



Articles

Ideational semiosis: a tri-stratal perspective on grammatical metaphor

Semiose ideacional: uma perspectiva triestratal para a metáfora gramatical

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ABSTRACT

This paper addresses the challenge of analysing texts for ideational grammatical metaphor. It undertakes this task from the perspective of recent work on field (Doran & Martin in press) and discourse semantics (Hao 2020a). In doing so it highlights the benefits of adopting a tri-stratal perspective on experiential and logical grammatical metaphor (Hao 2020b) – bringing all three of the most relevant strata (i.e. field, discourse semantics and lexicogrammar) into the picture.

Keywords: *grammatical metaphor; ideational semantics; field; knowledge building.*

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RESUMO

Este artigo enfrenta o desafio de analisar textos pelo prisma da metáfora gramatical. Realiza esta tarefa ideacional pela perspectiva de trabalho recente sobre campo (Doran & Martin, no prelo) e semântica discursiva (Hao 2020a). Ao enfrentar tal desafio, destaca os benefícios de se adotar a perspectiva da metáfora gramatical lógica e experiencial (Hao 2020b) ? trazendo três dos estratos mais relevantes (isto é, campo, semântica discursiva e lexicogramática) para o debate.

Palavras-chave: *metáfora gramatical; semântica ideacional; campo; construção de conhecimento.*

1. Taking stock

Halliday's (1985) *An introduction to functional grammar* established multiple agendas for functional linguistic research around the world. In this paper we focus on the legacy of just one of these, namely grammatical metaphor – arguably the most powerful of his insights as far as the dialectic of theory and practice he christened as ‘applied linguistics’ is concerned (Halliday 2008). Simon-Vandenberg et al.'s (2003) edited collection documents several dimensions of the impact of this work; and it has played a key role in the development of our understanding of academic discourses of science (Halliday & Martin 1993, Halliday 2004), social science (e.g. Wignell 2007) and history (e.g. Coffin 2006). More recently it has fertilised ongoing dialogue between Systemic Functional Linguistics (SFL) and Maton's (2013) Legitimation Code Theory (LCT), especially in relation to LCT's concepts of semantic gravity and semantic density (e.g. Christie & Martin 2007, Christie & Maton 2011, Martin et al. 2020, Maton et al. in press).

This paper is in effect a stock-taking exercise, written from a linguistic perspective and oriented to the challenge of analysing texts for ideational grammatical metaphor (and setting aside issues relating to interpersonal grammatical metaphors of mood and modality, which have recently been productively explored in Taverniers 2018). It addresses this task from the perspective of recent work on field (Doran & Martin in press) and discourse semantics (Hao 2020a). In doing so it highlights the benefits of adopting a tri-stratal perspective on

experiential and logical grammatical metaphor (Hao 2020b) – bringing all three of the most relevant strata (i.e. field, discourse semantics and lexicogrammar) into the picture.

2. Renovating field

Martin (1992) characterised field as a related set of activity sequences oriented to some global institutional purpose, alongside the dedicated taxonomies of the participants involved in these activities, organised by classification (type-subtype relations) and composition (part-whole relations). Doran & Martin (in press) update this perspective, mapping field as a set of resources for construing phenomena. In simple terms (Figure 1) this renovation allows for both a dynamic perspective (on activities) and a static perspective (on items); and it allows for gradable, possibly measurable properties to be assigned to both activities and items. The terms have been carefully selected to avoid confusion with terms on other strata. So what Martin (1992) referred to as activity sequences are here referred to as activities; and what he referred to as participants are here referred to as items (the concept of property, at the level of field, was not made explicit in his model).

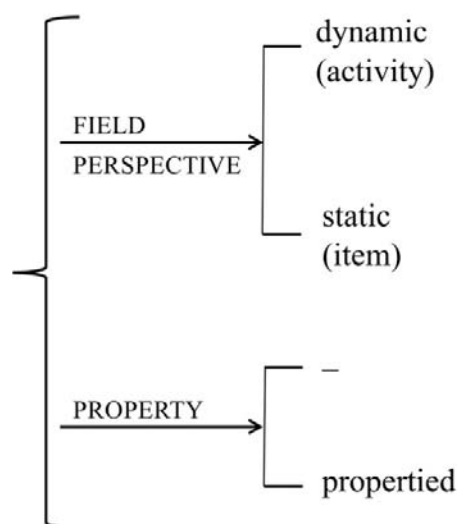


Figure 1 – Basic parameters of field (Doran & Martin in press).

