International Journal of English Language Studies
ISSN: 2707-7578
DOI: 10.32996/ijels
Journal Homepage: www.al-kindipublisher.com/index.php/ijels

IJELS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

A Corpus-Based Study of Interpersonal Metaphors of Modulation in Academic English

Man Guo[1] ✉ and Nan Gao[2]
[12]School of Foreign Languages, Sun Yat-sen University, Guangzhou, China
Corresponding Author: Man, Guo, **E-mail**: gman@mail.sysu.edu.cn

| ABSTRACT
This article presents a study on the synchronic distributions of interpersonal metaphors of modulation based on the British National Corpus (BNC). The synchronic research reveals that interpersonal metaphors of modulation are mode-sensitive to written texts. Regarding genre distribution, metaphorical obligations driven by the explicit orientation dominate fiction texts. In contrast, the objective orientation drives obligations to be more prevalent in academic texts or more technical genres. The objective orientation of metaphorical inclinations is notably prevalent in newspapers and magazines other than academic texts. Besides, the findings highlight that the inherent personal and subjective characteristics of interpersonal modulations remain unchanged in their metaphorical forms, demonstrating less objectivity compared to ideational metaphors in highly technical disciplines.

| KEYWORDS
Corpus-based; interpersonal metaphor; modulation; orientations

| ARTICLE INFORMATION
ACCEPTED: 20 July 2023 **PUBLISHED:** 30 July 2023 **DOI:** 10.32996/ijels.2023.5.3.2

1. Introduction

Grammatical metaphor (GM), suggested by Halliday (1985), is one of the most important characteristics of academic, bureaucratic, and scientific discourses. It is one of the crucial contributions of Systemic Functional Linguistics (SFL) to linguistics and education. In SFL theory, two models that theorize GM have been suggested: the stratal model (Halliday, 1985; Halliday, 1998; Martin, 1992; Martin, 1993; Halliday & Martin, 1993) and the semantic model (Halliday & Matthiessen, 1999). The definition of GM from the perspective of the stratal model might be the resetting of the relationship between discourse semantics and lexicogrammar, creating a stratal tension. The semantic model theories grammatical metaphor as a semantic junction, and consequently, Halliday and Matthiessen base their categorization of GM on the joining of semantic categories. The definition and types of GM vary according to each model, as the notions of stratal tension and semantic junction draw on different linguistic configurations that lead to GM. The stratal model, adopted in this essay, theorizes GM about the stratal tension between discourse semantics and lexicogrammar (Halliday, 1985; Halliday, 1998; Martin 1992, 1993; Halliday & Martin, 1993). The definition of GM from the perspective of the stratal model might be the resetting of the relationship between discourse semantics and lexicogrammar, creating a stratal tension.

The two main GM categories within the stratal model are interpersonal and ideational metaphors (Halliday, 1985). Ideational metaphor is categorized into two types: experiential and logical (Martin, 1992), while interpersonal metaphor consists of metaphors of mood and modality. For example:

(1) a. Because technology is getting better, people are able to write business programs faster.
b. Advances in technology are speeding up the writing of business programs.
(2) a. Open your mouth, please, so that we can shove this in.
b. Kyle, can you open your mouth so we can shove this in?

(3) a. Probably that pudding never will be cooked.
b. I don't believe that pudding ever will be cooked.

Interpersonal metaphor is categorized into metaphors of mood and modality, creating a stratal tension between discourse semantics and lexicogrammar. Mood metaphors construe a discourse semantic speech function through an incongruent mood option in grammar. To illustrate, the speech function command might be realized as a command, e.g., *close the door*, using the imperative mood. Alternatively, the command might also be realized as a suggestion, as in "*Can you close the door?*" using interrogative mood or a declarative clause, as in "*The door is open*." Modality refers to the area between positive and negative polarity, i.e., to the cline between "yes" and "no". Modality is congruently realized by modal finite, e.g., *can*, *may*, *could*, and mood adjuncts, e.g., *possibly*. These instances are implicit ways of realizing speech function in grammar and are considered congruent, as they do not create stratal tension. However, speech function might be explicitly projected in a clause complex, creating stratal tension, e.g., *I believe …, I think …, it is possible to argue that …, it is obvious that …*The first two examples are considered explicit subjective, whereas the other two are considered explicit objective (Halliday, 1985). The congruent realization of speech function occurs within clauses through modal finite such as *can, may, could,* and *should* (implicit modal) or through modal adjuncts, e.g., *possibly* or *probably* (implicit mood adjunct). Alternatively, speech function can be realized within the modality system through projecting clause complexes consisting of mental and idea clauses, e.g., "*I think…*", "*I believe*" (explicit subjective), or objectively such as "*It is possible to argue that…*" (explicit objective). Detailed illustrations of types of interpersonal metaphors can be found in the next section.

Grammatical metaphor has attracted the great attention of systemicists around the world. (e.g., Davidse, 1991, 1998; Davidse & Simon-Vandenbergen 2008; Halliday 1996, 1998; Martin 1992, 1993, 1995; Matthiessen 1993, 1995a, 1995b, 1998; Matthiessen & Nesbitt 1996; Ravelli 1998; Simon-Vandenbergen 2003; Taverniers 2002, 2006, 2008) since its first formal publication (Halliday, 1984).

From the synchronic perspective, the ideational metaphor has been tested to be not only mode-sensitive (Ravelli, 1996; Hyland, 2009) and genre-sensitive (Halliday, 1989; Martin & Rose, 2003; Biber, 2006) but also discipline-sensitive (MacDonald, 1994; Unsworth, 1997; Swales, 1998; Charles, 2003; Coffin, 2006; He & Yang, 2018). Of the two types of interpersonal metaphor, metaphors of mood are found more common in spoken texts (Schleppegrell, 2001; Devrim, 2015) as it involves indirect speech acts or shifts from one type of mood to another (Painter, 1999). However, the second type of interpersonal metaphor, i.e., metaphor of modality, is more likely to be found in written language (Devrim, 2015; Liardét, 2018). Although more commonly explored in spoken conversation (e.g., Yang, 2013), interpersonal metaphors can be integrated into academic texts to evaluate and negotiate the certainty of a proposition while obscuring the author's voice as the source of the evaluation, presenting the assertions in objective and impersonal ways(Biber, 2006; Hewings & Hewings, 2002; Hyland & Tse, 2005; Wu, 2007). The interpersonal metaphors of modalization are found to be genre-sensitive (He 2021). However, it remains unclear whether the interpersonal metaphors of modulation, including obligation and inclination, also have the same preference in genre distribution as that of modalization.

