from their functions, modelling the technique to use with their students. Finally, the nominal group is post-modified with Qualifiers and pre-modified with a Focus (see Rose and Martin 2012 for more detail). The meaning potential of prepositional phrases is expanded by identifying various types of prepositional phrase in the text extracts (in addition to time and place). And the functions of common grammatical items including pronouns, conjunctions, prepositions, adverbs and adjectives are described.

Applying metalanguage to analyzing sentences

Finally, these analyses are embedded in pedagogic applications. Sentences from reading texts are written on cardboard strips, and cut up into clauses and word groups (as in the Sentence Making activity (Rose, Chapter 9, this volume)). Word groups are labelled with the type of semantic element they express, and rearranged to see what structures are possible. Extended nominal groups are cut up into words, with each word labelled for its function, and rearranged to explore what is possible. Teachers can use these same activities for teaching grammatical metalanguage with their classes. This metalanguage can then be used in discussions during reading and writing lessons.

Grammatical metaphor

The third step in this phase of the programme brings grammatical metaphor to consciousness. Metaphors are first defined as wordings whose literal meaning differs from their inferred meaning, using examples of lexical metaphors (following the model of Halliday 1994). Examples of lexical metaphors are 'wash their hands in innocence' or 'fear and anxiety swept over them', that invoke fields from the Bible and a flood, to construe the meanings 'denying responsibility' and 'uncontrollable feelings'.

Once the principle of layered meanings is established, teachers then label word groups in texts containing grammatical metaphors. They discover that the semantic labels they have applied to some word groups, based on the lexical items, differ

from the meaning expected for their grammatical class. For example, *campsite locations were affected by seasonal changes* may be interpreted lexically as 'place affected by time', while the grammar construes it as 'thing (nominal group) affected by thing (nominal group)'.

Teachers then practice unpacking grammatical metaphor in texts, by keeping lexical items constant and rewriting them into congruent grammatical structures. For example, 'people moved their campsites because the seasons changed'. They then recognize that the unpacked version is the kind of spoken paraphrase used in Preparing for Reading, where it is used to prepare students to comprehend a technical or abstract text as it is read.

In reading lessons, teachers can now consciously prepare students to identify metaphorical items by giving their transferred meanings and then elaborate by unpacking the layers of metaphor. They can also start guiding students to package information into metaphors in their writing. These strategies are demonstrated in videoed lessons (NESA 2018a).

Sufficient grammatical metalanguage

The grammatical metalanguage outlined here is sufficient for most literacy applications in the primary and secondary school; it is a 'good enough grammatics' for these contexts (Macken-Horarik *et al.* 2011). The focus is on structures that realize patterns of register, rather than grammatical systems. The only clause rank system briefly touched on is TRANSITIVITY, as its model of experience as process types involving people and things emerges naturally during analyses. Interpersonal and textual grammatical systems are less accessible; they need more semiotic labour to make be brought to consciousness, and involve additional layers of technical terms. For example, analyzing the grammar of mood requires technical definitions for the mood element of a clause (its Subject and Finite functions) and their sequencing rules. On the other hand, speech functions realized by mood, such as statement, question and command, are immediately accessible to common sense. The question is whether it is more useful for teachers to look upwards to the discourse structures of their classroom exchanges, or downwards to the grammatical structures of mood systems.

It is possible to touch on both MOOD and MODALITY, while exploring the structures of verbal groups (noted above). But it is crucial not to overload teachers with the complexity of these grammatical systems, so that comprehension and memory is drowned in detail. MODALITY is better understood as a resource for evaluation in texts, alongside other appraisal resources. Similarly, the textual functions of THEME can only be understood in the context of organizing information in texts; so THEME is more meaningfully addressed as a discourse semantic resource, rather than a grammatical system. Grammatical distinctions among these systems are important to linguists, as they constitute necessary argumentation for SFL's theory of metafunctions. But for teachers such distinctions involve too much information to learn, and provide too little pay-off for their teaching. Table 10.4

TABLE 10.4 Some common terms for discussing grammar in the classroom

clause	independent, dependent; simple/complex sentence (power grammar) doing, happening, saying, sensing, being, having (material, mental, verbal, relational)
word group	people, things, process, time, place, quality (power words)
verb group	time: past/present/future (tense) probability, usuality, obligation, inclination (how likely, often…) (modality)
noun group	Focus, Pointer, Number, Describer, Classifier, Thing, Qualifier
preposition phrase	place, time, cause, means, role, comparison, accompaniment…
word	lexical/grammatical (content/helper) adverb, adjective, conjunction, preposition, pronoun

sets out some common terms that have been found useful for discussing grammar in the classroom.