Taking examples from the field of immunology, the network can be illustrated as follows (based on Greenwood & Allen (2004: 118-119). From the dynamic perspective of activity we might focus on how the body responds defensively to injury (i.e. inflammation). This general activity is construed on a more specific tier by Greenwood & Allen as:²

1. blood vessels increase in diameter and become more permeable
2. phagocytes migrate and destroy invading microbes
3. new tissue is created to replace damaged tissue

And if we focus on step 2 then they construe this activity on a still more specific tier as:

- 2.1 phagocyte detects microbe
- 2.2 phagocyte engulfs microbe
- 2.3 phagosome forms, enclosing microbe
- 2.4 phagosome fuses with lysosome
- 2.5 enzymes break down microbe into chemical constituents
- 2.6 indigestible material is discharged from phagocyte

Turning to a static perspective, we might focus on the items involved in phagocyte migration – including from a compositional perspective blood vessel walls, red blood cells, phagocytes, macrophages and bacteria; and including from a classification perspective recognition of neutrophils and macrophages as two types of phagocytic cell, which phagocytic cells are types of white blood cell, which white blood cells are types of cell.

Properties associated with these activities and items might include amoeba-like (phagocyte cells), dormant (microbes), permeable (blood vessels), and painful, hot, red, swollen (sites of tissue damage).

In addition we need to allow for phenomena to be reconstrued in a given field. This is an important resource for technicalising a field of inquiry (Halliday & Martin 1993, Halliday 1998, 2004), especially

2. For Doran & Martin steps 1 and 2 would each in fact comprise two activities (increase in diameter plus become more permeable, and migrate plus destroy).

in science (but across academic and administrative discourse). For example, we might itemise the property ‘permeable’ as **permeability** (i.e. as something we can digitally measure and thereby quantify). Or we might activate a property like ‘painful’ (saying for example that a cut **becomes more painful**). We might also itemize an activity, by naming it (e.g. **phagocytosis** as a step in **inflammation**, or **detection, ingestion, phagosome formation, lysosome fusion, digestion and discharge** as steps in **phagocytosis**); this in effect turns tiers of activity into a composition hierarchy, and also allows for classification of activities (e.g. inflammation as a type of non-specific resistance). Or we might activate an item, as it becomes part of something else (e.g. **phagosome fuses with a lysosome**). Examples of reconstruals are set out in Table 1.

Table 1 – Examples of field reconstruals

Field reconstruals	Example
itemized property	<i>permeability (of blood vessels); diameter (of something round)</i>
activated property	<i>(the cut) becomes more painful; (blood vessels) enlarge</i>
itemized activity	<i>inflammation; phagocytosis; discharge</i>
activated item	<i>phagosome fuses with a lysosome; microbe is broken down into chemical constituents</i>

The framework I am summarising here is set out in more detail in Doran & Martin (in press). The key point for this paper is that it establishes activity, item and property at the level of field, and allows for various reconstruals of one type of phenomenon as another.

3. Renovating discourse semantics

As far as ideational meaning is concerned one of the most influential models is Halliday & Matthiessen (1999). They classify phenomena into three main types: sequence, figure and element – with sequence complexing two or more figures and figures configuring two or more elements (with elements further classified as process, participant or circumstance). The overall purpose of this publication was to encourage

researchers to allow for the possibility of interpreting cognition as semiosis, with concepts conceived as meanings. And they drew heavily on SFL models of ideational grammar in their framework (especially Halliday 1985/1994 and Matthiessen 1995). Unfortunately this involved re-deploying terminology which had been well-established in descriptions of lexicogrammar (e.g. Process, Participant, Circumstance for role types; process, participant, circumstance for role fillers; expansion and projection for types of sequence) – in effect using their own grammatical terms as semantic ones (cf. pp. 50, 56).

Hao (2020a) takes their work as point of departure, but adopts a discourse semantic perspective (following Martin 1992) as opposed to Halliday & Matthiessen's clause semantics one. In doing so she adjusts some terminology to avoid the confusion of grammatical and semantic categories. The general scaffolding of sequence, figure and element is maintained; but elements are subclassified as entity, occurrence and quality. In addition Halliday & Matthiessen's subclasses of entity are revised for the field of biology. One crucial revision as far as this paper is concerned has to do with the recognition of activity entities (2020a, p. 60), which she characterises as names of macrophenomena. Everyday examples would include *trip, voyage, tour, journey, jaunt, junket, pilgrimage, outing, expedition, excursion*; examples from Hao's data include *method, experiment, study, project*. Seen from the perspective of field they are names of activities (e.g. *inflammation, phagocytosis, detection, ingestion, phagosome formation, lysosome fusion, digestion* and *discharge* as introduced above).