This article aims to investigate the mode, genre, and discipline preferences of interpersonal modulation metaphors. For this purpose, we will employ authentic language data from large-size corpora to conduct a quantitative study. A brief introduction to interpersonal metaphors is presented in Section 2. The corpus and the data collection are introduced in Section 3. The research findings on the synchronic distributions of interpersonal modulation metaphors are presented in Section 4. A discussion of the findings follows in Section 5.

2. A sketch of the interpersonal metaphor

The interpersonal metafunction deals with language as interaction. The most fundamental types of speech roles are just two: are just two: (i) giving and (ii) demanding (see Halliday, 1984). Either the speaker is giving something to or demanding something from the listener. The thing that is given or demanded may be goods-&-services or information. These two variables define the four primary speech functions of offer, command, statement, and question. See Table 1.

Table 1. Giving or demanding, goods-&-services or information

Role in exchange	(a) goods-&-services	(b) information
(i) giving	"Offer" Would you like this teapot	"Statement" He's giving her the teapot.
(ii) demanding	"Command" Give me that teapot!	"Question" What is he giving her?

One grammatical area which belongs to the interpersonal component of language is the grammar of mood. This is the grammar of interrogatives, declaratives, imperatives, and the like. The choice between these different mood types enables us (i) to argue about propositions (e.g., we can demand information by means of a question, using the interrogative mood, or give information by means of a statement, using the declarative mood); and (ii) to negotiate about actions to take place (e.g., we can express a command by using the imperative mood.

Another interpersonal area of grammar is modality, which refers to the intermediate degrees between the positive and negative poles. What the modality system does is to construe the region of uncertainty that lies between 'yes' and 'no'. However, there is more than one route between the two, one for propositions and one for proposals. In a proposition, there are two kinds of intermediate possibilities: (i) degrees of probability: 'possibly/probably/certainly'(as in (4)); (ii) degrees of usuality: 'sometimes/usually/always' (as in (5)). It is these scales of probability and usuality to which the term "modality" strictly belongs and hence be referred to as modalization. In a proposal, there are two kinds of intermediate possibility: (i) degrees of obligation: 'allowed to/supposed to/required to' (as in (6)); (ii) degrees of inclination: 'willing to/anxious to/determined to' (as in (7)). The scales of obligation and inclination are referred to as modulation to distinguish them from the modality of modalization.

(1) That'll *probably* be John. (probability)
(2) He'll *usually* sit there all day. (usuality)
(3) You *are supposed to* know that. (obligation)
(4) I'm *anxious* to help them. (inclination)

Of the two types of interpersonal metafunctions, Halliday and Mathieson (2004) distinguish between basic, non-metaphorical expressions and metaphorical ones, namely interpersonal metaphors. With regard to mood, each speech function has its standard, default type of encoding: statements are encoded by the declarative, questions by the interrogative, and commands by the imperative. However, the derivation from the standard, the most straightforward realization of a speech function with the mood types, will create a metaphor of mood. For example:

(5) a. Send your proposal by email, please.
b. Could you send your proposal by email, please?
c. I would advise you to send it by email.

The examples in (8b) and (8c) are different metaphorical variants of expressing a command that can also be expressed, in its most straightforward, standard way, as an imperative (8a). The metaphorical examples in (8) include the interrogative mood type (the standard expression of requests for information) and the declarative mood type (the normal way to express the speech function of giving information).

As mentioned above, modality refers to the area of meaning that lies between yes and no – the intermediate ground between positive and negative polarity, and it can be either modalization indicating degrees of probability or usuality or modulation demonstrating some degree of obligation or inclination. With modality, it is very clear that certain grammatical environments constitute metaphorical realizations of modality. The basic distinction that determines how each type of modality will be realized is the orientation: that is, the distinction between subjective and objective modality and between the explicit and implicit variants. It is the separation of modality and modalized proposition, with the former realized by a projecting clause and the latter by a projected clause, creating interpersonal metaphor of modality (Halliday & Matthiessen, 2014). See Table 2.

Table 2. Modality: examples of 'type' and orientation combined

	Subjective	**Subjective**	**Objective**	**Objective**
	Explicit	**Implicit**	**Implicit**	**Explicit**
Modalization: Probability	***I think*** Mary knows	Mary***'ll*** know	Mary ***probably*** knows	**It's *likely*** that Mary knows
Modalization: Usuality		Fred***'ll*** sit quite quiet.	Fred ***usually*** sits quite quiet	***It's usual*** for Fred to sit quite quiet
Modulation: Obligation	***I want*** John to go	John ***should*** go	John***'s supposed*** to go	***It's expected*** that John goes
Modulation: Inclination		John***'ll*** help	Jane***'s keen*** to help.	

Modulated clauses occur frequently as offers, commands and regularly implicate a third person. They are statements of obligation and inclination made by the speaker in respect of others. We may infer that modulations are mode-sensitive to spoken discourses and less appropriate for written genres because the former one usually contains more exchange of goods-&-services. Besides, several studies have examined how the use of anticipatory *–it* structures, namely the *it* interpersonal metaphors, varies across different registers (Biber & Conrad, 1999; Biber, Conrad, & Cortes, 2004; Biber & Barbieri, 2007), disciplines (Cortes, 2002, 2004; Freddi, 2005; Hyland, 2008; Jalali, Rasekh, & Rizi, 2009), and find that they are strong discriminators of academic, formal discourse among native English speakers. We can hereby hypothesize that the interpersonal metaphors of objective modulations are more common in academic texts, while the subject modulations tend to appear more likely in less academic ones such as fiction texts.

