Chapter 6
Cognition in Systemic Functional Linguistics

Abstract In this chapter, we first place cognitive systems within the four orders of systems in Systemic Functional Linguistics (SFL). Then we discuss how cognitive linguistics can be approached within the SFL perspective, and differentiate between the knowledge-based approach and the meaning-based approach in studies on language and the brain. We also cover topics like Hopper and Traugott's discussions on language, instantiation and individuation, conceptual metaphor and grammatical metaphor, and the corroboration between SFL and cognitive linguistics. Finally, Christian Matthiessen gives some advice to young scholars in this area for future research.

6.1 Introduction

The present interview examines the place of cognition in Systemic Functional Linguistics (SFL) theory. SFL has often been criticized for not having a "cognitive commitment" (see e.g., Butler 2013) — "a commitment to providing a characterization of general principles for language that accords with what is known about the brain and mind from other disciplines" (Lakoff 1990: 40) or "a commitment not to isolate the study of linguistics from the study of the mind, but to take seriously the widest range of other data about the mind" (Lakoff 1990: 46). Following this commitment, several functional approaches to linguistics have emerged under the label "cognitive linguistics", including Cognitive Grammar, and the different versions of construction grammar. We may also add Simon Dik's Functional (Discourse) Grammar and Robert Van Valin's Role and Reference Grammar. The common argument among these approaches is that principles of linguistic structure need to reflect what is known about human cognition from other disciplines, notably philosophy and psychology. Many SFL scholars would however argue against explaining linguistic structure with reference to assumed cognitive processes. Until most recently, what many cognitive linguists use as evidence is experimental studies from psychology and principles of logic from philosophy rather than empirical observations of what is actually going on in the brain. We now know from neuroscience that language is not represented in the

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brain as forms and structures but as networks of relations between neurons and that linguistic processes in the brain are not really divorced from sensori-motor processes (Lamb 1999; García, Sullivan & Tsiang 2017). This finding resonates with Edward Sapir's (1921: 8) earlier characterization of language as an "overlaid function" or rather "a group of overlaid functions" of the human biological system. Admittedly, some of these insights have now been incorporated into some cognitive linguistic approaches such as George Lakeoff's notable revision of his Conceptual Metaphor Theory as Neural Metaphor Theory (Lakoff 2014).

There is however one fundamental difference between cognitive linguistic approaches and SFL. Most of cognitive linguistics emerged to provide alternative answers to questions posed by Noam Chomsky and the generative linguistics school about language and the mind. SFL however did not evolve as a reaction against Chomsky but in response to a different set of questions — questions that border on social semiotics and social accountability of linguistic science. We can therefore characterize SFL as primarily having a "sociosemiotic commitment", to use a term proposed by Geeraerts (2016: 527). Thus, most of the issues investigated under the label cognitive linguistics are addressed in SFL but as resources of *meaning* rather than *cognition* and many instances of the term "cognitive" in the cognitive linguistics literature can normally be replaced with "semantic" from the SFL point of view.

Nonetheless SFL theory has a cognitive or rather biological agenda from a different point of view from cognitive linguistics. This agenda is to investigate how the brain or generally sensori-motor systems interact in the production, processing and perception of language using insights from neuroscience. In this sense, Halliday and Matthiessen (1999/2006: 606–610) use the term "bio-semiotic systems" to refer to sensori-motor systems. While little work has been done on this agenda directly under SFL (see Melrose 2005), it is fully compatible with Sydney Lamb's Relational Network Theory (Lamb 1999; García, Sullivan & Tsiang 2017), where language is truly treated as an embodied semiotic system. In this interview, Christian Matthiessen explains some of the issues highlighted here. While he recognizes the need for dialogue with other traditions, he discusses the complexities involved in such collaborations, notably the reluctance of scholars in cognitive linguistics to engage with related work in SFL (e.g., Halliday & Matthiessen 1999/2006). We hope that the discussion here will motivate interest in empirical research in the bio-semiotic agenda of SFL and promote cross-fertilization of ideas.

6.2 The Place of Cognitive Systems in the Four Orders of Systems

Isaac Mwinlaaru: Within the ordered typology of systems operating in different phenomenal realms, the four types of system are ordered in increasing complexity from physical systems to semiotic systems. Biological systems are made up of physical systems [physical systems + "life"], social systems are made up of biological

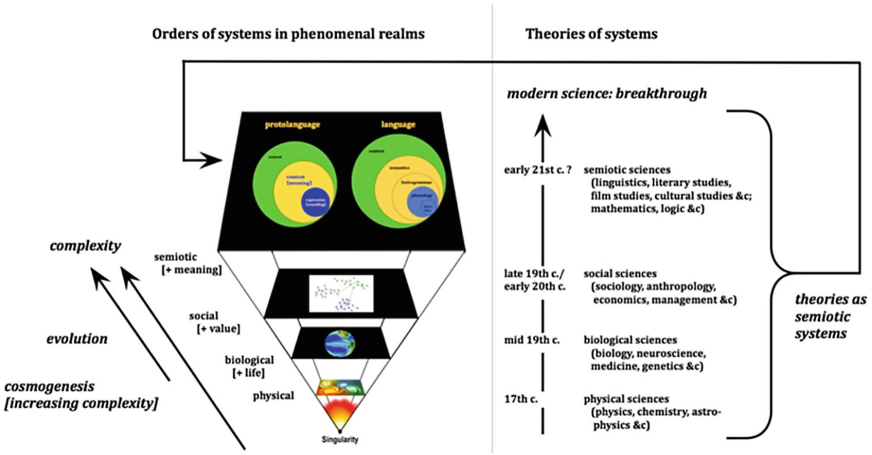

Fig. 6.1 Orders of system in phenomenal realms and theories of systems

systems [biological systems + "value"], and semiotic systems are enacted as of social systems [social systems + "meaning"] (see Fig. 6.1; see also Sect. 8.2). Where would you place the cognitive systems?

Christian Matthiessen: This is a very interesting and important question. If you look at mainstream cognitive science, which began to develop in the 1950s as a kind of macro-discipline (see e.g., Gardner 1985; Miller 2003; Bermúdez 2020),[1] it would be natural to expect that mainstream cognitive science would have been grounded in biological systems, specifically neurological systems. In principle, cognitive systems should be related to neural systems, except that the scientists did not actually engage with neuroscience within ***mainstream*** cognitive science in the first couple of decades. There were a few of related reasons. One was that the techniques of observation in neuroscience were fairly crude in the sense that there was still the tradition from the nineteenth century of observing dead brains with different injuries, identifying regions with different disorders like Broca's area and Wernicke's area. And it was not actually until the early twentieth century that Santiago Ramón y Cajal was able to provide more detailed accounts of neurons, producing very accurate drawings based on a new observational technique and thereby contributing to the foundations of modern neuroanatomy. In the late 1950s, Wilder Penfield (1958) very crudely put electrodes in the brain during brain surgery while patients were still conscious, which, while it was a very invasive technique, made certain observations possible. But it was not the ordinary happy living brain going through daily life. That was certainly a constraint.

Another reason was the development of computer science and the way it took over commonsense metaphors dealing with the mind from ordinary language, and then

[1] The conceptual-temporal map of cognitive science created by Anna Riedl gives a good sense of the macro nature of the enterprise: https://www.riedlanna.com/cognitivesciencemap.html.

elaborated on them in the construction of cognitive models (e.g., Matthiessen 1993, 1998; Halliday & Matthiessen 1999/2006: Chap. 14). Thus computer science worked with the notion of memories as containers, suggesting that things were stored in and retrieved from memories. Of course, these computer-based models were powerful ones up to a point; they were more explicit and more developed than the folk model. But they were still grounded in the commonsense understanding of consciousness — of processes of thinking and other processes of sensing.

Mainstream cognitive science was developed in some degree of isolation from other relevant developments. (1) Neuroscience began to adopt ways of observation that were much more sophisticated (see already Sejnowski & Churchland 1989). Different scanning techniques were developed so that in principle you could observe the brain engaged in daily activities in real time with both the temporal and the spatial resolution necessary.

(2) At the same time, there were scholars who objected to the notion of cognition developed within mainstream cognitive science and emphasized the re-interpretation of the mind as the embodied mind (e.g., Varela, Thompson & Rosch 1991). If you talk about cognition and the mind, you have to realize that it is not just a free-floating kind of computational model, but is actually something embodied. This implies that we have to relate cognition to the biological order of system.

(3) In addition, scholars were beginning to talk about interaction between people, and that led to thoughts about social systems, interactive behaviour and so on — the social mind (cf. Wertsch 1985, who made the work by Lev Vygotsky from the 1930s accessible).

In terms of the ordered typology of systems, a more sophisticated understanding of cognition would indicate that cognition is not only directly related to the biological system (i.e., the brain), but also goes through some kind of mediation within social systems. This suggests that it could be explored as a 4th-order system. When you move to the 4th-order systems, you actually have two alternative interpretative views: the **semiotic** view (if you come from the semiotic tradition) and the **cognitive** one (if you take the sophisticated re-understanding of cognitive systems as embodied in organisms taking on roles in social interaction). So we can represent these views as two alternative conceptualizations of 4th-order systems (see Fig. 6.2).

How do we come to grips with this? In one way, they are just alternative perspectives on the same phenomena. This view is stated at the beginning of our book *Construing Experience through Meaning* (Halliday & Matthiessen 1999/2006) (cf. also Matthiessen 2021a, b). You can think of these 4th-order phenomena in cognitive terms as knowledge (as cognitive processes) or in semiotic terms as meaning (as semiotic processes). Then, one interesting question is: What are the consequences of adopting one view or the other? There is a tendency in cognitive science and cognitive linguistics to explain language in terms of cognition whereas what Michael Halliday and I were trying to say (Halliday & Matthiessen 1999/2006) was: "No, no, no, it is the other way around". The kinds of phenomenon that are evoked when cognitive scientists talk about cognition — how would you explain them? Our answer was that language plays a central role in explaining them. Here Painter's (1999) language-based study of the ontogenesis of "knowledge" is both uniquely important

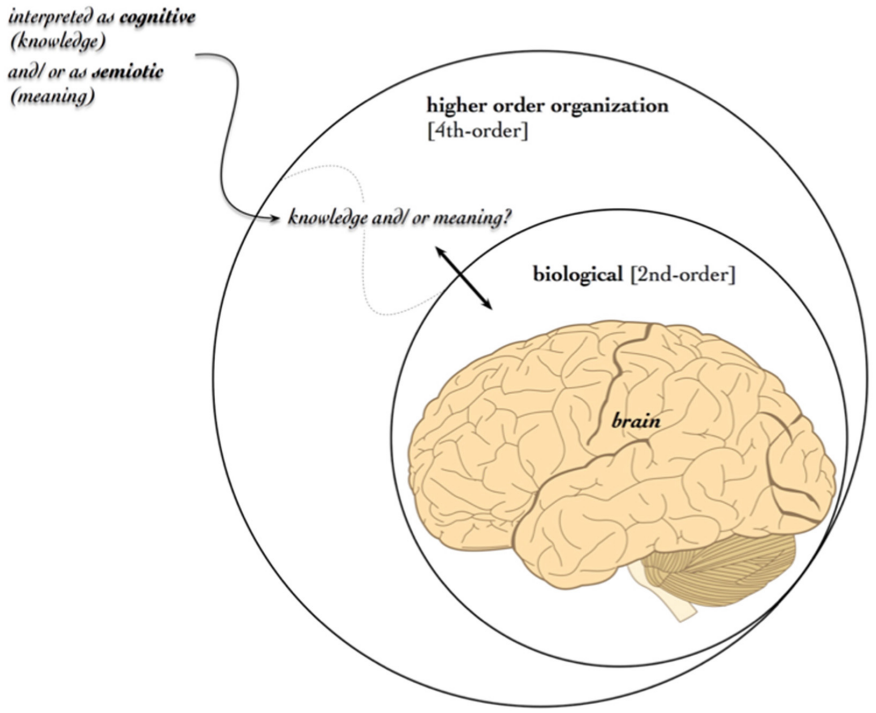

Fig. 6.2 Interpretation of 4th-order systems: as systems of knowledge (cognitive systems) or as systems of meaning (semiotic systems)

in providing empirical evidence drawn from a couple of case studies and stimulating as a model of how to move forward with linguistic studies that shed light on the emergence of "general cognitive principles" and other notions from cognitive science.

There was another trail of exploration: scholars wondered about the source of the complexity of the human brain. There had been various proposals over the years, like tool-making. This proposal fell by the wayside when researchers discovered that lots of our fellow creatures (not only immediate cousins like chimpanzees and bonobos, but also species of birds) actually use tools or even make tools.

Another proposal people tried was general intelligence, but that in itself needs explaining — what could be the source of general intelligence? Among neuroscientists, Terrence Deacon (e.g., 1992, 1997) argues that the only phenomenon of the kind of complexity that could possibly explain the complexity of the brain is language. He holds that language and the brain co-evolved towards increasing complexity.

Here Michael Halliday's (1975a) account of ontogenesis can serve as a model of the gradual development of language as a powerful and complex semiotic system: he identifies three major phases in **ontogenesis** — the process of young children learning how to mean in interaction with their immediate caregivers. The phases are

set out in Table 6.1 together with the correlates I hypothesize in phylogenesis (see Matthiessen 2004). If we propose and explore a phased model of the evolution of language (and other complementary semiotic systems), we do not have to assume that language and the brain emerged full-fledged, with language in its current complexity from the start with a content plane stratified into semantics and lexicogrammar.