Another important development has to do with Hao's recognition of instigated figures. These involve a figure (i.e. some combination of entity, occurrence and quality) which is brought about by an entity. For example, in the following instigated figures, a human entity (*senior researchers*) helps the research assistant to do the experiment, just as an activity entity (*vasodilation*) facilitates phagocytes squeezing through blood vessel cells:

Senior researchers helped her do the experiment.

Vasodilation facilitates phagocytes squeezing between blood vessel cells.

These developments put us in position to clearly distinguish ideational terminology at the strata of field, discourse semantics and lexicogrammar. Thus a tiered activity (technically a momented one) corresponds to a sequence in discourse semantics and a clause complex in lexicogrammar; an untiered activity (technically an unmomented one) corresponds to a figure in discourse semantics and a clause in lexicogrammar; an item corresponds to an entity in discourse semantics and a nominal group in lexicogrammar; and a property corresponds to a quality in discourse semantics and either a nominal group Epithet or circumstance of Manner in lexicogrammar. These unmarked correlations are summarised in Table 2.

Table 2 – Ideational correlations across strata

Field	Discourse semantics	Lexicogrammar
activity (tiered)	sequence	clause complex
activity (untiered)	figure	clause
item	entity	nominal group
property	quality	Epithet, Manner

By way of completing this summary of Sections 2 and 3 of this paper, we can add two addenda to the unmarked correlations in Table 2. First, keep in mind that an activity can be alternatively realised in discourse semantics by an activity entity. Second, an activity, item or property triggering an activity is realised in discourse semantics as an instigated figure. Both these points are critical to our discussion of grammatical metaphor below.

4. Revisiting grammatical metaphor

A fundamental challenge for any linguist exploring grammatical metaphor lies in establishing what counts as a congruent realisation of discourse semantics in grammar and what counts as a metaphorical one. Developing distinctive terminology for discourse semantic and lexicogrammatical phenomena is obviously one critical step, in order

to be clear about which stratum we are talking about – as afforded by the developments outlined above.³

Another critical step lies in distinguishing transcategorisation from grammatical metaphor. Transcategorisation is a grammatical process whereby one class is derived from another. Depending on the language there may be more or less morphological marking of this process (lots for example in languages like Spanish or Tagalog, and next to none in Chinese or Vietnamese). In a language like English, the less ‘Germanic’ the word, the more likely there is to be morphological evidence. Drawing on the immunology examples given above, we encounter nouns derived from verbs (e.g. *fusion* from *fuse*), nouns derived from adjectives (e.g. *permeability* from *permeable*) and verbs derived from adjectives (e.g. *enlarge* from *large*); and if we cast our net more widely we can note an increasing propensity for English speakers to derive verbs from nouns (cf. *text me* vs *send me a text message*, *let’s goal* vs *score a goal*, or *to secretly progress the talks* vs *to make progress in the talks*). In all these examples we have a shift in grammatical class, sometimes marked morphologically (*fusion*, *permeability*, *enlarge*) and sometimes not (*text*, *goal*, *progress*).

It is important to distinguish transcategorisation (an intrastratal grammatical process) from grammatical metaphor; the latter has to be understood as a relationship between strata, not within one (Martin 2008). It is very crucial in this regard not to assume that all nominalisations (i.e. nouns derived from another word class) involve ideational grammatical metaphor. They may or they not. It depends on what the nominal in question is realising. To take a more quotidian example, if I write that *the player texted his manager*, then we have three derivations (two nominalisations, *player* and *manager*, and one verbalisation, *texted*) but no grammatical metaphor – because *player* and *manager* both realise discourse semantic entities and *texted* realises a discourse semantic occurrence. In this example a

3. Compare Halliday & Matthiessen (1999, p. 99) where semantic elements are characterised as realised by grammatical classes (in the proportions process realised by verbal group, participant realised by nominal group and circumstance realised by adverbial group or prepositional phrase) with Halliday (e.g. 1985 and subsequent editions) where these proportions hold between ranks in lexicogrammar, not between strata. Halliday (1998, p. 190) uses the same proportions interstratally in his canonical paper on grammatical metaphor.

discourse semantic figure has been congruently realised by a clause. Returning to our immunology field, in Hao's terms, all of the following 'nominalisations' are congruent, because they all realise activity entities in the field of immunology: *inflammation, vasodilation, phagocytosis, detection, ingestion, phagosome formation, lysosome fusion, digestion, discharge*.⁴ As used by Green & Allen (p. 118), every one of these nominals refers to an activity at the level of field (an itemised one); but none of them realise a discourse semantic figure.⁵