3. Methodology

3.1 Corpus

This research used the British National Corpus (BNC) as the target corpus because the BNC contains texts from a wide range of genres, including fiction, newspaper, magazine, academic, and non-academic. These genres are also organized with regard to different specific disciplines. For example, the academic and the non-academic sub-corpora cover the disciplines of medicine, natural science, law and education, engineering, and humanities and arts. This can facilitate the comparative study of not only the genre but also the discipline distributions of modulation. In addition, the BNC is available online (http://corpus.byu.edu/bnc), and it provides convenient search tools which are helpful for retrieving relevant constructions concerning modulation.

3.2 Data collection

With Modulation, both obligation and inclination can be expressed in either of two ways: (a) by a finite modal operator, e.g., *you should know that I'll help them*; (b) by an expansion of the Predicator through verbal group complexing, (i) typically by a passive verb, e.g., *you're supposed to know that*, (ii) typically by an adjective, e.g., *I'm anxious to help them*. The modal verbs realize the implicit orientations of modulation, and mental projecting clauses realize the explicit orientations of modulation.

In a declarative clause, the modal verb appears unmarked between the subject and the predicate, a passive verb or adjective may be positioned after the verb *be*, and mental projecting clauses will typically be placed preceding the projected clauses. For example:

(1) a. Beveridge thought a small part of the new scheme's income *should* go to the NHS as it had under the old. (BNC_W_ac_soc_science) [implicit subjective obligation]
b. *I want you to* sort him out and bring homework home. (BNC_W_ac_polit_law_edu) [explicit subjective obligation]
c. The museum *is expected to* attract a million visitors a year from its opening in 1995. (BNC_W_newsp_brdsht_nat_misc) [implicit objective obligation]
d. *It is hoped that* the British unit might do the same. (BNC_W_newsp_other_science) [explicit objective obligation]
e. They want to know when, where, how, why, and who with. (BNC_W_newsp_tabloid) [implicit subjective inclination]
f. The mother of a mixed race adopted daughter, she *is keen to* see more black families recruited. (BNC_W_non_ac_soc_science) [implicit objective inclination]

The speaker or writer may have indefinite ways to express their opinions. We only used the modal expressions or constructions proposed by Halliday & Matthiessen (2014) in this research. See Table 3 for a summary of the typical modal expressions.

To retrieve these modal expressions from the BNC, we wrote the following regular expressions (REs):

RE (1) [=must] [vv*]
RE (2) I [vv*] [nn*]|[pp*] to -[y*]
RE (3) [nn*]|[pp*] [vb*] [v?n*] to
RE (4) It [vb*] [v?n*] that|to
RE (5) [=will] -be [vv*]
RE (6) [vb*] [=willing]|[=unwilling] to -[y*]

Table 3. Typical expressions of modulation in English.

	Implicit		Explicit	
	Subjective	Objective	Subjective	Objective
Obligation	modal verb [lexical verb]	be [expected, supposed, allowed, required] to	I [want, expect, require] you to	It's [expected, supposed, allowed] to
Inclination	I [want, wish] to; I will	be [willing, keen, eager, prepared] to		

The first regular expression can be described as any construction consisting of any verb being equal to *must* and followed by any lexical verb. We can retrieve the implicit subjective obligation using this regular expression as in (10).

(2) a. The school should go out to the community, and the community should also support and be part of the school. (BNC_W_ac_polit_law_edu)

b. He must go to the Court of Chancery to get, among other things, an injunction to forbid A to go on. (BNC_W_ac_polit_law_edu)

c. And that the future reports to the committee should consider green implications, including the financial implications of green issues. (BNC_S_meeting)

The second regular expression can be described as any construction consisting of the first personal pronoun *I* and any lexical verb and any noun or personal pronoun, and the infinitive marker followed by anything other than a punctuation mark. Using this regular expression, we can retrieve projecting clauses realizing explicit subjective obligation. For example:

(3) a. I want you to go because you want to go. (BNC_W_fict_prose)
b. Therefore, *I urge you* to support the Conservative resolutions I now put forward. (BNC_ S_meeting)
c. *I need you* to tell me the story of your girlhood. (BNC_W_fict_prose)

The third regular expression can be described as any construction consisting of any noun or personal pronoun and any form of the verb be and any past participle followed by the infinitive marker *to*. Using this regular expression, we can retrieve constructions realizing implicit objective modality of obligation as in (12).

(4) a. Because the home was planning to cut down its numbers, I was asked to find somewhere else to live. (BNC_W_ac_soc_science)

b. He was forced to address himself specifically to the bishops' arguments in their letter. (BNC_W_ac_humanities_arts)

c. Students are encouraged to believe that they must be broad and hopefully able to cope with any Physical problem. (BNC_W_ac_polit_law_edu)

The fourth regular expression can be described as any construction consisting of anticipatory *it* and any form of the verb *be* and any past participle followed by the complementizer *that*. Using this regular expression, we can retrieve projecting clauses realizing explicit objective obligation as in (13).