As indicated in Table 6.1, I suggest what the phases might have been in human evolution. Phase I, protolanguage, must have had a long history, stretching far back into our primate ancestry. After all, it seems that a range of species have evolved semiotic systems comparable to our Phase I, protolinguistic system, and like human protolanguage during ontogenesis, our ancestors' protolanguages and those of our fellow creatures are likely to have been "multimodal" throughout, e.g., involving both vocalizations and gestures as expressive resources.

The emergence of Phase II out of protolanguage seems to be likely to have occurred with the first burst in brain growth going from *homo habilis* to *homo erectus* around 2.2 to 1.8 million years ago.

Phase II is characterized by a generalization of the microfunctional organization of protolanguage into two **macrofunctions**, the mathetic and the pragmatic, and the gradual emergence of a split of the content plane into semantics and lexicogrammar and of the expression plane into phonology and phonetics (with vocalization taking over as the linguistic expression plane and gesture being transformed into the expression plane of a distinct but closely related and highly coordinated semiotic system, the semiotic system of gesture). During ontogenesis, Phase II is relatively short because young meaners have a model of Phase III to draw on — the mother tongue or tongues spoken around them. But obviously our ancestors did not have a model around; it seems plausible that the transitional Phase II would have lasted over a million and a half years. During this period there are certainly pieces of evidence suggesting continued evolution, like the evolution of our vocal organs (biological) and the "invention" of fire (social).

Then, Phase III language, modern language, emerged with Anatomically Modern Humans (AMHs), i.e., *Homo sapiens sapiens*, 150 to 250,000 years ago. This marks the emergence of "modern" humans — both semiotically modern and biologically modern. The account just outlined is consistent with, and supported by, Deacon's (e.g., 1992, 1997) hypothesis that language and the human brain co-evolved. I would thus interpret "modern humans" as a package deal; they were both AMHs and LMHs (linguistically modern humans).

Then there were of course other lines in early human evolution although only our line has survived, e.g., the Neanderthals, who eventually died out 30 to 40,000 years ago, probably because they lost ground when competing with our nasty ancestors, although there seem to have been many pre-historic versions of Romeo and Juliette. There are many details to take account of, and build into, a reasonably comprehensive account. For example, there has been a good deal of discussion in the literature of what we might interpret as evidence for a burst of socio-semiotic creativity during the Upper Paleolithic period. I touch on a number of these details in Matthiessen (2004), but it is an abridged version of the full manuscript and many new findings have emerged since then. However, while researchers have found evidence of early

Table 6.1 Linguistic phases in ontogenesis and hypothesized in phylogenesis

Phase	Properties	Properties	Ontogenesis	Phylogenesis	
I – protolanguage	Microfunctional	Bistratal [content > expression]	Around 5–8 months of age to middle of second year; starting to crawl	Millions of years ago (far back in primate history)	
II — transition	Macrofunctional	Emergence of stratified content and expression	Around middle of second year of life	Around 2 million years ago	*Homo habilis* (c. 2.2 million years BP), *Homo erectus* (c. 1.8 million years BP) — first significant brain expansion
III — modern language	Metafunctional	Quadristratal [content: semantics > lexicogrammar; expression: phonology > phonetics]	Starting to walk upright	Around 200 K years ago	*Homo sapiens sapiens* (cf. 200 K years ago): AMH — anatomically modern humans & LMH — linguistically modern humans

humans in new places — a process of discovery likely to continue, I don't see any findings yet that would be a reason to change the overall picture that I have suggested.

Even within semiotic systems in general, it is very interesting to continue to think about the emerging complexity and the orders of systems from primary semiotic systems to higher-order semiotic systems. Michael Halliday (e.g., 1995) used these terms, drawing on Gerald Edelman's (e.g., 1992) discussion on brain and consciousness and his distinction between primary consciousness and higher-order consciousness. In other words, the central idea is to link language and the brain without a cognitive intermediary level; it means that language is the human system through which you can understand the emergent complexity of the human brain, increasing with the increasing complexity of language. You could thus talk about the **language brain** or the grammar brain in this respect. In principle, this account is empirically grounded or groundable, which is one of its significant features. So, one of the interesting observations to me is: human language is the one and only human system that is pervasive in the brain, and thus human language (including both spoken and written language) integrates the different parts of the brain (cf. the reference below to Bickerton's 1995 feline example).

6.3 Studying Cognitive Linguistics from the Perspective of Systemic Functional Linguistics

Isaac Mwinlaaru: Scholars in other areas, for instance, Christopher Butler (e.g., 2013), think that Michael Halliday has conflicting and contradictory statements about language and cognition. In Halliday and Matthiessen (1999/2006), you have written that the human brain is the immediate environment of language. Also, Michael Halliday has foregrounded the importance of complementing the "intra-organism" perspective on individuals with an "inter-organism" one, since we are not bounded by the skin as individuals. Building on Firth's (1950) outline of persons and personae, he shows the development of individuals as persons in interaction with social groups (see in particular, Halliday 1978: Chap. 1). This fundamental point is also elaborated by Butt (1991), Lemke (1995) and Halliday & Matthiessen (1999), and challenges "the assumption that a human being is bounded by his skin" (Halliday 1975b). Does it mean that Systemic Functional Linguistics (SFL) is not interested in cognitive linguistics?

Christian Matthiessen: Let me begin by commenting on a central question identified by Butler (2013: 207):

> In my own recent work (see e.g., Butler 2008, 2009), I have advocated the last of these positions, on the grounds that the ultimate goal of functional linguistics should be an account of how people communicate using language, so that the question we should be asking ourselves is one which Dik (1997: 1) proposed was at the centre of functional approaches: 'How does the natural language user work?'. [fn: Hudson (2008: 91) even goes so far as to claim that "by the end of the [twentieth] century the focus had shifted from the language system to the individual speaker's cognitive system".] Dik himself shied away from attempting a full

> investigation of this question, but I believe we should take it literally and work towards an answer in collaboration with colleagues from the full range of disciplines concerned with the scientific study of language.

The question "How does the natural language user work?" is interesting. However, it is certainly not at the centre of functional approaches in general — demonstrably not at the centre of SFL, but one can't claim that it is at the centre of the Prague School — which has had a very rich and varied agenda, and it is not at the centre of Okuda's functional school in Japan. There are many fascinating and urgent questions about language addressed in functional linguistics approaches that are only very indirectly related to this so-called "central question". And to address this "central question", we need to adopt a holistic view of language in the ordered typology of systems operating in different phenomenal realms (Fig. 6.1), and also answer other key questions, e.g., "How do groups of speakers work in speech fellowships?" (cf. the reference to Malinowski's 1935 insights in Sect. 6.6). One of the hallmarks of Halliday's approach to language woven into SFL is the "commitment" to answering a wide variety of questions about language, which means (among other things) that SFL has not been driven by questions that have been claimed to be central at one time or another by one particular linguist or group of linguists. Halliday never accepted Chomsky's central questions about language, and there is absolutely no reason why we should accept "How does the natural language user work?" as being "at the centre of functional approaches". If that question had been at the centre of SFL, there is a vast amount of critically important work that may not have been carried out if researchers had been preoccupied with this "central question". If one linguist or group of linguists have a central question, that's great; but they should not impose it on other linguists. There has been far too much of this kind of attempt to control the agenda since the mid-twentieth century.

Now, let me turn to the question you lead up to: "Does it mean that Systemic Functional Linguistics (SFL) is not interested in cognitive linguistics?" It would be a bit pointed to say that SFL is not interested in cognitive linguistics — and even wrong if we survey the whole varied range of contributions to SFL. There is of course an important difference between interest in the ***phenomenon*** of cognition and the ***framing and study*** of that phenomenon in cognitive linguistics. Many systemic functional linguists have taken an interest in phenomena that have been conceptualized in terms of cognition — including centrally developmental studies, explicitly foregrounded by Painter (1999). Here the approach to phenomena interpreted in terms of cognition is language-based — as also in Hasan (1992), Halliday (1993a, 1995) and Halliday & Matthiessen (1999/2006).

In addition, there is also the strand within SFL pioneered by Robin Fawcett, and clearly reflected in his first major book (Fawcett 1980): *Cognitive Linguistics and Social Interaction.* This strand can be said to represent an interest in cognitive linguistics as a way of framing and studying phenomena that have been conceptualized in cognitive terms. There are certainly opportunities for dialogue — a theme brought out by the extensive metalinguistic study of the functional-cognitive space by Chris Butler and Francisco Gonzálvez-García (Gonzálvez-García & Butler 2006; Butler &

Gonzálvez-García, 2014) and also, already mentioned above, by Butler (2013). It is possible to discern commonalities between functional theories and cognitive ones that are "usage-based" (e.g., Bybee 2010; Goldberg 2006, 2019). At the same time, it is also important to note the complementarity since the 1960s between Halliday in his development of SFL and Lamb in his development of Stratificational Linguistics (with some name changes over the years, more recently "Relational Network Theory"). Lamb's orientation has been towards cognitive and neurological considerations — see e.g., Lamb (1999) and García, Sullivan & Tsiang (2017). Importantly, García and his fellow researchers have also turned to SFL, showing how it can be an active partner in neurolinguistic studies, e.g., García and Ibáñez (2017) and Trevisan and García (2019). Their work goes much further than a general cognitive model that is not grounded in empirical evidence or some notion of "cognitive commitment" (see also Sect. 6.3 below, on different kinds of "commitment").

To understand Halliday's stance, we need to go back to the 1960s, when he faced the growing dominance of cognitive science as a macro-discipline, including the development of cognitive psychology, formal linguistics and psycholinguistics. Psycholinguists during this period tried to investigate those kinds of phenomenon that were often conceptualized in formal generative linguistics through typical laboratory-style experiments. This intellectual environment was not conducive to Halliday — neither methodologically, since he favoured authentic data for various excellent reasons, nor metatheoretically, since he pursued what we can characterize as "systems thinking". He had a much more holistic view of language in relation to other (human) systems, including centrally social ones. You will find this in his *Language as Social Semiotic* (*LASS*) (Halliday 1978), which is a direction-setting collection of papers from the 1970s. This book sets out a thematic area of studies, **social semiotics** — one that is really a complement to cognitive science, and it led to very productive developments, starting in the 1980s (see e.g., Andersen et al. 2015; Matthiessen 2017). Halliday was keenly aware of the need to engage with language also as a social system — more specifically, as a semiotic system that is also a social system, e.g., involving social interactive behaviour, social role systems, division of labour, social hierarchies and value systems. Theoretically, this was a fundamental aspect of language (as it had been for J.R. Firth, e.g., 1950) — not an optional extra to be studied only in a hyphenated branch of linguistics; and, crucially, this conception was needed to support a range of applications, including educational ones. At the time, the realm of social phenomena was largely or even totally absent from, or effaced in, mainstream cognitive science. This is what Jackendoff (1992) has called the "mentalist stance". Let me quote him at some length since the choice of "stance" is of fundamental importance (1992: 2):

> The basic stance of generative linguistics is that we are studying "the nature of language," not as some sort of abstract phenomenon or social artifact, but as the way a human being understands and uses language. In other words, *we are interested ultimately in the manner in which language ability is embodied in the human brain*. Chomsky makes this distinction nowadays by saying we are studying "internalized" language (I-language) rather than "externalized" language (E-language). Generative grammar is not the only theory of language adopting this stance. The tradition of Cognitive Grammar adopts it as well, Lakoff (1990), for instance,

> calling it the "cognitive commitment". On the other hand, a great deal of work in formal semantics does not stem from this assumption. For instance, Bach (1989) asserts Chomsky's major insight to be that language is a formal system — disregarding what I take to be the still more basic insight that language is a psychological phenomenon; and Lewis (1972), following Frege, explicitly disavows psychological concerns.
>
> What about the abstract and social aspects of language? One can maintain a mentalist stance without simply dismissing them, as Chomsky sometimes seems to. It might be, for instance, that there are purely abstract properties that any system must have in order to serve the expressive purposes that language serves; and there might be properties that language has because of the social context in which it is embedded. The mentalist stance would say, though, that we eventually need to investigate how such properties are spelled out in the brains of language users, so that *people* can use language. It then becomes a matter of where you want to place your bets methodologically: life is short, you have to decide what to spend your time studying. The bet made by generative linguistics is that there are some important properties of human language that can be effectively studied without taking account of social factors.
>
> Similar remarks pertain to those aspects of language that go beyond the scale of the single sentence to discourse and narrative. Generative grammar for the most part has ignored such aspects of language, venturing into them only to the extent that they are useful tools for examining intrasentential phenomena such as anaphora, topic, and focus. Again, I am sure that the construction of discourse and narrative involves a cognitive competence that must interact to some degree with the competence for constructing and comprehending individual sentences. My assumption, perhaps unwarranted, is that the two competences can be treated as relatively independent.