We should probably also clarify at this point what we mean by metaphor – including the traditional lexical metaphors which inspired Halliday's notion of grammatical metaphor (Martin 2020). For purposes of this paper let's say that a metaphor involves two meanings, in some kind of figure and ground⁶ relationship (referred to as a source to target relation in Lakoff & Johnson (1990) influenced cognitive linguistics), with the former in some sense symbolising the latter. To analogise from the game of chess, it takes a knight's move to shift perspective from lexicogrammar to discourse semantics – because, informally speaking, the meaning is not being directly realised in the wording. If we write for example that *South African politics erupted in a rebellion in black townships throughout the country*, then we have both lexical and grammatical metaphors to deal with. Lexically speaking, we have to deal with the rebellion being likened to a volcanic eruption; grammatically speaking we have to deal with a nominal group being used to symbolize a figure (i.e. *a rebellion in black townships* symbolising 'black people rebelled in townships').⁷

SFL's stratified content plane (as discourse semantics realised by lexicogrammar for purposes of this paper) provides a useful scaffolding

4. In Halliday's (1998) terms these nominalisations are 'dead' metaphors; in Taverniers' (2003) terms they are 'domesticated' ones.

5. Cf. Hao (2020b), which argues that nominalisations technicalised as activity entities can still be used metaphorically to realise figures if the unfolding discourse so requires.

6. The 'figure and ground' motif referenced here is from Gestalt psychology – this is a different use of the term figure from that deployed by Halliday & Matthiessen and Hao.

7. The co-text indicates that *rebellion* is not an activity entity here (referring for example to a historical event such as *the Boxer Rebellion* or *the Indian Mutiny*); the 'eruption' is variously coded as *revolutionary days, the 1984 to 1986 uprising, various forms of resistance, a major challenge, the conflict, clashes* and *violence*. Ultimately decisions of this kind need to be informed by expertise in a particular field, based on knowledge about what is or is not technicalised (i.e. itemised) in that field's discourse.

for this ‘incongruent’ relationship. The lexicogrammatical structure of grammatical metaphors captures their ‘literal’ meaning (the contribution of Lakoff & Johnson’s ‘source’ to interpreting the metaphor): e.g. Actor (*South African politics*), Process (*erupted*), Manner (*in a rebellion*), Location (*in black townships*), Location (*throughout the country*).⁸ Discourse semantics can then be deployed to capture the ‘figurative’ meaning (the contribution of Lakoff & Johnson’s ‘target’ to interpreting the metaphor): e.g. ‘black people got more and more frustrated with government policy and rebelled in townships throughout the country’. Setting aside the lexical metaphor (i.e. volcanic eruption standing for political rebellion), we now have an occurrence figure (‘black people rebelled in townships throughout the country’) in which a human entity (‘black people’) combines with an occurrence (‘rebelled’) in locations specified by spatial entities (‘townships’, ‘country’). The two levels of analysis, and critically the tension between them, constitutes the grammatical metaphor (Martin 2020).

In order to deal with the challenge of distinguishing discourse semantic from lexicogrammatical ideation, Hao (2020) develops Martin’s (1992) proposals for nuclear relations. Her approach to modelling a congruent example like *the phagosome ingests the microbe* is outlined in Figure 2. The bottom three rows provide for requisite grammatical analysis, showing the classes of group and phrase realising experiential clause functions (labelled from both a transitive and ergative perspective following Halliday 1985 and subsequent editions).

The discourse semantics analysis treats the figure as an orbital structure (cf. Martin 1995, 1996 on types of structure) – whose centre comprises an occurrence (‘ingest’), extended by an entity (‘microbe’) to form the figure’s nucleus, extended agentively by another entity (‘phagosome’) in its inner orbit. As we can see, in a congruent example of this kind there is no stratal tension. A figure is realised by a clause – whose Process realises an occurrence, and whose Participants realise entities.

8. The Locations *in black townships* and *throughout the country* could alternatively be analysed as embedded phrases qualifying *rebellion*.

In the diagram clause functions are aligned with discourse semantic elements to highlight the congruence of the relation between them. This alignment takes advantage of the fact that experiential clause structures in English are ‘sequenced’ with respect to MOOD and THEME options, not TRANSITIVITY ones (so the order in which constituents are presented is not relevant to this discussion).

	(inner) orbit		
	nucleus		
	centre		
discourse semantics	occurrence	+ entity	+x entity
	<i>ingests</i>	<i>the microbe</i>	<i>the phagosome</i>
lexicogrammar (congruent)	Process: material	Medium/Goal	Agent/Actor
	verbal group	nominal group	nominal group

Figure 2 – Stratified analysis of a congruent example (figure realised by clause)

Hao’s approach to modelling a metaphorical example is outlined in Figure 3. Therein the congruent realisation outlined in Figure 2 is contrasted with the metaphorical realisation of the figure as a nominal group (i.e. *ingestion of the microbe by the phagosome*). The presentation makes the stratal tension clear. This time round the occurrence is realised as a Thing (not a Process), and its extending entities are realised in Qualifiers (not as clause rank Participants). Considered from the perspective of metafunctions, ideational metaphors of this kind, involving just one figure, can be thought of as experiential metaphors. Discourse semantic sequences are not implicated.