(5) a. *It was agreed to* hold a vote on the bus this Sunday, as there were people who would normally be attending and also. (BNC_S_meeting)
b. *It is suggested that* Olugboja is unlikely to become a complainant's charter. (BNC_W_ac_polit_law_edu)
c. *It is recommended that* vigorous resistance is displayed on all occasions rather than capitulation. (BNC_W_non_ac_medicine)

The fifth regular expression aims to search construction consisting of any verb being equal to *will* and any word other than *be* followed by any lexical verb. Here we do not consider the expression of *will* directly followed by any lexical verb (*will+verb*) as implicit subjective inclination because it's highly dependent on context and thus very uneasy to be identified as modulation. Using the regular expression, we can retrieve implicit subjective inclination. For example:

(6) a. At some stage, teachers will also *wish to* take groups further afield to see examples that are some of the best of their kind. (BNC_W_ac_polit_law_edu)
b. They *want to know* if we want to have a stall there? (BNC_S_meeting)
c. The Crown Office *will not* take any direct interest in the programme and the legal question of identification, at least until the BBC decides formally to proceed with filming. (BNC_W_newsp_other_arts)

The sixth regular expression can be described as any construction consisting of any form of the verb *be* and any adjective being equal to *willing* or *unwilling* followed by *to*. Using this regular expression, we can retrieve constructions realizing implicit objective inclination. For example:

(7) a. Governments *are reluctant to* allow planning permission or import licenses. (BNC_W_newsp_brdsht_nat_misc)
b. People in government *are unwilling to* understand clear, simple things,' said one economist in the capital. (BNC_W_newsp_other_social)
c. Neil Kinnock is warning the Labour Party to *be ready to* fight an election at any time. (BNC_S_brdcast_news)

Using the above six regular expressions, we retrieved 216,741 occurrences of modulations listed in Table 4 from the BNC.

Table 4. Data collected from BNC

		Implicit		Explicit	
		Subjective	Objective	Subjective	Objective
Modulation	Obligation	57824	58609	3507	13231
	Inclination	71333	12237		

4. Synchronic distribution of interpersonal metaphors of modulation in the BNC

4.1 Mode distribution of interpersonal metaphor of modulation

In this section, we investigated the hypothesis that modulation prefers spoken discourses to written genres in the BNC. Using the six REs, we collected 133,171 occurrences of obligation and 83 570 occurrences of inclination from two modes. See Table 5.

Table 5. Mode distribution of Modulation

	Obligation		Inclination	
	Raw	Standard	Raw	Standard
Spoken	9260	929.38	10373	1,041.08
Written	129426	8885.62	83570	6,165.08

To facilitate comparison, we converted the normalized frequencies of the two types of modulation to that of equal total frequency. See Figure.1

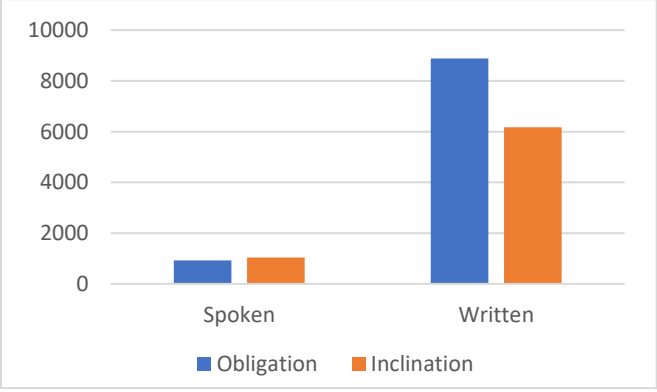


Figure 1. Mode distributions of Modulation

Figure 1 shows that modulations are mode-sensitive. This is not in agreement with our hypothesis that they are more prevalent in spoken discourses. On the contrary, both the modulation of obligations and inclinations occur more in written genres. The reason for the higher frequency in written texts might be that it is not the modality of modulation but the imperative mood that has the characteristic of spoken discourses. If we take a further look into modulation, it can be found that obligation should be considered as the incongruent form of an imperative clause, which is the most congruent way for a command. The connection between 'imperative' clauses and modulation is why modulation has been characterized as the 'imperative type' of modality. On the one hand, an 'imperative' clause imposes an obligation; on the other hand, the imperative tag checks the addressee's inclination to comply (Halliday 2014).

The results from Figure 2 are in line with that of Figure 1. It should be noted that both the congruent forms of obligation and inclination, i.e., implicit subjective obligation and inclination (He, 2021) and the metaphorical form of explicit subjective obligation,

have higher frequencies in spoken texts, while relatively lower frequencies in written languages. Moreover, the latter one enjoys a significantly high frequency and the polar opposite of that in written texts. This may be explained as spoken genres emphasize the direct expression of the speaker's stances or attitudes; thus, subjectivity is one of the core characteristic features, and explicit subjective type is the least impersonal form for the expression of one's perspective.

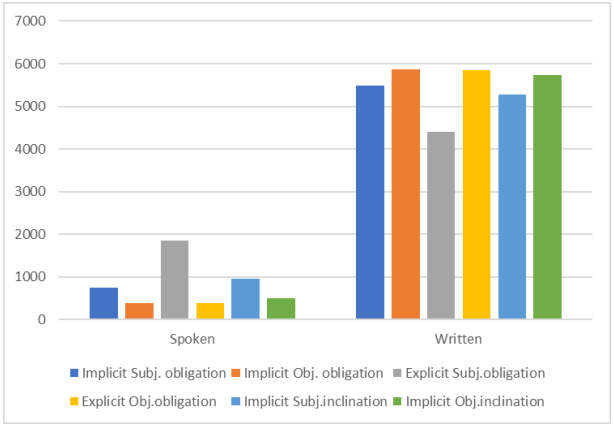


Figure 2. Mode distributions of interpersonal metaphors of modulation

4.2 Genre distribution of interpersonal metaphors of modulation

In this section, we compared the genre distribution of obligations and inclinations. Using the regular expressions, we retrieved 216,741 occurrences of modulations from the BNC, which includes 133,171 obligations and 83, 570 inclinations. It can be hypothesized that objective modulations are more common in academic texts, while subject modulation tends to appear more likely in less academic ones. See Table 6.

Table 6. Genre distribution of Modulation

	Obligation		Inclination	
	Raw	standard	Raw	standard
FICTION	16357	1187.37	16084	1167.56
MAGAZINE	7814	1264.01	6744	1090.92
NEWSPAPER	14031	1286.98	9792	967.95
NON-ACAD	24970	1639.37	10899	715.56
ACADEMIC	26607	1735.43	9498	619.5

To facilitate comparison, we converted the normalized frequencies of the two types of modulation to equal total frequencies. See Figure 3.