It is not hard to understand why the "mentalist stance", as articulated by Jackendoff, was impossible for Halliday to work with — in the 1960s, or in subsequent decades. The "properties that language has because of the social context in which it is embedded" are left out of the picture completely, and the engagement with "those aspects of language that go beyond the scale of the single sentence to discourse and narrative" is, at best, postponed for later consideration. To Halliday, and to systemic functional linguists in general, discourse in context is part of the core of a holistic theory of language. It made absolutely no sense at the time to ignore the social enactment of language. Its social manifestation was, of course, of considerable interest in its own right — in line with the intellectual tradition of Malinowski and Firth. However, if one is interested in the core properties of language, the "nature of language", then bypassing its nature as a social system (as well as a semiotic and a biological system) makes absolutely no sense. Central properties of language are due to its social nature (as Saussure and those following him recognized). This obviously involves the nature of the interpersonal metafunction and its relation to the tenor parameter within context; but it suffuses language in context as a whole.

Of course, there have been significant developments in cognitive science since the 1960s, and even since Jackendoff (1992) characterized the "mentalist stance" three decades ago. Scholars have introduced alternatives to the mainstream, e.g., emphasizing the "social mind" and the "embodied" mind; and the mainstream is arguably quite different from that of the first couple of decades of cognitive science. One source of inspiration and support was Lev Vygotsky (1896–1934), a Soviet psychologist specializing in child development — of the same generation as Benjamin Lee

Whorf (1897–1941), and also a creative scholar who died quite young. While his work had appeared in English already in the early 1960s (Vygotsky 1962), it was not until the 1980s that it began to influence thinking within cognitive science in the West more generally, in large part thanks to Wertsch (1985). (By then, the work on the brain by his student Luria [e.g., 1976] had become well-known in the West, including his theory of the non-localist organization of the brain.)

Vygotsky's view of the relationship between language and cognition was more resonant with Halliday's approach, including the central role he gave to language, related to the view that we are not bounded by our skins. This parallel is brought out in an important volume conceptualized and edited by Heidi Byrnes, *Advanced Language Learning: The Complementary Contribution of Halliday and Vygotsky* (Byrnes 2006) — a point also made by Wells (1994) in relation to Halliday's (1993a, b) steps towards a language-based theory of learning (see further e.g., Hasan 1992; Han & Kellog 2019).

In order to understand the relationship between the development of cognitive science and the Hallidayan strand of SFL, we can contrast the 1960s and the 1990s: see Table 6.2. While there was not much for Halliday and other systemic functional linguists to engage with during the 1960s, the situation had changed significantly by the 1990s. On the one hand, the technology for observing the brain "in action" in non-obtrusive ways had improved dramatically (already by the late 1980s, e.g., Sejnowski & Churchland 1987), therefore new data became available as empirical evidence for neuroscience — and neurolinguistics. Consequently, cognitive models of the mind could be grounded in studies of the brain, and could move away from

Table 6.2 Comparison of the 1960s and the 1990s in terms of emergent activity in cognitive approaches relevant to language (highly selective) and related SFL publications

Decade	Psycholinguistics — language and mind	Neurolinguistics — language and brain	SFL
1960s	Growth of psycholinguistics: experimental studies investigating "performance" (stimulated by generative linguistic accounts of competence)		—
1990s		Improved technology for observing the brain processing language (e.g., Sejnowski & Churchland 1987); central role of language in brain development & evolution: Edelman (1992); Deacon (1992, 1997); Dunbar (1996)	Halliday (1995); Painter (1999); Halliday & Matthiessen (1999/2006)

disembodied accounts based on computational models (cf. Edelman's 1992 incisive critique).

On the other hand, cognitive science had become more theoretically aware of the fundamental importance of the embodiment of the "mind" (e.g., Varela et al. 1991) and of its social construction in interaction with people in social groups (cf. Halliday 1978). I remember Michael and me discussing these developments on various occasions, both leading up to Halliday & Matthiessen (1999/2006) and after its publication. We both liked the formulation by Susan Greenfield, the neuroscientist, who said that if one needed to speak of the mind, the best approach was to think of it as a **personalized brain**.[2]

The developments during the 1990s and the publications they led to — key ones being listed in Table 6.2 — created an aspect of cognitive science that was much more in tune with Hallidayan SFL than the work during the 1960s. We worked on *Construing Experience through Meaning: A Language-based Approach to Cognition* through a good part of the 1990s (going back to joint research we had begun in 1986; see Sect. 4.2). We discussed the developments in cognitive science just noted above and referred to them in our book — also contextualizing them in terms of SFL. This included a section on cognitive linguistics of the Berkeley variety, developed within linguistics by George Lakoff. (In parallel, Kristin Davidse engaged with Ron Langacker's Cognitive Grammar. This has turned into an interesting long-term project, reflected in a number of publications over the years, e.g., Vandelanotte 2009.)

Before leaving your question, let me return to the central role played by experimental studies in psycholinguistics. Here we can consider a Hallidayan principle. It is not just Hallidayan; it is also manifested within the study of phenomenal realms other than that of semiotic systems, as in Heisenberg's (e.g., 1930) observer's paradox — articulated in reference to the observation of physical systems. Once you begin to observe a system, you disturb it. If that is true of physical systems at the quantum level, it is even truer of human systems. So, the techniques, paradigms, hypotheses and experimental methodology that were developed in material sciences cannot be taken over when we move to higher-order systems, as occurred in psycholinguistics. Observation of naturally occurring phenomena becomes much more important, and that was of course established as the central tradition in anthropology, i.e., the ethnographic approach Malinowski pioneered in his fieldwork. Experimentation has very limited value when you investigate human systems. What you will learn (if you do experiment) is what people do under experimental conditions. It may be necessary to set up experimental conditions, especially when we want to investigate the embodiment of language as a biological system. But that is a constraint — although observational techniques have been improving (e.g., Kuhl 2010; Trevisan & García 2019), and we are interested in what they do under natural conditions. As Halliday has pointed out, it is even worse when you experiment with children: you are not likely to get anywhere near the natural development frontier under experimental

[2] See e.g., https://www.youtube.com/watch?v=_QJilnXBcPc.

conditions. So, the kind of experimental approach in the study of language development under the metaphor of "language acquisition" was not likely to yield very interesting results. That was also part of the picture.

6.4 Knowledge-Based and Meaning-Based Approaches Towards Language and the Brain

Isaac Mwinlaaru: In *Construing Experience through Meaning*, there is a statement of your approach towards language and the brain: "our approach contrasts with representations of knowledge in that in our own work the experiential environment of the grammar is being interpreted not as knowledge but as meaning" (Halliday & Matthiessen 1999: 2). You have referred to this as meaning-based instead of knowledge-based. What are the knowledge-based and meaning-based approaches and why do you make this distinction?

Christian Matthiessen: The notion of a **knowledge base** came out of artificial intelligence and computational linguistics — as strands within cognitive science — in the 1960s and it was certainly advanced in the 1970s when people began to find ways of representing knowledge in earnest (for a selection of fairly early influential contributions, see e.g., Brachman & Levesque 1985). The notion of a knowledge base in such computational models can be seen as a conception based on our folk theory of knowledge, and I have tried to demonstrate the same for the conception of the mind in a few different places by analysing the discourse of mainstream cognitive science (Matthiessen 1993, 1998; cf. also Halliday & Matthiessen 1999/2006, in particular Chap. 14). This concept of knowledge comes from generations upon generations of people building up folk models — commonsense models of our experience of our own processes of consciousness (cf. contributions to cognitive anthropology, e.g., D'Andrade 1987; Holland & Quinn 1987). What I suggested was that mainstream cognitive science just took over the folk model rather unquestioningly, and added the computational model of memory, processing, reasoning and inferencing. This model depends centrally on ideational grammatical metaphor, one consequence of which is that the "knowers" are typically effaced. Now, we must obviously make sense of the folk model as part of the world view construed unconsciously over generations within a given speech community and culture. It reflects and construes lived experience and is negotiated by speakers in innumerable exchanges; but it is not a scientific model — anymore than folk models of our experience of the material world are.

If you want to look at our construal of experience scientifically, you of course take seriously the understandings coming through from the collective wisdom embodied in folk theories, in commonsense theories. But then you take a step back and say: "Well, now let's try to understand it scientifically". What we are saying is: "If you try to understand it scientifically, that means understanding it in terms of the resource that enables us to construe our experience of the world around us and inside us, i.e., language". Cognitive scientists try to approach language in terms of cognition;

they try to explain language by reference to cognition. However, we would put it the other way round: the only way that they can explain cognition is by reference to language and, of course also to other semiotic systems (including bio-semiotic ones), but language is the most powerful, so most complex, human semiotic system.

Again, the fundamental question we face is where the construal of experience comes from in the life of an individual. Here, one could make more connections with Vygotsky (e.g., Vygotsky 1962; Wertsch 1985; Byrnes 2006). The folk notion is in some sense "inside-out" — reflected in a whole cluster of lexicogrammatical metaphors like putting thoughts or feelings into words (e.g., *It is never easy to put thoughts into words.*), which means that cognitive structures are externalized — i.e., we can analyse them by observing their "products" such as language. The Vygotskyan notion is "outside-in", which means that children develop their cognitive structures with the resources of language and other semiotic systems mediated through social systems (cf. Hasan 1992). That is how they build up a more internal representation always in interaction with others. Thus, children build up an internal representation of experience always in interaction with others — from the "outside".

This is exactly what the ordered typology of systems — semiotic > social > biological > physical — enables us to apprehend and theorize because the internal organization is not just biological, but also social, which means constructed through interaction in groups. Thus, the semiotic system involves not just an organism with a brain but a person in different role relationships with other persons in a range of social groups. This follows from the ordered typology of systems we have proposed (see Sects. 6.1 and 8.2). That is, semiotic systems have properties unique to them, but they also "inherit" the properties of social systems (since they are enacted in social systems). And they inherit the properties of biological systems too (since they are embodied in biological systems) and of physical systems (since they are ultimately manifested physically). This feature of the ordered typology of systems is foregrounded in Fig. 6.3.

In the literature, we find many titles that include "the social self" and "embodiment". They generally reflect significant advances over "mainstream" cognitive science as it began to take shape in the 1960s after the pioneering contributions in the 1950s by Herb Simon, George Miller, Noam Chomsky and other scholars who were instrumental in getting it started. However, these advances could actually have been part of the picture from the start if something along the lines of an ordered typology of systems had been considered — cf. the contributions by Lev Vygotsky, George Herbert Mead, Gregory Bateson that were, in principle, available during the early stages of cognitive science (and by another route, Bronisław Malinowski and J.R. Firth, with the emphasis on context and on persons as aggregates of personae).

Working with the account diagrammed in Fig. 6.3, we can have certain "commitments" that can be made in developing a theory of language (and descriptions of particular languages). I'm using Lakoff's (1990) term here simply because it may be helpful to compare what I'm about to say with what he says (p. 40):

> For me, cognitive linguistics is defined by two primary commitments, what I will call the Generalization Commitment and the Cognitive Commitment. The generalization commitment is a commitment to characterizing the general principles governing all aspects of human

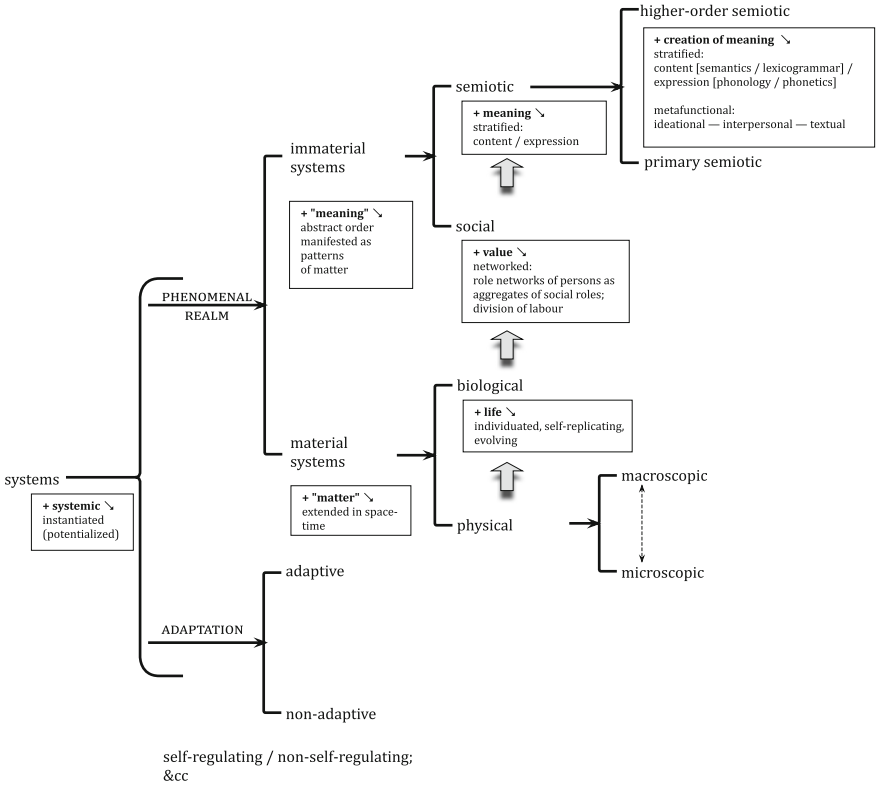

Fig. 6.3 Ordered typology of systems (material: physical, biological; immaterial: social, semiotic), showing that higher-order systems inherit the properties of lower-order ones

language. I see this as the commitment to undertake linguistics as a scientific endeavour. The cognitive commitment is a commitment to make one's account of human language accord with what is generally known about the mind and the brain, from other disciplines as well as our own.