	(inner) orbit		
	nucleus		
	centre		
discourse semantics	occurrence	+ entity	+x entity
	<i>ingests</i>	<i>the microbe</i>	<i>the phagosome</i>
lexicogrammar (congruent)	Process: material	Medium/Goal	Agent/Actor
	verbal group	nominal group	nominal group
lexicogrammar (metaphorical)	nominal group		
	Thing	Qualifier	Qualifier
	<i>injection</i>	<i>of the microbe</i>	<i>by the phagosome</i>

Figure 3 – Comparison of a congruent with a metaphorical realisation (experiential metaphor)

What about logical metaphors, where a sequence is in fact involved (Hao 2018, 2020a)? Analysis of *the phagocyte ingests the microbe then the enzymes digest it* is provided in Figure 4 below. This example involves a discourse semantic sequence of two figures, one following the other. The figures themselves have the same structure as the figure in Figures 2 and 3. Hao terms the relationship between them connexion (abbreviated as conx in Figure 4); this allows us to reserve the term conjunction for grammatical analysis. This sequence is realised grammatically as a clause complex – a paratactic enhancing one, notated 1 x2 (following Halliday 1985 and subsequent editions).

Ideational semiosis

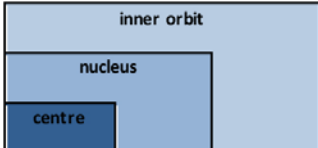
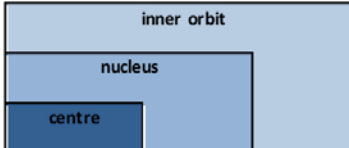
							
discourse semantics	occurrence figure			conx	occurrence figure		
	occurrence	+ entity	+x entity		occurrence	+ entity	+x entity
	1			x2			
	<i>ingests</i>	<i>the microbe</i>	<i>the phagocyte</i>	<i>then</i>	<i>digest</i>	<i>it</i>	<i>enzymes</i>
lexicogr. (cong.)	Pro: mat	Med/Go	1 st Ag/ Act		Pro: mat	Med/Goal	1 st Ag/Act
	v. gr.	n. gr.	n. gr.	conj	v. gr.	n. gr.	n. gr.

Figure 4 – Stratified analysis of a congruent example (sequence realised by clause complex)

An alternative realisation, involving logical metaphor, is analysed in Figure 5. Once again the presentation makes the stratal tension clear. This time round each discourse semantic figure is realised as a Participant (i.e. *ingestion of the microbe by the phagocyte* and *digestion of the microbe by the enzymes*), and the connexion between them is realised as a Process (i.e. *precedes*). What was congruently realised as two clauses in Figure 4 is now encoded in a single clause. The realisation of both figures is ‘scrambled’ along the same lines as Figure 3. As we can see, logical metaphor implies experiential metaphor – i.e. realising a sequence in a clause depends on ‘down-ranking’ the realisation of sequenced figures as a group or phrase.

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	<i>ingests</i>	<i>the microbe</i>	<i>the phagocyte</i>	<i>then</i>	<i>digest</i>	<i>the microbe</i>	<i>enzymes</i>																			
lexicogr. (cong.)	Pro: mat	Goal	Actor		Pro: mat.	Goal	Actor																			
	v. gr.	n. gr.	n. gr.	conj.	v. gr.	n. gr.	n. gr.																			
lexicogr. (metaphr.)	nominal group			v. gr.	nominal group																					
	Token			Process	Value																					
	<i>ingestion of the microbe by the phagocyte</i>			<i>precedes</i>	<i>digestion of the microbe by enzymes</i>																					

Figure 5 – Comparison of a congruent with a metaphorical realisation (logical metaphor)

Hao’s concept of activity entity plays an important role in distinguishing congruent from metaphorical realisations. The discourse semantic and lexicogrammatical structure of *inflammation triggers phagocytosis* is presented in Figure 6. Both Participants in this circumstantial identifying relational clause realise activity entities – in the grammar *inflammation* plays the Token role and *phagocytosis* the Value; and the Process *triggers* realises an occurrence. So while we can argue from the perspective of field that two activities (itemised ones) are involved, from the perspective of discourse semantics and lexicogrammar the realisation relationship is a congruent one. There is no grammatical metaphor – neither experiential nor logical.