Discourse structures: organizing, tracking, linking, classifying, evaluating

The fourth macro-phase of the programme introduces the discourse semantic systems of PERIODICITY, CONJUNCTION, IDENTIFICATION, IDEATION and APPRAISAL (Martin and Rose 2007). The approach to grammar reviewed above backgrounds grammatical systems in order to focus on the types of structures through which register patterns are realized. In contrast, discourse systems directly realize patterns of register, so they are more accessible to conscious recognition and application. Through the writing assessment (outlined above), teachers have already been introduced to CONJUNCTION, IDENTIFICATION, IDEATION and APPRAISAL, and have practiced identifying their features in students' texts. Basic paradigms of options are now presented for each system, and used to identify features in texts of various genres – revealing their distinctive roles and patterns in different genres. Options for applying these patterns in reading and writing lessons are then discussed for each system. Teachers' induction into the discourse semantic systems is thus directly linked to the curriculum genres in which they will be applied in the classroom.

Information patterns

A natural starting point for exploring discourse systems is with the organization of information in texts (PERIODICITY). As argument genres have already been explored from the perspective of stages and phases, they are now reviewed from the perspective of packaging information. Looking forward, the introductory preview predicts the text structure, topics predict paragraph content; and looking backwards

the concluding review distils the arguments. The text organizing functions of internal conjunctions are also noted, such as *firstly, secondly, in contrast, in conclusion*. A simple paradigm for organizing information is jointly constructed, as in Table 10.5.

Recognizing familiar information structures at text and paragraph levels forms a basis for identifying patterns at sentence level, that are less familiar to teachers. A story is used to show how people are consistently presented as Themes, while places and times as marked Themes signal shifts in story phases. Teachers are guided to highlight the beginning of ranking clauses, up to and including the first person or thing – with the proviso that this identity is sometimes implicit. In this way the concept of clause Themes is readily brought to consciousness, and the function of marked Themes to signal phase shifts becomes apparent. This recognition is then extended by identifying time and place Themes that mark phases in biographical and historical recounts. Teachers can see immediate applications in guiding students to organize stories and chronicles, by appropriating Theme patterns in model texts.

A further step is to identify the function of grammatical metaphor to organize information in abstract and technical texts. The texts that were analysed earlier for grammatical metaphor are re-analysed for Theme and New – revealing how grammatical metaphor is deployed to sequence chunks of information as Themes and News. Teachers then explore similar patterns in other texts, and plan Detailed Reading and Rewriting lessons that will guide students to package information into these patterns.

Items and relations

CONJUNCTION, IDENTIFICATION, IDEATION and APPRAISAL systems are explored by highlighting items that realize them in texts, and discussing patterns of relations between items. IDENTIFICATION and CONJUNCTION are relatively easy starting points, as they are realized by finite sets of items that are familiar to teachers – conjunctions, pronouns, articles, comparatives. The first option in IDENTIFICATION is between presenting or presuming identities, which is revealed as the primary meaning of *a* and *the* (despite other definitions teachers may have encountered for articles). Presuming options include demonstrative, possessive,

TABLE 10.5 A simple paradigm for organizing information

	start		*end*
text	introduction	'body'	conclusion
exposition	Thesis	Arguments	Restatement
discussion	Issue	Sides	Resolution
paragraph	statement preview	topic elaboration point	review concluding
sentence/clause	Theme		New

comparative, pronominal and text reference, all of which teachers find familiar, and can readily identify items in example texts such as narrative dialogue (for complex speaker identification) and text responses (for diverse text reference).

Conjunctions are presented in a basic paradigm that cross-classifies logical relations of addition, comparison, time and consequence, with external conjunctions that connect events and internal conjunctions that organize text, as in Table 10.6. Items are then identified in genres such as stories (for time and addition), arguments (for internal conjunction) and explanations (for consequence). Patterns of explicit or implicit conjunction are also explored. Finally, an expanded CONJUNCTION paradigm is presented on a single page, which can be copied for students' workbooks or classroom posters.

The focus with IDEATION is on lexical items and relations: repetition, synonyms, contrasts, whole/part and class/member relations. The role of lexical repetition in supporting comprehension is examined in children's stories and technical texts, and the use of synonyms is discussed in guiding students to comprehend new concepts and vocabulary. However, the major focus is on the function of whole/part and class/member relations for building fields in curriculum subjects. Items are identified in classifying reports and compositional descriptions, to explore relations of classification and composition. Taxonomies are then drawn (using the items in these texts) that display the organization of fields in natural and social sciences, as in Figure 10.5.