The generalization commitment comes with a phenomenological characterization of subfields in terms of the kinds of generalizations required:

In syntax: Generalizations about the distribution of grammatical morphemes, categories, and constructions.

In semantics: Generalizations about inferences, polysemy, semantic fields, various kinds of semantic relationships, conceptual structure, knowledge structure, and the fitting of language to what we perceive, experience, and understand.

In pragmatics: Generalizations about speech acts, discourse, implicatures, deixis, and the use of language in context.

And so on, for morphology, phonology, etc. Of course, no a priori commitment is made as to whether these are separate subfields. It is an empirical matter, and empirical considerations suggest that they are not — that, for example, generalizations about syntax depend on semantic and pragmatic considerations.

> The cognitive commitment forces one to be responsive to a wide variety of empirical results from a number of disciplines. Examples include:
>
> Categorization results from cognitive psychology, developmental psychology, and anthropology that demonstrate the existence of basic-level categorization and prototype effects.
>
> Psychophysical, neurophysiological, anthropological results about the nature of color perception and categorization.
>
> Results from cognitive psychology concerning human imaging capacities and the association of conventional imagery with language.
>
> Results from cognitive neuroscience and connectionism regarding the computational mechanisms of the brain.

The ordered typology of systems diagrammed in Fig. 6.3 above enables us to derive "commitments" we can make in theorizing language and describing particular languages; let me put this in terms of the general theory of language:

- **the systems "commitment"**: we theorize language in such a way that we take into account the properties of complex adaptive systems in general. These properties are **fractal** in the sense that they are manifested within the different phenomenal realms in which systems operate, and they are **emergent** in the sense that they emerge with increasing complexity.
- **the semiotic "commitment"**: we theorize language according to its own systemic order as a semiotic system with the general properties of semiotic systems and properties that are unique to language such as the metafunctional diversification and the internal stratification of the content plane into semantics and lexicogrammar and the expression plane into phonology and phonetics. We strive to develop a holistic theory of language, supporting the development of comprehensive descriptions of particular languages.
- **the social "commitment"**: we theorize language according to its enactment in society as a social system, ensuring that the properties of language we postulate are consistent with the nature of social systems, e.g., the meaner (speaker) as a person playing different roles within a wide variety of social groups and language as a socially distributed collective meaning potential, transmitted or re-created across generations of persons, and that the semiotic account can interface with the social one.
- **the biological "commitment"**: we theorize language according to its embodiment in the human organism as a biological system, ensuring that the properties of language we postulate are consistent with the nature of biological systems — of course, in particular those aspects of the human body directly involved in language, e.g., the semantic system as an interface to sensorimotor systems (bio-semiotics systems) and more generally language as a relational system integrating different regions of the brain.
- **the physical "commitment"**: we theorize language according to its manifestation as a physical system, taking both physical affordances and constraints into consideration. This includes, then, what scholars pursuing social semiotics have discussed in terms of "materiality", but also the kinds of issue that come to the fore in e.g., speech processing.

The general point is that these "commitments" are metatheoretical principles directly grounded in our theory of the ordered typology of systems operating in different phenomenal realms. Thus they are in fact not separate or separable "commitments"; they are ***inherent in the theory***. Lakoff's "cognitive commitment" seems to be dispersed into what I called, using his term "commitment", the semiotic commitment and the biological commitment. As an alternative to what I just sketched above, we could follow Geeraerts (2016), whom you referred to above, and add what he calls "the sociosemiotic commitment" to "the cognitive commitment". He characterizes it as follows (p. 537):

> To complement the Cognitive Commitment, we define a **commitment to make one's account of human language accord with the status of language as a social semiotic, i.e., as an intersubjective, historically and socially variable tool, and to base that account on a methodology that likewise transcends the individual**. [Bolding in original]

This relates directly to the third-order systems in our ordered typology, i.e., to social systems. Thus one might argue that the combination of the "cognitive commitment" and the "sociosemiotic commitment" covers the ground not covered by Lakoff's (1990) "general commitment". However, I prefer to relate the consideration of "commitments" to the theory itself, in fact deriving them from the theory of the ordered typology of systems operating in different phenomenal realms. This means that each higher order of "commitment" must be responsive to, and responsible for, lower-order "commitments"; in other words, the "commitments" are ordered according to the orders of the ordered typology.[3] Further, I think that the general systems "commitment" is of fundamental importance, and will grow in importance as we learn more from developments within different strands of **general systems theory** (e.g., Bertalanffy 1968; Boulding 1956; Gell-Mann 1994; Larsen-Freeman & Cameron, 2008; Skyttner 2001), including **network science** (Barabási 2016). We can of course also foreground considerations of semogenesis: the theory of language must bring out its characteristics as a learnable evolved system.

As an aside — but an important one, we can take a step back to consider the postulation of "commitments" in the light of the context in which we do science. Taking this step back, we can see that the concern with "commitments" relates to the field of doing science, directly to the field of experience — the phenomenal realms we investigate and theorize — but also to the field of activity — doing science as an activity. However, we can complement these field-oriented considerations with **tenor-oriented considerations**. Such considerations include the roles we take on as scientists in different groups, including roles working with professionals and other members of the community outside universities, and the value systems we adopt and enact.[4] Considerations of this kind have, of course, been highlighted by Michael

[3] There's much more to be said about this, but I'll leave it for another occasion. However, it is interesting to note Kuhl's (e.g., 2010) emphasis on social considerations, including her "social gating hypothesis (Kuhl 2007).

[4] One example we have been involved with is *The International Charter for Human Values in Healthcare Initiative*. See: https://charterforcompassion.org/healthcare-partners/international-charter-for-human-values-in-healthcare-initiative.

Halliday in his discussions of **social accountability** (see Sect. 3.1). The field-oriented considerations and the tenor-oriented ones come together in his conception of **appliable linguistics** (e.g., Halliday 2008; Matthiessen 2014). Halliday (2008: 7) characterizes it succinctly as follows:

> a comprehensive and theoretically powerful model of language which, precisely because it was comprehensive and powerful, would be capable of being applied to the problems, both research problems and practical problems, that are being faced all the time by the many groups of people in our modern society who are in some way or other having to engage with language.

What Michael and I were suggesting was to look at the highest order of phenomena in the ordered typology of systems in semiotic terms rather than only in cognitive terms (cf. Fig. 6.2 above). Interestingly, if you look at the later development of cognitive science, you would notice the moves of saying "No, no, no, it's not disembodied minds, it's embodied minds — embodied in brains as part of biological organisms", and "No, no, no, it's not just isolated individuals, it's individuals in interaction with others" — cf. Geeraerts (2016) on the "social turn" in cognitive linguistics.

If you take a semiotic approach — i.e., a meaning-based approach, you could say that cognitive scientists have taken a huge detour, which is a bit disappointing after the decades following the launch in the 1950s. But if you follow through the trail from Malinowski to Firth (Europe), from Sapir to Whorf (the US) and then to Halliday (possibly in dialogue with Vygotsky in Russia), the semiotic approach is there — evolving throughout these generations of ideas. One has to find ways of having dialogues around these two developments — that of cognitive science and that of the semiotic approach.

One of the most powerful demonstrations of the role played by language in construing our experience of phenomena in the world around us and inside us — phenomena that are usually conceptualized in cognitive terms — is Clare Painter's (1999) work, where she demonstrates that the development of what our cognitive friends would discuss in terms of cognition is fundamentally a semiotic development, and more specifically a linguistic development (cf. Halliday's 1993 notion of a language-based theory of learning). Painter (1999) chronicles this development from the second year of life up to the age of two, three and four.

There are breakthroughs in what children are able to construe for themselves when they master the part of the grammar that provides them with the appropriate resources for construing particular domains of experience. Here relational clauses (i.e., clauses of attribution and identification) play a central role; as children master the resources step by step, they are able to move from labelling to taxonomizing to defining:

- labelling material phenomena by means of cataphoric reference, using attributive relational clauses (e.g., *that's a circle*);
- taxonomizing meanings that have been construed in this way, using relational clauses, either attributive (e.g., *frogs are amphibians*) or identifying (e.g., *frogs, toads and salamanders are amphibians*);

- defining meanings, "concepts", including abstract ones, using identifying relational clauses (e.g., *balance means you hold something in your hand and it doesn't fall*).

This gradual mastering of more of the linguistic system enables children to expand their semogenic potential — always grounded in authentic data and empirical investigation.

6.5 Robin Fawcett's Studies on Cognition

Isaac Mwinlaaru: Robin Fawcett (e.g., 1980) is a key person in SFL who engages with discussions in cognitive linguistics and attempts to develop cognitive models in his version of SFL theory. He has mentioned the "communicative mind" and "belief system" and has tried to model how language production relates to the brain in terms of processing. How do you relate Robin Fawcett's ideas to your own work?

Christian Matthiessen: In his work, which goes back to the 1970s, he attempted to put the "social" and the "cognitive" together. I don't know to what extent we can say that he studied "cognitive phenomena" since this might be taken to imply that he carried out psycholinguistic experiments or grounded the cognitive aspects of the model in neuroscience (cf. Lakoff's 1990 "cognitive commitment", referred to above). But it seems to me that his notions were from mainstream cognitive science, like the notion of belief models. The Cardiff model, developed by Robin Fawcett, Gordon Tucker and their great team of students and scholars, looks like the architecture of a computational linguistic/AI system from the 1970s or 1980s. I am not saying that this is wrong. But it is very different from our systemic functional architecture of language in context — a **relational architecture** that is based on intersecting **semiotic dimensions**, each of which is the domain of relations of particular kinds. I myself was — and am — more interested in the reconceptualization of what our cognitive friends talked about in terms that are semiotically informed, in other words empowered by an understanding of language and other semiotic systems.

We certainly need to address the phenomena that cognitive scientists consider when they talk about "belief systems" and similar abstractions in cognitive models, but Michael Halliday and I were keen to do this in a way that incorporates insights from the interpersonal realm of meaning in relation to the contextual parameter of tenor. That was, more generally, why we developed the meaning base approach rather than the knowledge base approach in *Construing Experience through Meaning* (Halliday & Matthiessen 1999/2006). The meaning base is multifunctional — the **ideation base**, the **interaction base** and the **text base**. We focussed on the ideation base aspect of the meaning base, but we also discussed the text base and the interaction base.

Sketching aspects of the **text base**, we showed how **textual statuses** such as identifiability, thematicity and newsworthiness can be represented as partitions within the ideation base (see Halliday & Matthiessen 1999/2006; Bateman & Matthiessen 1993

and cf. also Matthiessen 1992). Up to a point, the notion of partitions representing different textual statuses works quite well, and one can try to model **textual transitions** from one textual partition to another along the lines we sketched (cf. also Matthiessen 1995, where I try to suggest how this approach might be used to explore thematic progression in text).

In terms of the **interaction base**, we thought in interactive or **intersubjective** rather than subjective terms; for instance, the interactant's ways of projecting models of other interactants in a way that considered the tenor of their relationship. Thus, we went beyond the standard belief models in AI and computational linguistics at the time, models that did not foreground the interpersonal aspect of modelling one's relationship to other meaners in terms of belief, feelings — a history of sharing meanings, often updating the record in casual conversation (cf. Eggins & Slade 2005; Eggins 1990). We were influenced by creative pioneering thinkers who were not part of the cognitive science mainstream, in particular Colwyn Trevarthen (e.g., 1974, 1987, 2009, 2011) from Edinburgh University and his notion of **intersubjectivity**.

One of Trevarthen's contributions is included in Margaret Bullowa's (1979) edited volume of new insights into early development, *Before Speech: The Beginnings of Interpersonal Communication.* This volume also includes Halliday's (1979) chapter on the protolinguistic precursors to the later emergence of dialogue, complemented by his account in Halliday (1984b), and a chapter by Catherine Bateson (1979), who looked at the interaction between mother and child, like proto-conversation. Bateson's chapter developed from videotaping very young children and their mothers, which opens up the possibility of watching the proto-conversation in slow motion. The study demonstrated that the mother and the child were already in some kind of proto-dialogue even right after birth, described as a kind of dance, with the child usually initiating and the mother responding. Colwyn Trevarthen (1979) theorized the phenomena being observed in terms of his notion of **intersubjectivity** (which he had taken from Jürgen Habermas). This is a fundamentally important alternative way of viewing a wide range of phenomena that have traditionally been interpreted in more subjective terms in cognitive science. I was surrounded by belief systems and knowledge-based perspectives for almost a decade in daily work, in my work environment at the research institute (ISI) (see also Sects. 1.1, 2.3 and 2.5). So, I was thinking of a way to re-conceptualize language development in more linguistic, semiotic and metafunctional terms.

6.6 Paul Hopper and Elizabeth Traugott on Semantics

Isaac Mwinlaaru: In the book on grammaticalization, Hopper and Traugott (1993) referred to Michael Halliday's work on stratification. They talked about the semantic stratum, which interfaces with context and lexicogrammar, and pointed out that the stratum could be learned or interpreted procedurally in terms of language production. In this way, the individual speaker tried to cognitively interact with the environment through semantics, and then transferred that to lexicogrammar in terms of the

cognitive model of processing. What do you think of that interpretation of semantic stratum?