Ideational semiosis

	(inner) orbit		
	nucleus		
	centre		
discourse semantics	occurrence	+ entity	+x entity
	<i>triggers</i>	<i>phagocytosis</i>	<i>inflammation</i>
lexicogrammar (congruent)	Process: relational	Value	Token
	verbal group	nominal group	nominal group

Figure 6 – Congruent clause involving activity entities realised as Participants (Value and Token)

We also have to take care with instigated figures. Suppose a figure such as ‘lysosomes merge with phagosomes’ is blocked by certain microbes: e.g. *some microbes stop lysosomes from merging with phagosomes*. In this case we certainly have ‘cause in the clause’, since an ‘extra’ Agent is involved (*some microbes*). But there is only one figure. So only an experiential metaphor is possible – e.g. *some microbes stop the merger of lysosomes with phagosomes*; or, if we needed to treat the whole instigated figure as a Participant, then would arrive at an alternative experiential metaphor such as *prevention of the merger of the lysosome with the phagosome*.

This brings us to consideration of a borderline area between experiential and logical metaphor. Consider the following series of examples. In (i) an activity entity (‘lysosome phagosome fusion’) instigates a figure (‘enzymes break down microbes’).

- (i) **lysosome phagosome fusion helps enzymes break down microbes**

In (ii), from a grammatical perspective an embedded clause rather than a nominal group functions as the extra Agent.⁹ This suggests an interpretation involving two figures, one playing the instigating role ('lysosomes combine with phagosomes') in another ('enzymes break down microbes').

(ii) [[lysosomes combining with phagosomes]] helps enzymes break down microbes

But this brings us very close to (iii). Here we have a sequence (i.e. *lysosomes merge with phagosomes and so microbes are broken down by enzymes*) – involving a canonical logical metaphor (i.e. a sequence realised by a clause).¹⁰

(iii) the merger of lysosomes with phagosomes leads to the break down of microbes by enzymes

In a sense the analysis is somewhat over-determined. We can arguably derive (ii) from either an instigated figure or a sequence. If we need to distinguish experiential from logical metaphors for analytical purposes, we'll have to decide where to draw the line in interpreting examples of this kind. Following Hao (2020a), it is perhaps clearest to treat both as logical metaphors – since two figures are involved, in a causal relationship with one another. The critical point for our present discussion is that Doran & Martin's (in press) revision of field and Hao's notions of activity entity and instigated figure enable us to draw a line. A tri-stratal perspective, with distinctive terms on for each stratum, is key.

9. We will set aside for purposes of this discussion the question of whether the realisation of figures by embedded clauses should be treated as a kind of grammatical metaphor – is down-ranking a clause enough to suggest that there are two meanings, in a figure to ground relationship, the one symbolising the other? To what extent, in other words, does down-ranking 'thingise' a figure? To what extent is the meaning potential of the language elaborated rather than curtailed?

10. Hao (2020a) prefers to treat examples like (ii) and (iii) both as logical metaphors, since two figures are involved.

5. Analysing grammatical metaphor

In recent papers, arising from SFL's dialogue with LCT, Martin & Matruglio (2013) and Martin (2017) revisit the register variables mode and field by way of adopting a broad metafunctionally diversified approach to context dependency (presence) and technicality (mass). The ability of analysts to reach consensus around what is and what is not a grammatical metaphor is crucial to both of these enterprises.

As far as presence is concerned, ideational grammatical metaphor is a key variable in measuring the degree of abstraction in discourse. Since they implicate experiential metaphors, logical metaphors are arguably more abstract than experiential ones; and both types are less concrete than congruent realisations lacking stratal tension. It is thus important to be able to distinguish logical metaphors from experiential ones. It is equally important not to confuse metaphorical realisations with congruent ones involving activity entities. And it is also important not to confuse grammatical metaphor with transcategorisation (since the latter may be involved in the former, but not necessarily so). Anything we want to say about waves of presence as a text unfolds, or as pubescent students transition through schooling, or as a culture invents or borrows writing depends on replicable consensus around how ideational grammatical metaphor is measured. A tri-stratal perspective is key.