A basic APPRAISAL system is presented that displays options for expressing feelings, judging people and appreciating things (attitudes), alongside options for amplifying and diminishing (graduation), and sourcing attitudes to oneself or others

TABLE 10.6 A basic paradigm for CONJUNCTION

	external	*(connecting events)*	*internal*	*(organizing text)*
addition	additive	and, besides	written	in addition, further
	alternative	or	spoken	well, okay, anyway
comparison	similar	like, as if	similar	similarly, for example
	different	instead of, whereas	different	by contrast, rather
time	successive	then, after, before	successive	first, secondly, finally
	simultaneous	while, as, when	simultaneous	at the same time, still
consequence	cause	because, so	concluding	thus, consequently
	means	by, thus		
	condition	if… then	countering	nevertheless
	purpose	so that, in order to		however

TABLE 10.7 Basic terms for discussing discourse systems

INFORMATION	introduction, conclusion; topic, elaboration, point; Theme, New (power composition)
REFERENCE	presenting/presuming, possessive, comparative, text reference
CONJUNCTION	internal/external, addition, comparison, time, cause, means, purpose, condition, concluding, countering
LEXIS	lexical relations, repetition, synonym, contrast, class, member, whole, part
APPRAISAL	feelings, judgement, appreciation, amplifying, diminishing, source, subjective, objective

(engagement). These basic options are applied to identifying items in a variety of texts. Teachers readily identify both inscribed and invoked items, and this distinction is pointed out. A focus with stories is on how authors engage readers and encode social messages through evaluations of characters' feelings and behaviour. Appreciation and judgement are identified in text responses, displaying how critics evaluate texts and their messages. Patterns of graduation and sourcing are identified in arguments, showing how commentators subtly manipulate positions. Academic texts are also explored for complex patterns of sourcing. The focus is on how accomplished authors deploy these evaluative resources in texts, rather than on the details of appraisal systems. Detailed Reading and Rewriting is practiced on key passages, showing how to guide students to recognize and appropriate these patterns for their own writing. Table 10.7 sets out a few basic terms for discussing discourse systems in the classroom.

Knowledge genres and metalanguage for teaching tasks

Recontextualizing knowledge about language from the academy to teacher education requires more than simply reducing technicality and increasing support for its acquisition. Even if teachers do successfully acquire such a reduced linguistic theory, they cannot then be expected to perform the more challenging task of recontextualizing it into classroom practice. Rather a metalanguage for embedding literacy in curriculum teaching requires a new delivery platform, informed as much by its pedagogic applications as by linguistic and educational theory.

The first step is to recognize that knowledge genres, and each stratum of their realization (i.e. register, discourse, grammar and graphology), come into being only through the curriculum genres in which they are written and read. It is not enough to re-instantiate the curriculum genres of academic linguistics and language teaching traditions in contemporary classrooms, in order to teach components of the language learning task. Rather new curriculum genres are required, such as the teaching/learning cycle of genre writing pedagogy. Just as the pedagogic metalanguage for knowledge genres (their names and stages) emerged from the transdisciplinary dialogue of linguistic analysis and pedagogic design, so the metalanguage

outlined in this paper has emerged from analyzing each component of the tasks of reading and writing – and designing curriculum genres for teaching them and a pedagogic metalanguage to serve them. The design includes not only the curriculum genres and metalanguage for the classroom. Equally important are the teacher training curriculum genres through which teachers construe this knowledge, described in the accompanying paper (Rose, Chapter 9, this volume). And the metalanguage is designed not only to be teachable in the classroom, but learnable by teachers in their training.

This design is by no means complete. The largest gap in our metalanguage is the systems and instantial patterns of register that vary by genre, curriculum field and stage of schooling. Mapping these patterns and designing a registerial metalanguage that is learnable for teachers and appliable in the classroom is a challenging research task. But the payoff will be an ever-growing relevance for functional linguistics in education.

Notes

1 Teachers participating in R2L training programmes are routinely asked if they have studied courses in functional grammar. They are also asked what they remember of these studies and what they apply in their teaching. Very few are able to recall more than a little about process types and modality. Fewer still use this knowledge in their teaching.
2 Graphology is practiced throughout R2L writing activities.
3 This approach helps to avoid the erroneous notion that transitivity is about types of verbs. One source of this notion seems to be genre materials that focus on grammar features such as verbs. The significance of relational processes is not the verb but the relations they express; for saying and sensing it is what they project and how.
4 Halliday (2013: 35) makes a similar point that register cannot be interpreted directly from grammar:

> I'm a grammarian; so I can't help observing that the verb *launch* represents a material process, one that is 'effective' (that is, having two participants, an Actor and a Goal), and in which the Actor is human and the Goal is an artefact, one designed to move across water (in other words, a boat). The process of launching consists in shifting the boat from where it has been built to where it is going to work: from land to water… But if we say that the Queen of England launched a new luxury liner, she may have performed some material act, like hurtling a bottle of champagne against the boat; but she didn't actually push it. Or rather, she didn't push it materially; she pushed it semiotically. She said something – she performed some act of meaning – which inaugurated the movement of the boat. So even with boats, launching may be a semiotic process rather than a material one.