Christian Matthiessen: There are a number of interesting points there. One has to do with the stratal location of semantics within the overall system of language in context: we can return to Michael Halliday's (e.g., 1973, 1978) early formulation of semantics as interlevel or **interface**. In a stratal theory and model of language, lexicogrammar and phonology are purely internal to language, and semantics and phonetics (in spoken language) belong to the interface strata or levels, phonetics interfaces with the articulatory and auditory systems, and semantics interfaces with the perceptual systems and motor systems of the brain: see Fig. 6.4.

In Hjelmslevian terms, the inner strata are **form strata** and the outer strata are **substance strata**. The substance strata interface with "substance" in other semiotic systems, both other social semiotic systems such as gesture and drawing and **bio-semiotic systems**, to use the term Halliday and I suggested for sensorimotor systems (Halliday & Matthiessen 1999/2006: 606–610). In the case of semantics, the interface is concerned with meaning — broadly conceived. This includes the interface with the higher-order, or connotative, semiotic system of context (not shown in Fig. 6.4, but see Fig. 6.3).

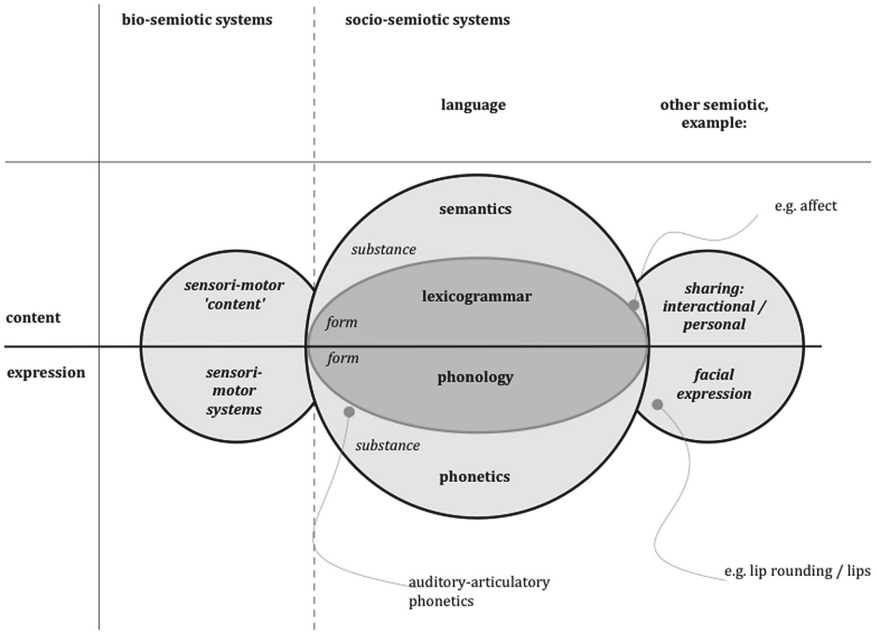

Fig. 6.4 The stratification of language interpreted in terms of form and substance, with the substance strata as interfaces to bio-semiotic systems and denotative semiotic systems other than language

In terms of the brain, the other systems include perceptual systems and motor systems — bio-semiotic systems, but language is unique as a human system in that it is pervasive in the brain, serving to integrate other systems within different regions. To illustrate this point, I have referred to Bickerton's (1995) example showing that the "linguistic cat" is the "holistic cat": if you think about the cat, the linguistic cat is the cat that integrates all our experiential engagements with cats. The concept of cat in our experiential semantic network is linked to our visual image of cats, our auditory image of cats (what they sound like), possibly to our tactile experience (that they are soft and furry, and may scratch or bite), our experience of lifting cats, cuddling cats, and so on. Our whole feline experience is accessible through the cat node in our experiential semantic network, which illustrates the insight that language is the one human system that integrates different parts of the brain, e.g., auditory cortex within the temporal lobe and the visual cortex within the occipital lobe. This relates back to the meaning-based versus the knowledge-based distinction. Here there is a kind of real resonance between Bickerton and the Hallidayan systemic functional insights.

In AI, there was a longstanding question about the conception of knowledge (or meaning, in our semiotic interpretation) — the distinction between declarative knowledge and procedural knowledge, which came into focus in the 1970s.

There was quite a debate about this distinction, and part of the picture was related to what Terry Winograd[5] (an AI researcher who studied with Michael Halliday in London in the late 1960s) did when he built his SHRDLU system, where he introduced a procedural way of thinking about meaning in terms of the processes undertaken to do something. You could trace that back to ideas in Western philosophy, e.g., Wittgenstein's objection to the early Wittgenstein — the *Tractatus* model in the tradition from Frege and Russell, which was focussed on declarative, propositional, knowledge or meaning, as opposed to meaning as a way of doing (action and interaction).

There is a whole complex way of sorting out the complementarity between declarative and procedural representations. On the one hand, there are the phases along the cline of instantiation — potential, subpotential/instance type, instance — and the process of instantiation itself. On the other hand, there is the metafunctional one, where the ideational invites the declarative way of thinking about it, versus the interpersonal inviting the procedural one (language as a mode of action and interaction), which as Geoffrey Sampson (1980) pointed out, Malinowski (1923) said quite a long time before Wittgenstein became famous for it — the interpretation of meaning in terms of use. So, you have these tensions built in the history of human thinking — our intellectual history. The different interpretations become thesis-antithesis pairs, and often the appropriate intellectual way forward is to turn to a theory that allows us to conceive of a synthesis. That is what systemic functional theory does. But it takes a great deal of work. With the growing work in the area of semantics and neuroscience, there is an additional insight based on the relationship between different domains of meaning within semantics and sensorimotor systems, e.g., the relationship between

[5] e.g., https://en.wikipedia.org/wiki/Terry_Winograd and https://profiles.stanford.edu/terry-winograd.

doings-&-happenings within the semantics of figures and bodily action — explored by García and Ibáñez (2017) in systemic functional terms (see further e.g., Kemmerer, 2015: Part V on "grounded cognition" and the "hub and spoke model").

As an expert in the history of English and pioneer in research on grammaticalization, Traugott, from Stanford University, has produced very interesting and important work (e.g., Traugott 1985, 1997; Hopper & Traugott, 1993/2003), and drawn some insights from Michael Halliday (e.g., Traugott 1982). Halliday has been to Stanford for extended periods twice: one was in the early 1970s and the other was in 1979, which was when I met him there (see Sect. 1.1). There had been interactions and discussions between Halliday and Traugott. As Randy LaPolla has pointed out in the discussions on grammaticalization, Traugott (e.g., 1982, 1997) adopted some insights from the theory of metafunction in SFL.

6.7 Instantiation and Individuation

Isaac Mwinlaaru: At the ESFLC (European Systemic Functional Linguistics Conference) in Paris in 2014, Margaret Berry (2014) gave a plenary talk, where she mentioned the notion of choice in relation to system network and instantiation. As you have pointed out, instantiation will involve different phases, and is the selection of systemic features from the systems that make up the resources of the linguistic system. Her point was: SFL has talked about language, but the *speaker* (or user) has been backgrounded. If we bring in the speaker here, how would you relate this to the process of the brain in terms of instantiating text?

Christian Matthiessen: Unluckily, I missed the talk. Did she talk about computational modelling in SFL?

Isaac Mwinlaaru: Not really.

Christian Matthiessen: No, that unfortunately gets overlooked in the main currents of SFL again and again, but computational modelling in SFL is of crucial importance in relation to your question because that is where you have to come to terms with both the speaker and the addressee as part of modelling the exchange of meanings. What we were doing through the 1980s was modelling not in the sense of psychological realism (whatever that would actually mean), but modelling the processes of generating text. I do not see how you could say the speaker was not taken into account in that body of work. That was precisely what we investigated and modelled. And the same applies to the computational work based on SFL by Robin Fawcett and his team at the University of Cardiff.

But I would also say: go to the literature on ontogenesis (e.g., Halliday 1975a, 2004; Painter 1984, 1999; Torr 1997, 2015; Painter, Derewianka & Torr 2007) because to arrive at deep insights into language development, you have to do case studies — longitudinal studies of individual children. The interpretation of ontogenesis focusses on the growth of individual meaners, but it does not lose sight of

the group because children always learn how to mean in interaction with others — initially with the members of their most immediate meaning group (cf. Halliday 1978 on the development of persons and personalities through interaction with members of groups, discussed below). I agree that it is very important to engage with speakers, and I agree that this has not been the focus in a good deal of SFL works, but one can go to sources where it has been the focus. I think this is crucial to really open up the dialogue with the cognitive folks, and it relates very directly to the longstanding puzzle in the twentieth/twenty-first century of what the relationship between the individual and the group or collective is.

You can go back to how Malinowski (1935) problematized the notion that comes through from Durkheim (1898, 1965) of the collective consciousness. Malinowski was influenced by him, but in the sense of reacting against this, he was using the *kula* exchange system in the Trobriand Islands and what he had experienced as a participant observer. He said: nobody knows the system in the sense of having a comprehensive understanding of the system, and yet all the members of that society together re-enacted it regularly. He problematized the question of who knew this system, and the answer was the ethnographer. So, we need to face it head-on because it is central to a number of tensions that are still around. That is one aspect and there are different attempts at this.

Firth (1950) made a very important contribution in his paper on person and personality. Michael Halliday (1978) continued this discussion in his book on language as social semiotic, illustrating how the person emerges from the group as an assemblage of personae or social roles taken on in different social groups: see Fig. 6.5. There is a kind of dialectic between the individual and the group. Going back to Firth and then Halliday, David Butt (1991) picked up the conceptualization and investigation of person and personality, and this framework has also been applied productively in the investigation of the self in psychotherapy, as in Henderson-Brooks (2006).

The tension between the focus on the individual and the focus on the collective has run through the twentieth-century linguistics and also other related disciplines within the field of "human sciences". It is very significant and quite interesting. In my own work since 1980, I found myself in a hot-zone where the AI and cognitive science conception clashed with the more ethnographic and social-oriented approaches, including SFL.

In 2003, there was an Australian SFL (ASFLA) conference in Adelaide, where I explored the relationship between the individual and the collective. Since we have Halliday's theory of the cline of instantiation, how do we conceptualize the individual in relation to instantiation as always being constructed through instances in interaction with people, observing how individuals emerge over time as persons with personalities (Fig. 6.5) — the process of **individuation**? Jim Martin and others (e.g., Martin 2008, 2009) have also worked on this problem; there are relevant contributions in Bednarek and Martin (2010). They used notions from sociology and psychology — including **affiliation** and **alignment**. This perspective complements that which is foregrounded by the notion of individuation. Individuation emphasizes the development of persons as aggregates of personae emerging as they interact with people in different groups, most likely starting with the institution of the family (cf. Halliday,

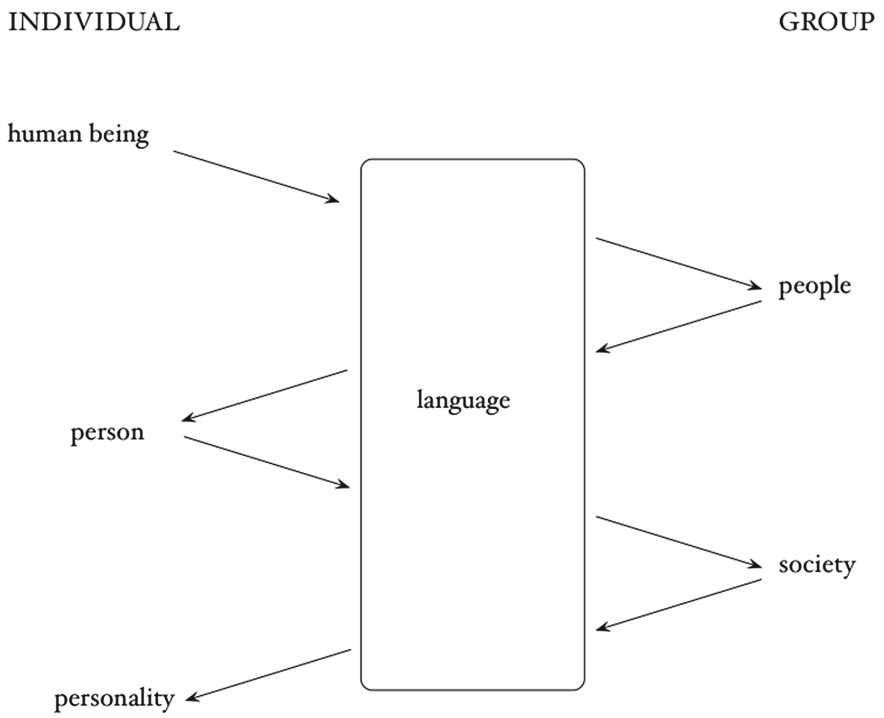

Fig. 6.5 Halliday's (1978: 15) schematic representation of individuals emerging as persons and their personalities through interaction with groups of people and members of societies

1978). The individual affiliates with the group, or as in the work by Martin Pickering, a psycholinguist, alignment is a process in dialogue of interactants aligning with one another (e.g., Pickering & Garrod 2006).