As far as mass is concerned, ideational grammatical metaphor is a key variable in tracking the phylogensis and ontogenesis of technicality (as live metaphors are 'domesticated' as itemised activities or itemised properties in the production and reproduction of knowledge) and in tracking the logogenesis of explanations (as the semantic potential of nominal groups and clauses is brought to bear on connexions between figures and construals of instigation). Realised congruently, connexion and instigation are blunt instruments as far as construing phenomena in uncommon sense discourse is concerned (cf. Achugar & Schleppegrell 2005, Halliday & Martin 1993, Halliday 1998, 2004, Martin 1993, 2002, 2003, 2007a, b, 2016). Anything we want to say about the semiotic mass of discourse as a text unfolds, or as students move through schooling, or as a culture deploys writing to build academic knowledge and its implementations in technology and administration

(Christie & Martin 1997, Martin & Veel 1998) depends on replicable consensus around how ideational metaphor is deployed to construe and evaluate phenomena. A tri-stratal perspective is key.

6. Teaching/learning grammatical metaphor

Let's bring this down to earth. The following text, 'The body's defences' is from the senior secondary biology textbook (Greenwood & Allen 2004, p. 116) we have been drawing examples from in this paper. It is taken from a larger section called 'Defence and the immune system' and nicely illustrates, among other things, the role played by grammatical metaphor in building uncommon sense knowledge in biology (formatting follows the original).

The body's defences

If microorganisms never encountered resistance from our body defences, we would be continually ill and would eventually die of various diseases. Fortunately, in most cases our defences prevent this from happening. Some of these defences are designed to keep microorganisms from entering the body. Other defences remove the microorganisms if they manage to get inside. Further defences attack the microorganisms if they remain inside the body. The ability to ward off disease through the various defence mechanisms is called **resistance**. The lack of resistance, or vulnerability to disease, is known as **susceptibility**.

One form of defence is referred to as **non-specific resistance**, and includes defences that protect us from any pathogen. This includes a first line of defence such as the physical barriers to infection (skin and mucous membranes) and a second line of defence (phagocytes, inflammation, fever, and antimicrobial substances). **Specific resistance** is a third line of defence that forms the **immune response** and targets specific pathogens. Specialised cells of the immune system, called lymphocytes, produce specific proteins called antibodies which are produced against antigens.

It opens with a sentence about microorganisms encountering resistance from our body defences. Two transcategorisations are deployed (*resistance* and *defences*). Both arguably involve grammatical

metaphor, at least for relatively naive newcomers to the field. A more congruent realisation of the figures in play might run along the lines of *If our body didn't defend itself by resisting microorganisms, we would be continually ill and would eventually die of diseases.*

If microorganisms never encountered *resistance* from our body *defences*, we would be continually ill and would eventually die of various diseases.

As the text unfolds however, it becomes clear that resistance and defences are being developed as itemised activities in the field – i.e. as activity entities. Resistance is explicitly technicalised as such, by definition; the text's bold face graphology draws attention to this process.

The ability to ward off disease through the various defence mechanisms is called **resistance**.

Once established as an activity entity, its absence (i.e. *lack of resistance*) is used to technicalise another grammatical metaphor, *vulnerability to disease* – as susceptibility (once again highlighted in bold face).

The lack of resistance, or vulnerability to disease, is known as **susceptibility**.

Once resistance is established as an itemised activity, it can be sub-classified – as non-specific resistance and specific resistance are in turn defined. And so here we have, in a nutshell, a key process whereby uncommon sense discourse builds knowledge – namely, recast congruent construals of everyday experience as grammatical metaphors, and then kill off the stratal tension by technicalising the nominal as an itemised activity (or property) in a given field, and once there, classify it and/or compose it as required.

Unlike resistance, in this text defences does not go through this process; but it is clear that it is being treated as an activity entity as the text unfolds (c.f. Hao 2020b).¹¹ The text takes full advantage of

11. It might be argued that a definition is unnecessary at this level of schooling, since most students would have encountered the term *defence* when it is being used to realise an activity entity in more familiar fields (sport, chess, war etc.).

the meaning potential of its nominal realisation to build a taxonomy of defences (technicalising non-specific resistance, specific resistance and immune response as it goes). These nominal realisations of defence are listed below (the title of the section is formatted in bold and larger font, in line with Greenwood & Allen's formatting).

The body's defences

our body defences
our defences
some of these defences
other defences
further defences
the various defence mechanisms
one form of defence
defences that protect us from any form of pathogen
a first line of defence
a second line of defence
a third line of defence

The pedagogic implications of this interplay between live and dead metaphors are significant. As outlined in Rose (2020a, b) and Rose & Martin (2012), scaffolding interaction cycles (Figure 7) are critical to successfully mentoring students into uncommon sense discourse. And success depends in students being adequately prepared for tasks (so they can all succeed) and then having their achievements supportively elaborated once the task has been achieved.