Figure 3 shows that both modulations of obligation and inclination are genre-sensitive. As 'technical' is a graded rather than a binary quality, and of the written genres, fiction texts are the least technical, and academic texts are the most technical (Copeck et al., 1997). From the figure, it is not difficult to tell that the modulation of obligation displays an upward frequency from the least technical genre of fiction to the academic one. On the other hand, Modulation of inclination tends to prefer fiction other than academic texts, showing an exactly reversed downward cline. The reason could be that modulation of obligation is favored in regulating texts which always contain more imperative commands and clear attitudes instead of negotiable offers with relatively lower certainty in inclinations. However, the presence of obligation, which is closely connected with imperatives, would sometimes be seen as a kind of 'manipulative' or face-threatening practice. However, acceptance of imperatives can come from a variety of sources, such as tradition, the recognized need for word economy, stylistic variation, and an 'extradiegetic' concern to capture the reader's attention at certain key junctures and selectively focus her gaze.

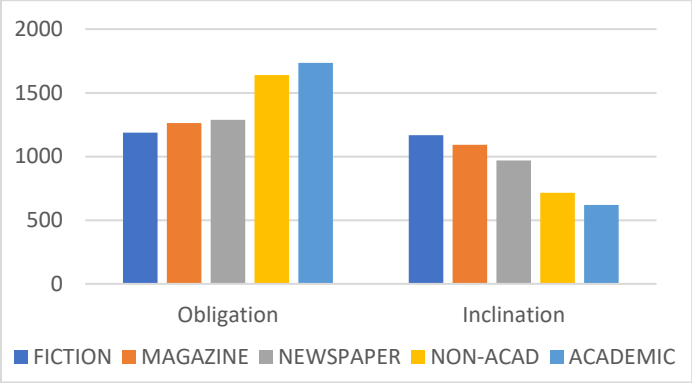


Figure 3. Genre distributions of modulation

The general distribution of obligations and inclinations may indirectly indicate the correctness of our second hypothesis that modulation does have a cline along the different technical degrees of 5 genres. However, it remains unknown whether the objective modulations enjoy a higher frequency in more technical genres. Taking a further probe into the genre distribution of interpersonal metaphor of modulation, it will be found these metaphorical expressions are also genre sensitive and in agreement with the previous hypothesis. See Table 7.

Table 7. Genre distribution of interpersonal metaphors of modulation

	Obligation				Inclination	
	Implicit		Explicit		Implicit	
	Subj.	Obj.	Subj.	Obj.	Subj.	Obj.
FICTION	10175	4170	1487	525	14530	1554
MAGAZINE	3679	3350	212	573	5785	959
NEWSPAPER	5382	7337	186	1126	7638	2154
NON-ACAD	8399	12841	168	3562	8896	2003
ACADEMIC	9786	13270	123	3428	7838	1660

To facilitate comparison, we converted the normalized frequencies of the two types of modulation to equal total frequencies. See Figure 4 and Figure 5.

Figure 4 shows that implicit and explicit obligations dominate academic and non-academic texts and seldom occur in fictions texts. With the objective obligations, there is an apparent cline of frequency increases along the 5 genres from fiction to academic texts and a polar opposite one for the explicit subjective obligation. With the subjective obligations, the implicit subjective obligations remain almost even in fiction and academic texts and indistinctively lower among the other three genres. Regardless of the congruent form of implicit subjective obligation, the other three metaphorical obligations are genre-sensitive, and their distributions are in agreement with our hypothesis that objective modulations prevail more in academic genres. Figure 5 displays that the implicit subjective inclination keeps decreasing along the increasing technicality of the 5 genres, while it is quite unexpected that the implicit objective inclination occurs most in newspapers other than academic texts.