It would be helpful if we take the challenge of modelling this explicitly and seriously as is done in computational linguistics and AI. Here we can draw on the work by Colwyn Trevarthen, coming from, and thus grounded in, biology. As mentioned above, he and his group have done extensive research shedding light on **intersubjectivity**, proto-conversation and related aspects of infants seeking to commune and communicate (e.g., Delafield-Butt & Trevarthen 2015; Trevarthen & Aitken 2003; Trevarthen 1979, 1987, 2009, 2011). Trevarthen's interpretation of infancy and early childhood resonates with Halliday's pioneering work on learning how to mean, as can be seen from the references they make to each other's contributions (cf. also Smidt 2017).

In addition, for considerations of the speaker, systemic functional linguists can turn to the work by Robin Fawcett and his group (originally modelled by Fawcett 1980 — a model which has informed subsequent research).

As we grapple with tasks such as relating the system to the instance along the cline of instantiation and the meaning group to individual meaners, we can ask general

metatheoretical questions. What kinds of model do researchers use when they extend their territory of theorizing, modelling and observing? How do you go about it? One approach (or methodology) that has been very dominant in the last few decades is the macro one — a kind of **eclecticism**. In fact, the notion of the eclectic account has been given high value, and that is positive and fair enough. But you could also look at eclecticism from another vantage point, adopting a different approach — the one I have worked with throughout my career, **meta-translation**. Eclecticism is like quilt work, or it is like Frankenstein's monster. It is difficult then to know how things fit together, so I prefer to do meta-translation, i.e., take insights from a wide range of frameworks and disciplines, absolutely acknowledge them and learn from them, but then translate them into Systemic Functional Linguistics so that I can see how everything fits together in terms of the dimensions of the systemic functional architecture of language and other semiotic systems and so that I can reason about the whole (see also Sect. 9.8). This approach supports systems thinking (e.g., Capra 1996).

Isaac Mwinlaaru: I think for research purposes, it is good to talk about instantiation and individuation, where people can clearly focus on different aspects of individuals and societies interacting with one another to create meanings. Theoretically, do you think instantiation is separate from individuation in terms of language production? I sense that once individuals are involved in interaction, they are instantiating text and at the same time they are individuating themselves. Do you think this is theoretical? For research purposes, we may have to separate these, do you think it would be theoretically valid to say instantiation and individuation are different?

Christian Matthiessen: Yes, absolutely. I agree with you. My sense is that "individuation" has not yet been sorted out — nor its relation to instantiation, and there is a very strong pressure to theorize this area so that we can get on with a wide range of tasks. I feel a bit frustrated with myself in that this area has been there on the agenda for quite a long time — I could see the tension between cognitive and socio-semiotic approaches quite clearly already in the 1980s as we were developing models of text generation. However, it is not a trivial challenge; it is reflected in various explorations throughout the twentieth century and two decades into the twenty-first century — including the tension between macro- and micro-views, the tension between the individual and the collective, the tension between social and cognitive conceptualizations, the relationship between the system and users of the system. We can of course posit individuation as another dimension — a cline like the cline of instantiation (cf. the contributions in Bednarek & Martin 2010); but I don't think this will work out. Individuation is not a "dimension" in the same way that, say, the cline of instantiation and the hierarchy of stratification are. I explore some of the options in Matthiessen (forthcoming) as part of the discussion of the architecture of language according to systemic functional theory.

How far up the cline of instantiation towards the meaning potential and the culture potential can an individual person, an individual meaner, move? That may partly depend on the nature of the society — its size and organizational complexity. But you must have an account of this. When you move towards the potential, it begins

to become a group of collective enterprise. How are they related to one another? That is also why I resist the notion from Jim Martin and his group that reading a text (reading position or reader position, listening position or speaker position) is even more instantial than the text because reading (or listening) positions derive from the **angles on the system** that different groups of people adopt. It is not just located at the instantial end, but is something that extends up the cline of instantiation. There is a lot of interesting work to be done there, including modelling not only registers but also the Bernsteinian codes — what Ruqaiya Hasan (e.g., 1973, 1989, 2009) worked extensively on.

Again, the problem goes back to these very fundamental questions that have bedeviled human sciences for a very long time. You get different manifestations of them, including the cognitive versus the social, the individual versus the group (the collective), the system versus the instance and the micro versus the macro. If we are going to benefit from the dialogue between the social and the individual scientists (people who focus on it), this needs to be sorted out. There is another thing that has to do with the individual focus: you tend to get people who work with more explicit models, whether such models can be found in speech act theory or in AI/ computational linguistics or somewhere else like knowledge systems or belief models, whereas those who work with social interaction are more collective and do not tend to develop these explicit models. Unfortunately, those who work with the more explicit models do not seem to value the contributions by scholars who do not produce or use explicit models. We need to instill a sense of valuing the latter in order to move on because as long as there is the notion that what some people are doing is not valuable, it will be difficult to make progress. I have felt this for 40 years because I have been involved in this interface between computational modelling and discourse analysis since 1980.

6.8 Conceptual Metaphor and Grammatical Metaphor

Isaac Mwinlaaru: Metaphor has been a key topic in cognitive linguistics right from the beginning. It has been theorized and discussed by many scholars interested in language and cognition. The notable one was Lakoff and Johnson's (1980) *Metaphors We Live by* on conceptual metaphor. In grammaticalization, Bernd Heine and his colleagues (e.g., Claudi & Heine 1986; Heine & Kuteva 2007) have related metaphor to the development of grammar and the transfer of meaning of a lexical item, which is always more concrete to abstract environments. In SFL, we have grammatical metaphor. Could you tell us what grammatical metaphor is? How would you relate it to the works on metaphor by scholars in cognitive linguistics?

Christian Matthiessen: I think that is a very crucial question. The potential for metaphor emerges in language with the split of the content plane into semantics and lexicogrammar — into meaning (semantics) and meaning constructed as wording (lexicogrammar). Thus, the potential is a characteristic of higher-order semiotic

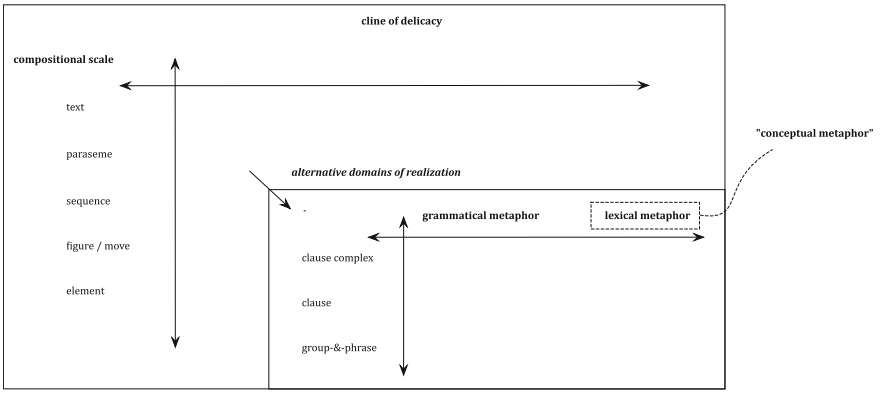

Fig. 6.6 Lexicogrammatical metaphor as a realizational relationship between semantics and lexicogrammar extended along the cline of delicacy

systems, i.e., ones where the content plane is stratified into two content strata. Language is the prototypical higher-order human semiotic; while there may possibly be other kinds, this has yet to be demonstrated. Of course, in the course of ontogenesis, once young children make this split during their second year of life, as they move into the mother tongue, they do not take up this potential for metaphor immediately, but it is there for them as a semogenic resource, and when they begin to take advantage of it, they start with the interpersonal metafunction — with metaphor (this being one manifestation of Halliday's 1993 interpersonal-first principle).

Now, since metaphor depends on the relationship between semantics and lexicogrammar, it is inherently **lexicogrammatical metaphor** — extending from the very general systems of grammar to the very delicate systems of lexis.[6] This is shown in Fig. 6.6: being a relationship between semantics and lexicogrammar, metaphor covers the full range of the cline of delicacy from the grammatical zone to the lexical zone, and its upper bound is the most extensive domain of lexicogrammar, i.e., the clause complex. Lexical metaphor was, of course, the traditional focus of studies of metaphor; and, in cognitive linguistics, it has been conceived of as "conceptual metaphor". In principle, "conceptual metaphor" could cover all of lexicogrammar, including the grammatical metaphor; but the accounts in Lakoff and Johnson (1980) and later publications always seem to focus on lexical metaphor. However, it is still of interest and relevance to systemic functional work on lexicogrammatical metaphor

[6] This theoretical insight into the conditions for and nature of lexicogrammatical metaphor can be contrasted with Black's (1962: 28) characterization: "To use a well-known distinction, "metaphor" must be classified as a term belonging to "semantics" and not to "syntax" — or to any *physical* inquiry about language.)" He adds "pragmatics" a few pages later; but the fundamental point is that ***metaphor depends on the stratification of the content plane*** into semantics and lexicogrammar, and exploits the realizational relationship between the two.

(cf. our comments in Halliday & Matthiessen 1999/2006).[7] And Mark Turner's (e.g., 1990, 1992) proposal for representing and modelling (lexical) metaphor can serve as one source for further work on the explicit representation of metaphor in SFL.

In SFL, metaphor — lexicogrammatical metaphor — has a clear location in the overall content system of language (alongside other figures of speech). This is related to the holistic nature of systemic functional theory and the goal of developing comprehensive descriptions of particular languages. Since most attention had traditionally been devoted to lexical metaphor, Michael Halliday needed to fill a gap and to shed light on grammatical metaphor, an investigation that can be traced back at least to his "Grammar, Noun and Society" (Halliday 1967). This was the period of the first sustained project on scientific English directed by him and reported on by Huddleston et al. (1968).[8] To describe scientific English, and also scientific registers of other languages (e.g., Halliday 1984a, 1993b), Halliday needed to flesh out the account of grammatical metaphor — and of course, he thought it through systematically, netting in not only **ideational metaphor** but also **interpersonal metaphor** (which follows from systems thinking based on intersecting semiotic dimensions, in this case the hierarchy of stratification and the spectrum of metafunction[9]). At the same time, we also recognize that scientific discourse depends on both lexical and grammatical metaphor — in other words, on lexicogrammatical metaphor. Various domains of our experience of the world are construed by means of lexical metaphor (as Whorf 1956 showed a long time ago) in everyday discourse, and when they are reconstrued scientifically, this reconstrual of our experience involves the full continuum from grammatical to lexical metaphor, as we illustrate in Halliday & Matthiessen (1999/2006, in particular in Chap. 14) (cf. also Matthiessen 1993, 1998). Within lexicogrammar, lexical patterns tend to be more exposed, more easily accessible to speakers of a language, than grammatical patterns — certainly than cryptogrammatical ones, and the same holds true of lexicogrammatical metaphor. People are more likely to notice lexical metaphors than grammatical ones. For example, people have become aware of various lexical metaphors used in construing the outbreak and spread of COVID-19 — metaphors mapping aspects of the virus and the pandemic onto the experiential domains such as those of warfare, fire and flooding, as noted by Elena Semino in a valuable contribution to *The Guardian* on July 5, 2021: *Fire, waves*

[7] I remember visiting George Lakoff in his office at UC Berkley and asking him about his opinions on SFL in the mid-1980s. I do not think he saw the connections there, but I do think that there are very interesting connections.

[8] They tried to get a book version of the report published, but formal linguistics had become so prominent in those days that publishers were not interested in text-based studies, so a number of studies like this one fell by the wayside and never got published. Huddleston (1971) did put together a book on his own that reflected some of the findings, but that report would have been an early example. The project clearly showed that it was important to have a way of understanding what happened in scientific English, and there was not really anything around. That was a real impetus for Michael Halliday's work on grammatical metaphor.

[9] So we can add one more dimension to Fig. 6.6, giving it perspectival depth to represent the addition of the metafunctional distinction between the ideational and interpersonal modes of meaning.

and warfare: The way we make sense of Covid. But the grammatical contribution to our metaphorical construal of Covid is equally important.

If one reasons about metaphor in a well-rounded way — trinocularly, holistically and systemically in the sense of systems thinking, one would ask about the metafunctions organizing both semantics and lexicogrammar within the content plane; and it turns out that lexicogrammatical metaphor operates not only within the ideational metafunction but also within the interpersonal one.[10] Halliday indicated that what linguists and philosophers conceptualized as indirect speech acts in speech act theory was a metaphor in the environment of the interpersonal (Halliday 1984b). You can put this together with his later work on interpersonal first principle (e.g., Halliday 1993a) and you would realize that a number of phenomena in language were first developed in the interpersonal environment. So, that was one reason for focussing on the grammatical zone within lexicogrammar.

To make my comments a bit pointed, when *Metaphors We Live by* appeared in 1980, I was already studying at UCLA and I remember the attention that their book received; but I did not think that there was fundamentally anything new in their work. This was partly because of the tradition of the study of metaphor in lexical semantics and in stylistics, but also because of Whorf (1956), who talked about this in the 1930s and early 1940s in detail in terms of the phenomena themselves and the broad outlines (cf. also Black 1962). And the same would have been the case in a number of other traditions, including linguists who had worked in historical linguistics. I remember one occasion when George Lakoff gave a talk on conceptual metaphor at UCLA (sometime in the early 1980s), and Robert Stockwell (from UCLA linguistics) asked him during the Q-&-A period when he thought metaphors became "dead metaphors" in the history of languages, and when one language borrows from another — Stockwell cited *arrive* from Latin "to" plus "shore" as one example of an item that was metaphorical in the original language but might not be recognized as such in English. Stockwell was, of course, very familiar with the role metaphor plays in the history of languages.