Figure 7 – Scaffolding interaction cycle

In order to apply successful scaffolding interaction cycles to literacy tasks, some sensitivity to the complementarity of technicality and abstraction is important. We have to keep in mind that unpacking technicality in preparation and elaboration phases of the cycle necessarily involves a field shift – as itemised activities and properties, realised as activity entities, are rendered in more common sense terms. Unpacking ‘susceptibility’ as *how likely we are to get ill* for example involves a move out of the biology discourse in which it opposed to resistance, and in which resistance is classified as non-specific and specific, among other things. Care needs to be taken that students are not moved out of uncommon sense discourse and stranded there. Re-packing, in subsequent phases or subsequent iterations of the cycle is required (Martin 2013). If we resuscitate dead metaphors in other words, then we also have to kill them off again.

Similarly for abstraction. Unpacking grammatical metaphors in preparation or elaboration phases of the cycle necessarily involves a mode shift – as metaphorical discourse is rendered in more spoken terms. Reworking *if microorganisms never encountered resistance from our body defences, we would be continually ill and would eventually die of various diseases* along the lines of *If our body didn't defend itself by resisting microorganisms, we would be continually ill and would eventually die of diseases* as we did above involves a move out of the written academic discourse we are in fact teaching them to understand. But learning to read and write grammatical metaphors in secondary school is the gatekeeper on which access to further education depends. So care must be taken, in subsequent phases or iterations of the cycle, to move back and forth between congruent and metaphorical discourse – since as we have stressed in this paper, it is the metaphorical discourse that engenders uncommon sense. Carefully planned shunting, sensitive to the complementarity of live and dead metaphors, is the key.

7. Consensus

In this paper we revisited SFL's modelling of grammatical metaphor from a tri-stratal perspective – reconsidering ideational meaning at the strata of field, discourse semantic and lexicogrammar. This perspective allows us to consider variation in the way field is realised in discourse

semantics as well as variation in the way discourse semantics is realised in lexicogrammar.

For example, a tiered second line of defence activity at the level of field, such as ingestion followed by digestion, can be realised in discourse semantics as a sequence, a figure or an activity entity:

sequence

‘microbes are engulfed by phagocytes wrapping pseudopodia around them to form a vesicle and then microbes are broken down by enzymes into chemical constituents’

figure

‘phagocytes destroy microbes’

activity entity

‘phagocytosis’

Turning to discourse semantics realised in lexicogrammar, both sequences and figures can be realised congruently or metaphorically. A sequence can be realised as a clause complex or a clause:

clause complex

the phagosome ingests the microbe and then enzymes digest the microbe

clause

ingestion of the microbe by the phagosome precedes digestion of the microbe by enzymes

And a figure can be realised as a clause or a nominal group:

clause

the phagosome ingests the microbe

nominal group

ingestion of the microbe by the phagosome

Hao’s notion of activity entity plays a critical role in sorting out this variation. Since activity entities are names of activity, they do not configure field activity as an occurrence figure. This means that they are always realised as nominal groups – sometimes as nominalisations (e.g. *specific resistance*), sometimes as nominalisations borrowed from

another language (e.g. *phagocytosis*, *haemostasis*) and sometimes as underived nouns – e.g. *method*, *project*). Thus activity entities do not have congruent and metaphorical realisations the way figures do. Recognition of this discourse semantic category is an important step in separating live grammatical metaphors from dead ones, something which is crucial if we want to sort out degrees of technicality (mass) and abstraction (presence) in discourse.

The concept of instigated figures also has an important role to play as far as distinguishing experiential and logical metaphor is concerned. For figures instigated by an entity (including activity entities), there is no sequence. So only an experiential metaphor is possible. Logical metaphors require two figures, in some kind of temporal or causal relationship to one another.

We have also argued that sensitivity to the difference between technicality and abstraction has a role to play in literacy pedagogy. There students will encounter texts that domesticate grammatical metaphors as technical terms – killing off stratal tension in order to elaborate an uncommon sense field. They have to learn to read and understand this process, and often to reproduce it in assessment exercises (to ‘prove’ they understand and aren’t just using fancy words they don’t understand). This brings awareness of grammatical metaphor into the picture, since shifts in abstraction (between congruent spoken and metaphorical literate discourse) and shifts in technicality (between common and uncommon sense) are both going on.

Multimodalists are fond of the metaphor of ‘multiplying meaning’ (Lemke 1998) when talking about the synergy between language and other modalities of communication. But there is an arguably much more powerful synergy inside language itself, afforded by the stratification of its content plane (as discourse semantics and lexicogrammar) and the phylogenesis of grammatical metaphor. It behoves applicable linguists and semioticians to keep working on both phenomena (a la Doran 2018), since they supplement one another as we construe meaning across modalities in knowledge production, reproduction, application and beyond.

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Recebido em: 30/07/2020

Aprovado em: 28/08/2020