References

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, research, critique*, Oxford: Rowman & Littlefield.

Christie, F. and Derewianka, B. (2008) *School Discourse: Learning to write across the years of schooling*, London: Continuum.

Christie, F. and Martin, J. R. (eds) (1997) *Genre and Institutions: Social processes in the workplace and school*, London: Cassell.

Coffin, C. (2006) *Historical Discourse*, London: Continuum.

Cope, W. and Kalantzis, M. (eds.) 1993. *The Powers of Literacy: A genre approach to teaching literacy*, London: Falmer (Critical Perspectives on Literacy and Education) and Pittsburg: University of Pittsburg Press (Pittsburg Series in Composition, Literacy, and Culture).

Dahl, R. (1998) *Fantastic Mr Fox*, London: Puffin Books.

Derewianka, B. and Jones, P. (2012) *Teaching Language in Context*, Sydney: Open University Press.

Doughty, P., Pearce, J. and Thornton, G. (1971) *Language in Use*, London: Edward Arnold.

Dreyfus, S., Hood, S. and Stenglin, M. (eds) (2010) *Semiotic Margins: Reclaiming Meaning*, London: Continuum.

Halliday, M. A. K. (1994) *An Introduction to Functional Grammar* (second edition), London: Arnold.

Halliday, M. A. K. (2012) *Interviewing Michael Halliday: Language turned back on himself*, London: Continuum.

Halliday, M. A. K. (2013) *Halliday in the 21st Century* (Vol. 11), London: Bloomsbury.

Halliday, M. A. K. and Hasan, R. (2006) 'Retrospective on SFL and literacy', in R. Whittaker, M. O'Donnell and A. McCabe (eds) *Language and Literacy: Functional approaches*, London: Continuum, 15–44.

Halliday, M. A. K. and Martin J. R. (1993) *Writing Science: Literacy and discursive power*, London: Falmer.

Halliday, M. A. K. and Matthiessen, C.M.I.M. (1999) *Construing Experience through Meaning: A language-based approach to cognition*, London: Cassell.

Halliday, M.A.K. and C.M.I.M. Matthiessen (2014) *An Introduction to Functional Grammar*, London: Edward Arnold.

Hood, S. (2006) 'The persuasive power of prosodies: Radiating values in academic writing', *Journal of English for Academic Purposes*, 5: 37–49.

Hood, S. (2010) *Appraising Research: Evaluation in academic writing*, London: Palgrave Macmillan.

Iedema, R., Feez, S. and White, P. (1994) *Media Literacy (Write it Right Literacy in Industry Research Project – Stage 2)*, Sydney: Metropolitan East Disadvantaged Schools Program.

Labov, W. and Waletzky, J. (1967) 'Narrative analysis: Oral versions of personal experience', in J. Helm (ed.) *Essays on the Verbal and Visual Arts* (Proceedings of the 1966 Spring Meeting of the American Ethnological Society), Seattle: University of Washington Press, 12–44.

Lövstedt, A.-C. and Rose, D. (2015) 'Reading to learn maths: A teacher professional development project in Stockholm', *Sydney: Reading to Learn,* 1–18. https://www.readingtolearn.com.au/wp-content/uploads/2016/01/Reading-to-Learn-Maths-A-teacher-professional-development-project-in-Stockholm.pdf

Macken-Horarik, M., Love, K. and Unsworth, L. (2011) 'A grammatics "good enough" for school English in the 21st century: Four challenges in realizing the potential', *Australian Journal of Language and Literacy*, 34(1): 9–23.

Martin, J. R. (1992) *English Text: System and structure*, Amsterdam: John Benjamins.

Martin, J. R. (2000) 'Grammar meets genre: Reflections on the "Sydney School"', *Arts: The Journal of the Sydney University Arts Association*, 22: 47–95.

Martin, J. R. (2006) 'Genre, ideology and intertextuality: A systemic functional perspective', *Linguistics and the Human Sciences*, 2(2).