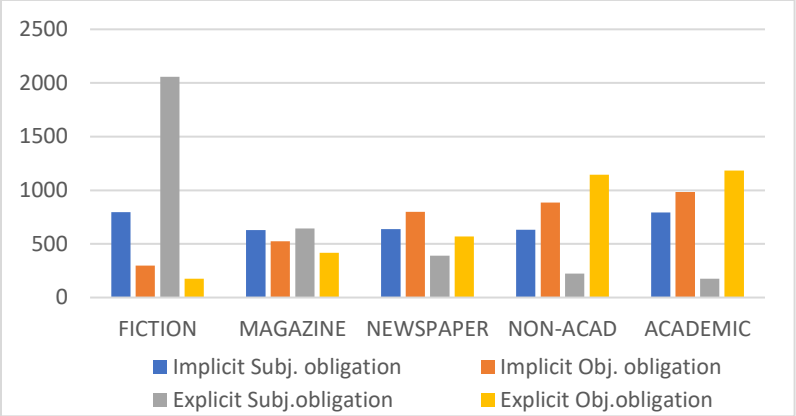


Figure 4. Genre distribution of obligations

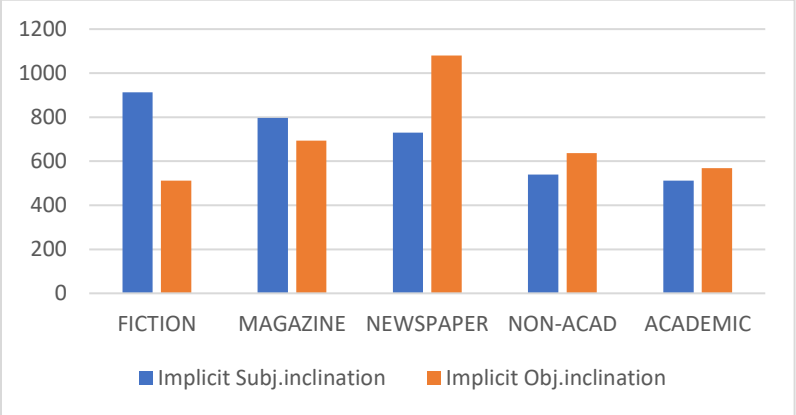


Figure 5. Genre distribution of inclinations

The reason for relatively even frequencies of implicit subjective obligation both in fiction and academic texts may result from the different communicative characteristics of the varieties. On one hand, the relatively high occurrence of implicit subjective obligations in fiction is because it is commonly required to exchange more goods-&service in such genres than that in non-fiction texts, and this could also explain the high frequency of implicit subjective inclination in fiction texts. On the other hand, that same occurrence in academic texts may be due to a subtle balance between the demands for a "tough" stance from the writer and objectivity(metaphors of the objective orientation). Consider, if an instruction manual is to constantly maintain a harmonious reader-writer relationship and to exhibit its deference to the community, what then would be the motivation for the use of this potentially risky device? With the significant frequency of implicit objective inclination in newspapers, the possible reason might be such expression meets the linguistic demands for both brevity and objectivity while it is the accuracy instead of brevity that is required in academic texts.

4.3 Discipline distribution of modulation

The research described in 4.1 and 4.2 shows that interpersonal metaphors of modulation are both mode-sensitive and genre sensitive. In this section, we will further investigate and compare the discipline distribution of the two types of modulation in the academic and non-academic sub-corpora of the BNC. We choose these two genres because they are both divided into the same sub-corpora or disciplines, such as social science, natural science, engineering, arts, medicine, and law, in the BNC.

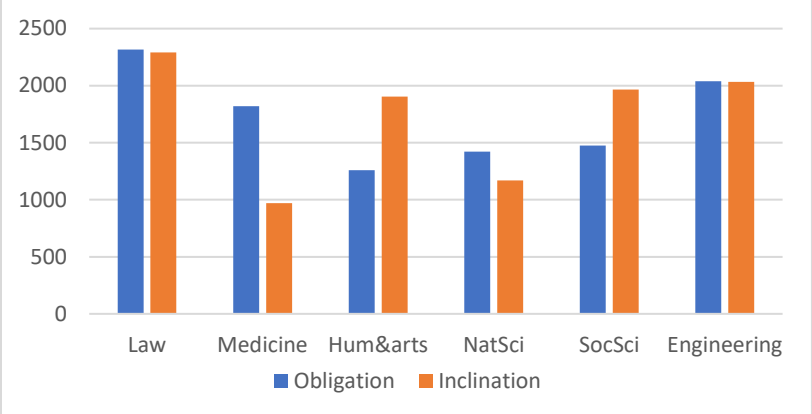
Using the six REs, we collected 28,494 modulations from the academic sub-corpora and 32697 modulations from the non-academic sub-corpora. See Table 8 and Table 9.

Table 8. Discipline distribution of modulation from the academic sub-corpora

Academic						
	Law	Medicine	Hum&arts	NatSci	SocSci	Engineering
Obligation	10697	2573	4150	1571	6232	1384
Inclination	3317	432	1990	418	2632	447

Table 9. Discipline distribution of modulation from the non-academic sub-corpora

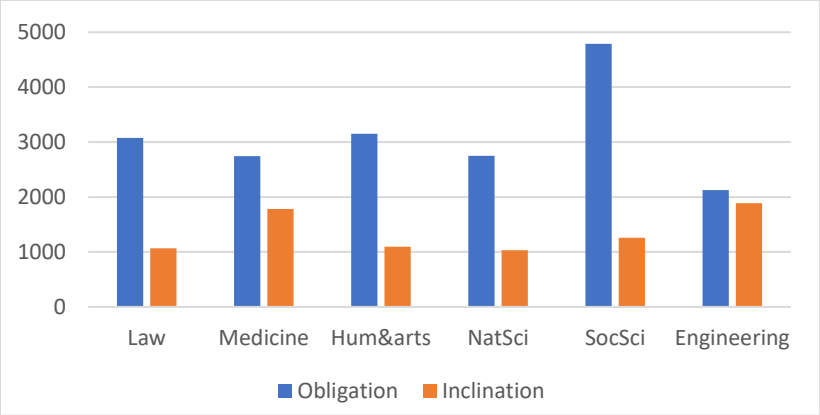
Non-Academic						
	Law	Medicine	Hum&arts	NatSci	SocSci	Engineering
Obligation	6723	922	5432	3369	6865	1659
Inclination	2194	592	1913	1683	3107	1410



Academic						
	Law	Medicine	Hum&arts	NatSci	SocSci	Engineering
Obligation	2317.78	1821.2	1259.08	1422.33	1475.21	2039.42
Inclination	2290.60	970.40	1904.44	1168.89	1966.78	2033.89

Figure 6. Discipline distribution of modulation in academic sub-corpora of the BNC

Figure 6 shows that the highest standard frequency of modulation goes to the law texts (4608.38) and the lowest frequency to the NatSci texts (2591.22). We then divided these six disciplines into natural sciences (medicine, natural science, and engineering) and social sciences (law, humanities and arts, and social science). Independent sample T-test shows that the two groups of data are not significantly different ($p = 0.413 > 0.05$), indicating that modulations are not discipline sensitive in the academic sub-corpus of the BNC.



Non-Academic						
	Law	Medicine	Hum&arts	NatSci	SocSci	Engineering
Obligation	3077.42	2744.32	3151.92	2751.19	4787.94	2128.69
Inclination	1069.44	1783.15	1094.96	1032.46	1259.78	1889.07

Figure 7. Discipline distribution of modulation in non-academic sub-corpora of the BNC

The trend in Figure 7 appears to be slightly different from that in Figure 6. It is the SocSci that displays the highest standard frequency while the NatSci the lowest one. Paired sample T-test shows that the two groups of data are slightly different ($p = 0.079 > 0.05$), which further proves that modulation is genre sensitive. Similarly, the Independent sample T-test shows that the distribution of modulation in natural sciences is not significantly different from that in social sciences ($p = 0.343 > 0.05$), indicating that modulations are not discipline sensitive in the non-academic sub-corpus of the BNC.