Interestingly, after Lakoff and Johnson (1980) had been published, Lakoff and others working with the general notion of conceptual metaphor and systems of conceptual metaphor have taken this in the direction of a description that was grounded in text but also applied in the analysis of text. As the US and its allies moved towards the first Gulf War, Lakoff circulated a paper pointing out how certain metaphors were quite misleading but useful to the war mongers, like the metaphor of war as surgery. This development in the engagement with metaphor was important, and it has continued in productive ways. If you talk to scholars like our colleague

[10] Some systemic functional scholars have suggested that there are also textual grammatical metaphors; but when we discussed such proposals, neither Michael Halliday nor I found these suggestions convincing. There was no "as if" aspect present in the cases cited as examples of textual grammatical metaphor. Metatheoretically, this would seem to be an interesting area: if there are ideational and interpersonal metaphors, why not textual ones? To address this issue, we have to go deeper into the nature of the metafunctions, and take into consideration the distinct nature of the textual one as an enabling metafunction (cf. Halliday 1978; Matthiessen 1992).

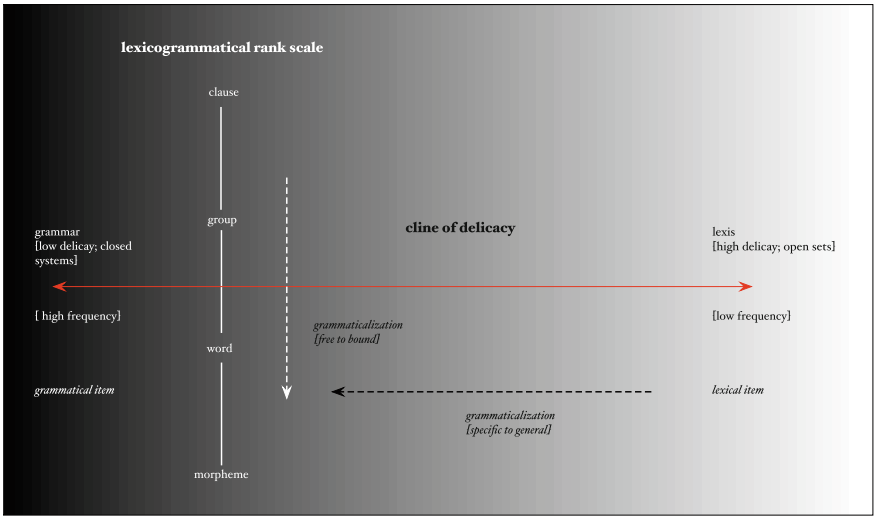

Fig. 6.7 The continuum from grammar to lexis

Dennis Tay (e.g., 2010, 2011; Tay & Jordan 2015), he will say that, like SFL, Conceptual Metaphor Theory is usage-based theory. By now, a number of strands in cognitive linguistics are usage-based (cf. Geeraerts 2016).

Just to round off our discussion of this topic: there is still very interesting work to be done on lexicogrammatical metaphor (see Fig. 6.7) — i.e., the continuum from grammatical to lexical metaphor — in different registers, within both the ideational and interpersonal metafunctions, as part of the description of an ever-wider range of languages. We need to bring out and network the way in which lexicogrammatical metaphor is a semogenic resource that serves to expand our ideational semantic strategies for construing our experience of the world as meaning and our interpersonal semantic strategies for enacting our roles, relationships and values as meaning. In this context, it will be helpful to consider lexicogrammatical metaphor alongside other semogenic strategies, including those that have also traditionally been interpreted as "figures of speech" — simile and synecdoche (see Halliday 1985b: Chap. 10).

6.9 Collaboration Between Systemic Functional Linguistics and Cognitive Linguistics

Isaac Mwinlaaru: There is a paper by Butler (2013), in which he gives an overview of SFL and the areas that can be combined, including cognitive linguistics in general, and particularly construction grammar and cognitive grammar. He has suggested a close interaction between SFL and some other frameworks. In which areas can

SFL collaborate with these traditions in the pursuit of knowledge on language and cognition?

Christian Matthiessen: One interesting academic and political question is: are they interested? Because collaboration suggests dialogue, and dialogue suggests a kind of give and take — it is based on the mutual exchange of meanings, on reciprocity. It is striking how little dialogue there has been. One person who made a very big effort to connect with, and draw on, Ronald Langacker's work in cognitive linguistics was Kristin Davidse (e.g., 1992, 1996), and she has continued to develop this framework together with other members of her group, an interesting example being Vandelanotte's (2009) "cognitive-functional" conception of projection.

Has this been a reciprocal dialogue? I remember meeting Ronald Langacker in the US in Washington DC at the Georgetown University Roundtable in 2006. We had both been invited as plenary speakers. We discussed the interaction between his cognitive grammar and SFL, and I emphasized the potential for dialogue. He said: "Yes, of course, Kristin Davidse was trying to do this." He was very much aware of it, but I do not think you will see a flood of references to her work or a kind of reciprocal attempt to do further the dialogue (cf. the lack of references in Langacker 2008, 2013).

How can you understand this? In different ways. In terms of the field parameter of context, what is your experience? What part of the literature do you control? Do you stop developing your own research tradition to look at this or not? But there is also a tenor aspect of it. The moment you go to somebody else's work in another tradition, you are potentially in some sense abdicating your status position in a hierarchy of power. It took me a long time to realize this, so I was getting impatient with people. I wondered why others did not engage with SFL even when there was so much resonance with their work. As it turned out, I was thinking only in field terms. At some point, it clicked. It was also about tenor — interpersonal networks, positions of academic strengths, the ranking of channels of publication and so on.

So, a reasonable practical test is this: when you are thinking of having a dialogue with somebody, do they actually need to refer to your work? The answer is often "no" because they have enough infrastructure and enough status and power in place in their own community to ignore you. One of the fairly late discussions I had with Geoff Thompson was about what scholars are included in citations, in particular in citations across frameworks and traditions. In this context, I talked about the effacement of Michael Halliday. Since Halliday was outside the dominant current within linguistics for a long time, out of phase with Chomskyan linguistics, scholars and students in linguistics tended not to engage with his work, either not seeing its significance in the context of mainstream theoretical linguistics or ignoring it altogether. Once linguists started to rebel against the Chomskyan paradigm and explore positions closer to Halliday's, they did not generally refer to him or to scholars who had followed up on his work. This tendency to overlook his work is clear in development in the last couple of decades concerned with the nature of language as a probabilistic system, with the continuity between grammar and lexis, with the intrinsic functional organization of language. As I sometimes say, Michael Halliday should have got himself born in

Texas rather than Yorkshire (once described by Mary Abercrombie as "the Texas of England") (cf. Halliday 1985a). On the other hand, if he had been born in Texas, he would not have had the kind of fertile linguistic academic soil he had in Britain.

6.10 Some Advice to Young Scholars on Future Research

Isaac Mwinlaaru: What is your advice to young scholars in SFL who hope to explore the links between the social semiotic perspective on language and language as something that interacts with the brain? What areas need to be focussed on? What areas have been neglected?

Christian Matthiessen: Heidi Byrnes has made a very important point about what to do if you want to be heard in North America and especially in the US context. In terms of SFL, there are a number of people contributing to it and engaging with it in the US. While the numbers are growing, there are not so many of them, but globally that is not critically important, because there are many people in Asia, in Australia, in Latin America, in Europe and a growing number in Africa. You have to answer this question in terms of what it is that you want to achieve within different fields of activity, but (as noted above) tenor considerations obviously also matter — in particular, in terms of power structures. Heidi Byrnes said to me: "It is all very well to do the work in applied linguistics, the genre model and so on, but you will not have a breakthrough until you engage with theoretical linguistics in the US, focussing on issues those theoretical linguists are concerned with." She urged me to address research questions that theoretical linguists are concerned with in the US. I think she was right.

It comes back to your question about **the construction of dialogic interfaces**. How do you get people in another camp, another community, another tradition to take an interest in dialogue and really engage in it? Probably, it can only happen with new generations, i.e., people who are more intellectually and institutionally mobile and who can benefit career-wise from taking on and developing new insights.

But one has to be very cautious and careful. In another of our discussions, I mentioned what Ruth Brend said to me in around 1987 (see Sect. 1.4): even though she found Tagmemic Linguistics and Pike's work absolutely invaluable, she would not take on new PhD students wanting to use Tagmemics because by then she considered Tagmemics a dead metalanguage. If students used it in their PhD research, they would not have any career opportunities. That is obviously an important consideration (although it can be a self-fulfilling prophesy).

Unlike Tagmemics,[11] SFL has survived the very difficult period in linguistics when Chomskyan linguistics dominated from, say, the second half of the 1960s into the 1990s, and it has even flourished and expanded (though mostly outside linguistics departments, and certainly outside linguistics departments in the US — which is related to Heidi's point), but research students still have to consider career paths very carefully. That puts a constraint on what you can do.

6.10.1 Passionate Interests and Career Considerations

However, let's put career consideration aside for a moment. If someone is interested in linguistics, then this is already an unusual choice in terms of study paths. If they still go ahead and study linguistics, but at some point decide to pursue areas that are likely to be strategic in terms of career opportunities, then maybe it would make sense to re-think about the decision to go into linguistics in the first place or even to pursue an academic path at all. There are so many obstacles nowadays for anyone starting out on an academic career that unless they are passionate about what they want to do, they are likely to find it very difficult to sustain the effort and persevere despite all the difficulties involved in securing an academic position (and then, contract renewal, tenure, promotion).

So I would say that while it is important to keep practical career considerations in view, one should do what seems truly energizing, exciting and effective — what really fires you up. That was what I did myself, but arguably "nerdily" rather than strategically. If I had known what it would be like career-wise, maybe I would have thought twice. But fortunately I did not think about such issues at all. Thankfully, all the metrics that have now been introduced were not around, so I was not constrained in my imagination by these ghastly anti-intellectual metrics that are supposed to guide us in decisions about where to publish. I was still part of the generation where publications were valued in their own right, and would be judged in terms of the quality of the contribution they made, not by the number of stars of the journal, of the publisher based on citations and impact factors. The constraints that have been introduced based on such superficial metrics — features that are easy to measure but very likely totally trivial as easy-to-measure features usually are — are a true tragedy as far as research and scholarship are concerned. The people who have enabled this syndrome of deeply depressing developments should be encouraged to take a step or two back so that they can get a clear sense of the devastating long-term effects of this infatuation — this dangerous liaison — with superficial metrics. How did we get to

[11] Cf. Pike (2001), completed in the month before he died on 31 December 2000: "A second major change was the paradigm shift in linguistics from descriptive (or structural) linguistics to Chomskyan transformational linguistics. While this was good for anthropological linguistics — all linguistics is anthropological, by the way — it was unsettling for me personally because I came out of the Bloomfieldian descriptive linguistics school, and especially because the transformational revolution shoved my own tagmemics theory to the back-burner. A humbling experience for me, but not surprising when we think of Thomas Kuhn's (1970) model.".

this point? Well, I think the pattern is common: enablers make small decisions, each of which probably seems harmless enough, but the cumulative effect of apparently innocuous decisions can turn out to be an existential threat. A creeping crisis that may only be noticed when it is too late.

But on the other hand, it meant that I did not accumulate publications in "A" journals because I got invited to contribute to books, edited volumes, etc., which was wonderful. Even now I have to pay the price for that. But if one is starting out, then one has to think about publication options very seriously. But again, if that is all one is doing, then why be an academic? It is not that academic positions pay better than other positions. It is not that the working conditions are better. (Not really actually. To succeed as a junior academic at The Hong Kong Polytechnic University, and at many other universities, people have to work seven days a week, without any real breaks during the year from obligations and deadlines.) Why become an academic if you do not do what you really consider to be exciting, if you do not feel that you are doing illuminating and life-enhancing work? One has to somehow balance these considerations.

6.10.2 Areas to Focus on — Areas that Need Work

I feel that SFL, as developed by Michael Halliday and others working with him, has given me so much beyond a job and a career on so many fronts one meets going through life. If you are in this kind of position, that is very important.

Now, if you decide that you would really like to be part of the development of SFL, then it is completely rational and productive to try to get a sense of the trajectories of development and to identify gaps that need to be addressed. What has not been covered? Fig. 6.8 shows the attention given to the different strata of language in context by scholars in the Firthian-Hallidayan tradition (which Sampson 1980 calls the "London School"). One can think about language itself, moving from Firth to Halliday, and then try to flesh out the agenda for further work as far as stratal coverage is concerned (see e.g., Matthiessen 2009).

As Fig. 6.8 indicates, Firth worked mainly on the outer strata, i.e., context and phonology and phonetics. When Halliday began to develop what was to become SFL, he saw that he had to work on the inner ones, in particular the strata of the content plane. That was why he worked on lexicogrammar, starting in the 1960s and summarized initially in the first edition of his *Introduction to Functional Grammar* (Halliday 1985a, b). Then based on the work on lexicogrammar, it became possible to do more work on semantics and relate the metafunctional account of semantics to context (e.g., Halliday 1973, 1978, 1984b).