Martin, J. R. (2007) 'Genre and field: Social processes and knowledge structures in systemic functional semiotics', in L. Barbara and T. Berber Sardinha (eds) *Proceedings of the 33rd International Systemic Functional Congress*, São Paulo: PUCSP, 1–35.

Martin, J. R. (2013) 'Embedded literacy: Knowledge as meaning', *Linguistics and Education*, 24(1): 23–37.

Martin, J. R. (2016) 'Exploring content: Building knowledge in school discourse', in L. T. Lai, A. Mahboob and P. Wang (eds) *Multiperspective Studies of Language: Theory and practice*, Beijing: Foreign Language Teaching and Research Press.

Martin, J. R. and Rose, D. (2007) *Working with Discourse: Meaning beyond the clause*, London: Continuum.

Martin, J. R. and Rose, D. (2008) *Genre Relations: Mapping culture*, London: Equinox.

Martin, J. R. and R. Veel (eds) (1998) *Reading Science: Critical and functional perspectives on discourses of science*, London: Routledge.

Maton, K. (2013) 'Making semantic waves: A key to cumulative knowledge-building', *Linguistics and Education*, 24(1): 8–22.

NESA (2018a) *Learning through Reading and Writing*, NSW Education Standards Authority. http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/english-year-10/learning-through-reading-and-writing

NESA (2018b) *Planning for Success on Secondary Mathematics*, NSW Education Standards Authority. http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/planning-for-success-in-secondary-mathematics

O'Halloran, K. (ed.) (2005) *Mathematical Discourse: Language, symbolism and visual images*, London: Continuum.

Painter, C., Martin, J. R. and Unsworth, L. (2013) *Reading Visual Narratives: Image analysis in children's picture books*, London: Equinox.

Pearce, J., Thornton, G. and Mackay, D. (1989) 'The programme in linguistics and English teaching, University College London, 1964–1971', in R. Hasan and J. R. Martin (eds) *Language Development: Learning language, learning culture*, Norwood, N. J.: Ablex, 329–68.

Rose, D. (2006) 'Reading genre: A new wave of analysis', *Linguistics and the Human Sciences*, 2(2): 185–204.

Rose, D. (2008) 'Writing as linguistic mastery: The development of genre-based literacy pedagogy', in R. Beard, D. Myhill, J. Riley and M. Nystrand (eds) *Handbook of Writing Development*, London: Sage, 155–66.

Rose, D. (2010) 'Meaning beyond the margins: Learning to interact with books', in S. Dreyfus, S. Hood and M. Stenglin (eds) *Semiotic Margins: Reclaiming meaning*, 177–208.

Rose, D. (2011) 'Genre in the Sydney School', in J. Gee and M. Handford (eds) *The Routledge Handbook of Discourse Analysis*, London: Routledge, 209–25.

Rose, D. (2015) 'New developments in genre-based literacy pedagogy', in C. A. MacArthur, S. Graham, J. Fitzgerald (eds) *Handbook of Writing Research* (second edition), New York: Guilford, 227–42.

Rose, D. (2016) 'Engaging children in the pleasures of literature and verbal art', *English in Australia*, 51(2): 52–62.

Rose, D. (2017) 'Languages of schooling: Embedding literacy learning with genre-based pedagogy', in *Languages of Schooling: Explorations into disciplinary literacies*, 5(2): 1–31.

Rose, D (2018) *Reading to Learn: Accelerating learning and closing the gap*, Sydney: Reading to Learn. http://www.readingtolearn.com.au

Rose, D. (2019a) 'The Baboon and the Bee: Exploring register patterns across languages', in Y. J. Doran, J. R. Martin and G. Figuedero (eds) *Systemic Functional Language Description: Making meaning matter*, London: Routledge.

Rose, D. (2019b) 'Doing maths: (De)constructing procedures for maths processes', in K. Maton, J. R. Martin and Y. Doran (eds) *Studying Science: New insights into knowledge and language in education*. London: Routledge.

Rose, D. and Martin, J. R. (2012) *Learning to Write, Reading to Learn: Genre, knowledge and pedagogy in the Sydney School*, London: Equinox.

Rose, D., McInnes, D. and Korner, H. (1992) *Scientific Literacy (Write it Right Literacy in Industry Research Project – Stage 1)*, Sydney: Metropolitan East Disadvantaged Schools.

Williams G. (2004) 'Ontogenesis and grammatics: Functions of metalanguage in pedagogical discourse', in G. Williams and A. Lukin (eds) *The Development of Language: Functional perspectives on species and individuals*, London: Continuum, 241–67.

INDEX