5. Discussion

It is found from the BNC-based synchronic study that interpersonal metaphors of modulation boast a significantly higher occurrence in written texts than that in spoken language. This is not in agreement with the hypothesis that interpersonal metaphors of modulation are mode-sensitive to spoken discourses and are less appropriate in written genres. Although both two types of modulations enjoy an identical preference for written discourses, modulations of obligations display an upward frequency with an increasing degree of technicality of different genres, while modulations of inclinations reveal an exactly reversed trend. Meanwhile, not all the interpersonal metaphors of modulations are gradually piled up along the texts with increasing technicality with regard to genre distribution. There are two apparent directions for the metaphors of modulation, i.e., the objective orientation and the explicit orientation. On one hand, both implicit and explicit objective obligations are more common to be found in technical texts. On the other hand, compared with implicit subjective obligations, explicit subjective obligations prevail most in the fiction genre. The result can partially support our hypothesis as interpersonal metaphors of objective modulations prevails in academic texts while subjective modulations prefer less-academic genres, and we hereby conclude that both the explicit orientation and objective orientation create interpersonal metaphors of obligations.

The objective orientation in inclination is not that genre sensitive as it is in objective obligations. Implicit objective inclinations take priority firstly in newspapers and secondly in magazines rather than in other more technical genres (i.e. academic texts), which are different from that in implicit objective obligations. Academic language is to directly project authors' subjective but non-negotiable stances, which are made on empirical and objective facts, to non-interacting audiences. Academic texts can be considered to a certain extent, as commands for readers' acceptance of authors' stances. By using the anticipatory, *it* leading a projecting clause, or the third person as a subject can significantly degrade the subjectivity of modal elements. This reasonably explains it is objective obligations rather than other expressions that prevail most in academic texts. Compared with those in academic texts, although objectivity is also one of the core features of newspapers or magazines, they are more likely to offer attractive stances for negotiation, whose words tend to be brief and are with relatively lower certainty. Therefore, it's not surprising that implicit objective inclinations are quite compatible with newspapers and magazines, as both the need for brevity and objectivity can be satisfied by hiding the modal elements in clauses.

Although there are no differences shown in the distributions of modulation between natural science texts and social science texts in either the academic or the non-academic sub-corpora, in both sub-corpora, it is the nature science texts that have the smallest

number of modulation among the six disciplines. The result is different from the discipline distribution of ideational metaphors in which they prevail the least in humanities and arts texts as the personal voice is more valued in the humanities and arts texts (He 2017). Similarly, the reason for our find is "interpersonal metaphors more fully allow writers to communicate their stance or attitudes toward the information conveyed.'' (Liardét 2018:66). Unlike ideational metaphors being inherently impersonal and perfect for nature science texts, interpersonal metaphors of modulation are not that appropriate for such discipline due to their unchanged personal and subjective characteristics.

6. Conclusion

This research intends to explore the synchronic distribution of interpersonal metaphors of modulation. The data from the BNC is employed to reveal the corresponding distribution variations in mode, genre and discipline. The mode distribution analysis shows that both modulations of obligation and inclination are mode-sensitive to written texts. Concerning genre distributions, there are two orientations for the interpersonal metaphors of obligation (i.e., explicit vs. implicit, objective vs. subjective) and one orientation for that of inclination (i.e., objective vs. subjective). The explicit metaphorical obligations reinforce the existence of the speaker or writer and hence dominate in the fiction texts, while the objective metaphorical obligations contribute to the objectivity of the texts and are hereby more prevalent in academic texts genres or formal genres. The objective metaphorical inclination is not that genre sensitive as hypothesized. Implicit objective inclinations take priority firstly in newspapers and then magazines. As for discipline distribution, either of the two types of modulation displays disciplinary sensitivity. It is the nature science texts that have the smallest number of modulation, which indicates the inherent personal and subjective characteristics of modulations remains in the metaphorical forms. This research provides empirical evidence with respect to the mode, genre and discipline variations of interpersonal grammatical metaphor. The findings on the synchronic distribution of metaphorical modulation contribute to the understanding of interpersonal grammatical metaphors of obligation and inclination. The scope of this study is limited in terms of data retrieval in that only the BNC is employed. In future research, more corpora can be adopted to collect more authentic data.

Funding: This research is supported by National Social Science Fund of China (21BYY043).
Conflicts of Interest: The authors declare no conflict of interest.
Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1] Biber, D. (2006). *University language: A corpus-based study of spoken and written registers*. John Benjamins. https://doi.org/10.1075/scl.23
[2] Biber, D. (2012). Register as a predictor of linguistic variation. *Corpus Linguistics and Linguistic Theory, 8*(1), 9-37. https://doi.org/10.1515/cllt-2012-0002
[3] Biber, D., & Gray, B. (2013). Being specific about historical change: The influence of sub-register. *Journal of English Linguistics, 41*(2), 104-134. https://doi.org/10.1177/0075424212472509
[4] Biber, D., & Barbieri, F. (2007). Lexical bundles in university spoken and written registers. *English for Specific Purposes, 26*(3), 263-286. https://doi.org/10.1016/j.esp.2006.08.003
[5] Biber, D., & Conrad, S. (1999). Lexical bundles in conversation and academic prose. *Language and Computers, 26*, 181-190.
[6] Biber, D., Conrad, S., & Cortes, V. (2004). If you look at…: Lexical bundles in university teaching and textbooks. *Applied Linguistics, 25*(3), 371-405. https://doi.org/10.1093/applin/25.3.371
[7] Biber, D., Conrad, S., & Reppen, R. (1998). *Corpus linguistics*. Cambridge University Press. https://doi.org/10.1017/CBO9780511804489
[8] Charles, M. (2003). 'This mystery . . . ': a corpus-based study of the use of nouns to construct stance in theses from two contrasting disciplines. *Journal of English for Academic Purposes, 2*(4), 313–326. https://doi.org/10.1016/S1475-1585(03)00048-1
[9] Coffin, C. (2006). *Historical discourse: The language of time, cause and evaluation*. Continuum.
[10] Copeck, T., Barker, K., Delisle, S., Szpakowicz, S., & Delannoy, J. (1997). What is technical text? *Language Sciences, 19*(4), 391–424. https://doi.org/10.1016/S0388-0001(97)00003-X
[11] Cortes, V. (2004). Lexical bundles in published and student disciplinary writing: Examples from history and biology. *English for Specific Purposes, 23*(4), 397–423. https://doi.org/10.1016/j.esp.2003.12.001
[12] Cortes, V. (2007). Teaching lexical bundles in the disciplines: An example from a writing intensive history class. *Linguistics and Education, 17*(4), 391–406. https://doi.org/10.1016/j.linged.2007.02.001
[13] Davidse, K. (1991). *Categories of experiential grammar. Department of English and Media Studies*, Nottingham Trent University.
[14] Davidse, K. (1998). The dative as participant role versus the indirect object: On the need to distinguish two layers of organization. In W. Van Langendonck & W. Van Belle (Eds.), *The dative, vol. 2: Theoretical and contrastive studies* (pp. 143–184). John Benjamins. https://doi.org/10.1075/cagral.3.07dav
[15] Davidse, K., & Simon-Vandenbergen, A. (2008). Introduction: The realization of interpersonal meaning. *Word, 59* (1–2), 3–23. https://doi.org/10.1080/00437956.2008.11432579
[16] Devrim, D. Y. (2015). Grammatical metaphor: What do we mean? What exactly are we researching? *Functional Linguistics, 2*(3), 1–15. https://doi.org/10.1186/s40554-015-0016-7