One can see this kind of trajectory, but work on the inner strata (lexicogrammar and phonology) has largely taken a backseat in recent times — in one way, naturally enough, since there are other areas that have needed attention. Part of the reason is the question of what pays off in doing linguistic discourse analysis or applications that involve discourse analysis, as in education, healthcare communication and forensic

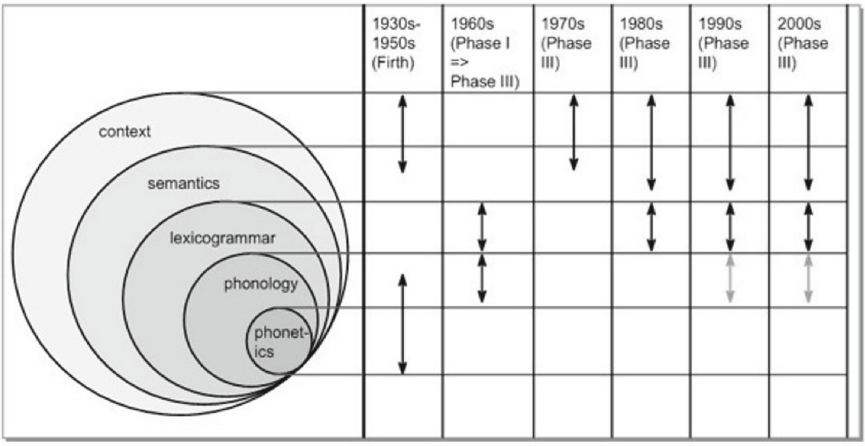

Fig. 6.8 Phases in the development of SFL out of Firthian linguistics, represented as expansion of coverage of the strata of language in context

linguistics. There are many applications where discourse analysis is central, and that already draw your attention to the aspects of the overall system of language. People have paid much or less attention to phonology since Firth and Halliday's earlier work on phonology, but here one has to clarify the different domains within phonology. There has been more work on prosodic phonology, but there is very little work on articulatory phonology (cf. Matthiessen 2021a, b). Systemic functional theory offers a very unique and considerable potential for the development of new insights into phonology, and the phonological systems of particular languages. Phonology would be a very exciting area to return to, building on what Firth and Halliday (in his early years) worked on and of course on subsequent developments (e.g., Bowcher & Smith 2014; Tench 1992).

6.10.3 Morphology

The focus on morphology in various linguistic traditions is partly an accident of the languages that these traditions were concerned with, as with traditional grammarians in the West focussing first on Ancient Greek and then Latin, and starting in the early twentieth century, American Descriptivists working on various indigenous languages with rich word grammars (e.g., Boas on Kwakiutl, now Kwak'wala, and Sapir on Takelma, a so-called polysynthetic language). On the whole, systemic functional linguists have been working on languages that do ***relatively*** less work at word rank, i.e., that have relatively less elaborated word grammars — even considering the systemic functional descriptions of languages like Japanese, Korean, Arabic or Finnish. I would love to see work on so-called polysynthetic languages. That would

be very valuable. Recently, I was asked by Edson Rosa de Souza, a scholar in Brazil, to contribute a chapter on systemic functional morphology (Matthiessen 2015a) to a book organized around questions asked of proponents of different linguistic theories, and I enjoyed the task he gave me thoroughly. Of course, I had to do it sketchily under time constraint, but it was very interesting to go back to morphology. When I studied Modern Standard Arabic in the second half of the 1970s and tried to learn the language, I began to think about the interesting challenges involved in developing a systemic functional description of Arabic word grammar, as part of the overall description of the grammar (see Bardi 2008).

6.10.4 Phonology and Graphology

Focussing on the expression plane of language, I think it would be fantastic to have the analogue of the accounts on phonology and phonetics for written language — i.e., systemic accounts of graphology and graphetics (cf. Sefton 1990). That would dovetail beautifully with multimodality, including all the work on images; and it would of course be very helpful in the analysis and interpretation of art made of graphology, as in the cases of Chinese and Arabic calligraphy — **graphological art** as a special case of verbal art (e.g., Hasan 1985), informed also of course by work on "visual semiotics". How will you work that out? You can start with John Bateman's (2008) stratification of the expression plane (layout) and content plane (e.g., RST [Rhetorical Structure Theory] analysis).

6.10.5 Semantics as Interface

Focussing on the content plane of language, I do think that semantics needs a great deal of further work. While there have been valuable descriptions of the internal organization of semantic systems — with most attention having been devoted to English, these contributions need to be supplemented in various ways. On the one hand, they need to be "upgraded" to ensure that they can support various kinds of reasoning — since reasoning depends on the natural logic of semantics, and, on the other hand, they need to be replicated for a much wider range of languages so that the great advances in the descriptions of the lexicogrammatical systems of a growing number of languages are gradually matched by semantic descriptions.

In addition, semantic accounts need to be developed to reflect the nature of semantics as an interlevel (e.g., Halliday 1973) — an interface to systems that operate outside language, both other social semiotic systems and what Michael Halliday and I in *Construing Experience through Meaning* (Halliday & Matthiessen 1999/2006) called "bio-semiotic systems", i.e., not only sensory systems, but also motor systems — sensorimotor systems. Here recent work by Adolfo García and his colleagues

can show the way, providing not only significant findings but also models of how to proceed (e.g., García & Ibáñez 2017; Trevisan & García 2019).

This last enterprise can be informed by the work that John Bateman started over a decade ago in Germany in the area of robotics working with people from Vortex (e.g., Bateman & Farrar 2005). If you try to link the kind of model that Michael Halliday and I sketched in *Construing Experience through Meaning* to other models of the same domains of experience, as John Bateman has done for the domain of space, you need to link the language-based model of space (the ontology of space as Bateman put it) to a model of space that can enable robots to navigate around space — modelling space in such a way that the robots can interpret it visually and use the model to move around it. In other words, the semantic model of space in language needs to be such that it can interface with the model of space designed to meet sensorimotor demands. The linguistic model of space must be able to construe visual information as meaning and it needs to be able to enact linguistic meaning as motor programmes. This view is comparable to that of "grounded cognition" and the "hub and spoke model" of meanings in semantics referred to briefly above. Bateman's line of research happens to involve robotic systems rather than human systems, but we can learn a great deal about demands on semantics as an interlevel form. At PolyU, we had discussions with researchers in geoinformatics about joint projects, but we did not succeed in attracting research funds. At the same time, we have carried on with linguistic research into the construal of our experience of space in different registers where space figures prominently: Abhishek Kashyap and I have published a number of papers on our exploratory research (Matthiessen 2015b; Matthiessen & Kashyap 2014; Kashyap & Matthiessen 2017, 2019).

6.10.6 Areas and Institutional Settings

We can also think about areas that need work — theoretical, descriptive, applied — in terms of institutions, and the settings or sites that relate to different areas of language in context. Systemic Functional Linguistics has, of course, been developed in such a way that it provides us with the resources for identifying what kinds of work is needed in different institutional settings — then planning it and carrying it out. Here we can still benefit from Malinowski's (1944) focus on institutions as the primary isolates of culture, from his conception of cultures as aggregates of institutions, and of course from more recent contributions such as Turner's (1997) account of institutional order. Some institutions have been part of the long-term programme of research and application from the start, institutions of education being a key example; but institutions have kept being added through the decades. There are institutions moving across cultures and languages, like translation and interpreting, which have been there for a long time. Much more work needs to be done, and can be done. Healthcare communication and the forensic contexts are also examples (e.g., Matthiessen 2013). The forensic area is one where not only discourse analysis, but also phonology and phonetics (graphology and graphetics) are involved. Other

institutions, like marketing and advertising, can also be involved because branding is so important nowadays (see Esterina Nervino's 2018 thesis that links SFL to this area). In these areas, there are interactions with the professional, which are very important.[12]

6.10.7 Areas of Engineering and Societal Significance

I would love to see a return to **computational modelling** because you can do things with computational models in terms of important applications and, because in certain intellectual contexts, it is only when you are forced to do computational modelling that you can really think through things theoretically. Computational modelling tends to be undervalued. I would also love to see this at a metalevel, like Wu Canzhong's (2000) and Mick O'Donnell's (1994) work. There is so much that can be done here. The software tools in corpus linguistics come out of language (or linguistics) department, and tend to be one-person efforts, which is a constraint (cf. McEnery & Hardie 2012: 43). But you cannot push the boundaries unless you get teams of people together in teams as in computational linguistics and Natural Language Processing. We should be part of that. I have the notion of a workbench for linguists, providing broad-range support for doing linguistics. I have tried to simulate with the suite of FileMaker Pro databases. Very interesting work can be done on so many fronts (see Sect. 7.7).

What seems very urgent now is **ecolinguistics**, which draws on Halliday (1990). Huang Guowen (e.g., 2016) is supporting the development of this at South China Agricultural University. That is what critical linguistics and critical discourse analysis have been engaged more with on the political stage. But we have to do this in a much more effective way so that those engaged in the work do not simply "preach to the converted" but rather provide strong and robust evidence that can influence people who are not yet convinced. At the same time, the framework has to be developed to the point where it can be introduced to pupils and students in the educational systems, empowering them as discourse analysts. This relates directly to the next topic.

There is also the scourge of **the post-truth society**. What do we do about this? How can people lie publicly — and visibly in everybody's view — and get away with it? How do we understand this? How do we analyse it? How can we give people the tools to resist it? Citizens and journalists can make positive contributions, but there

[12] If you examine different disciplinary boundaries, you can see that the roles you can play vary considerably. In some boundary areas, you can go in as an amateur; but in others, you really need to develop expertise across the boundary areas. One of the reasons for the really phenomenal success in educational linguistics was this: professional teachers came from education and did a PhD in linguistics, so they really became bimetalingual. Similarly, in computational linguistics, John Bateman is bimetalingual in computer science and linguistics, but that has been relatively rare. In some areas, you can come in from linguistics being a bit of an amateur, although you will have to learn to dialogue with the experts across the border; but if you move into something like neuroscience, you really need to have the professional expertise there.

can also be fake news. New semiotic technology can enable us to reveal patterns indicative of problems with the quality of discourse in large volumes of discourse — big data in the form of large fixed corpora or flow-through monitor corpora. Based on low-level patterns accessible through automated analysis, we can get some diagnostic indication of problems with veracity, bias, discrimination, and other current problem areas.[13] We can finally have the microscope or the telescope in linguistics, and we should use that opportunity.

But this changes the conditions for meaning-making, and we must think of ways to get at fake news, the Disneyfication of discourse and the post-truth societies. There is no shortage of work that we need to undertake. Of course, that always links back to education. That means we try to turn this into something to be put in the hands of everybody. In the early 1980s, Bill Mann had the notion of turning artificial intelligence into something that everybody could do in their garage (in a society less dominated by cars than the US, one might choose another place, of course!). In a real sense, that is now actually happening, including the continued development of high-level programming languages appropriate to such tasks and protocols for collective cumulative developments. (Our doctoral students may now undertake to learn Python to do their own programming work.) But by the same token, we need the same conception of equipping people linguistically so that they can deal with the complexities of the phase of human history that we find ourselves in.

Currently, although quite a few systemic functional **descriptions** of a fairly wide range of languages have been produced since the 1990s, there is an urgent need for descriptions of languages that have not yet been described in systemic functional terms and also for expansions of the descriptions that have already been produced, often involving the move from lexicogrammatical descriptions to include semantic accounts. Interestingly — but not surprisingly, there have arguably been more contributions in the last couple of decades to multimodal studies than to multilingual ones: multimodality has become very fashionable, and it is so much easier to do investigations of multimodality than of multilinguality[14] because the fact reminds that the most complex semiotic system ever evolved is language. So, please engage with different languages! Communities around the world urgently need appliable descriptions of their languages — descriptions that can serve as resources in education, healthcare, local media and administration, and many other community activities where the local modes of meaning are central to the living of everyday life. This takes us back to

[13] One important example is the work by Linus Ng in his final year project in our department at PolyU. He compiled a corpus of Brexit debates leading up to the referendum and used LIWC (http://liwc.wpengine.com) try to identify possible lies. He produced a report entitled "'Let's deal with this big fat lie once and for all': A linguistic analysis of inaccurate claims in four Brexit debates", and he presented part of his results at ESFLC at the University of Salamanca.

[14] I realize that this may come across as provocative, and I don't normally try to be provocative; but one way of getting a sense of what I'm suggesting is to contrast the task of describing a language that has not yet been described, at least not in anything approaching a comprehensive way based on text in context, with the task of describing a semiotic system other than language that has not yet been given adequate descriptive attention. The two are certainly not mutually exclusive; it makes sense to imagine future studies where linguists turn to the task of describing a "new" language and pay attention to accompanying semiotic systems in face-to-face interaction from the start.

the discussion of "commitments". The attempt to produce comprehensive descriptions of different languages spoken around the world is a field-oriented commitment, but the effort to make the description appliable as a resource for the community of speakers is a tenor-oriented commitment. When we reach this level of insight into what linguistics can do, we have gone far beyond the notion that the question "How does the natural language user work?" lies at the centre of functional linguistics — as I have argued, it does not, and also far beyond the "cognitive commitment".

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