[17] Freddi, M. (2005). Arguing linguistics: Corpus investigation of one functional variety of academic discourse. *Journal of English for Academic Purposes, 4*(1), 5–26. https://doi.org/10.1016/j.jeap.2003.09.002

[18] Halliday, M. A. K. (1978). *Language as social semiotic: The social interpretation of language and meaning*. Edward Arnold.

[19] Halliday, M. A. K. (1984). Grammatical metaphor in English and Chinese. In B. Hong (Ed.), *New papers on Chinese language use* (pp. 9-18). Contemporary China Centre, Australian National University.

[20] Halliday, M. A. K. (1985). *An introduction to functional grammar*. Edward Arnold.

[21] Halliday, M. A. K. (1989). *Spoken and written language*. Oxford University Press.

[22] Halliday, M. A. K. (1994). A*n introduction to functional grammar* (2nd edition). Edward Arnold.

[23] Halliday, M. A. K. (1996). On grammar and grammatics. In R. Hasan, C. Cloran, & D. Butt (Eds.), *Functional descriptions: Theory and practice* (pp. 1-38). John Benjamins. https://doi.org/10.1075/cilt.121.03hal

[24] Halliday, M. A. K. (1998). Things and relations: Regrammaticising experience as technical knowledge. In J. R. Martin & R. Veel (Eds.), *Reading science: Critical and functional perspectives on discourses of science* (pp. 185–235). Routledge.

[25] Halliday, M. A. K. (2002). The concept of rank: A reply. In J. Webster (Ed.), *On grammar* (pp. 118–126). Continuum.

[26] Halliday, M. A. K. (2004). Language and knowledge: The unpacking of text. In J. Webster (Ed.), *Collected works of M. A. K. Halliday, Vol. 5: The language of science* (pp. 24–48). Continuum.

[27] Halliday, M. A. K., & Matthiessen, C. M. I. M. (1999). *Construing experience through meaning: A language-based approach to cognition*. Cassell.

[28] Halliday, M. A. K., & Matthiessen, C. M. I. M. (2004). *An introduction to functional grammar* (3rd edition). Edward Arnold.

[29] Halliday, M. A. K., & Matthiessen, C. M. I. M. (2014). *An introduction to functional grammar* (4th edition). Routledge. https://doi.org/10.4324/9780203783771

[30] He, Q. (2019). Types of transfer in ideational metaphor: A corpus-based study. *Studia Neophilologica, 91* (3), 249–272. https://doi.org/10.1080/00393274.2019.1619093

[31] He, Q. (2021). A corpus-based study of interpersonal metaphors of modality in English. *Studia Neophilologica, 93*(1), 50-71. https://doi.org/10.1080/00393274.2020.1792805

[32] He, Q., & Yang, B. (2014). A study of transfer directions in grammatical metaphor. *Australian Journal of Linguistics, 34*(3), 345–360. https://doi.org/10.1080/07268602.2014.898226

[33] He, Q., & Yang, B. (2018). A corpus-based study of the correlation between text technicality and ideational metaphor in English. *Lingua, 203*, 51–65. https://doi.org/10.1016/j.lingua.2017.10.005

[34] Hewings, M., & Hewings, A. (2002). "It is interesting to note that": A comparative study of anticipatory 'it' in student and published writing. *English for Specific Purposes 21* (4), 367–383. https://doi.org/10.1016/S0889-4906(01)00016-3

[35] Hyland, K. (2006). Disciplinary differences: Language variation in academic discourses. In K. Hyland & M. Bondi (Eds.), *Academic discourse across disciplines* (pp. 17–48). Peter Lang. https://doi.org/10.3726/978-3-0351-0446-2

[36] Hyland, K. (2008). As can be seen: Lexical bundles and disciplinary variation. *English for Specific Purposes, 27*(1), 4–21. https://doi.org/10.1016/j.esp.2007.06.001

[37] Hyland, K. (2009). *Academic discourse: English in a global context.* Continuum.

[38] Hyland, K., & Tse, P. (2005). Evaluative that constructions: Signaling stance in research abstracts. *Functions of Language, 12*(1), 39–64. https://doi.org/10.1075/fol.12.1.03hyl

[39] Jalali, H., Rasekh, A. E., & Tavangar, M. R. (2009). Anticipatory 'it' lexical bundles: A comparative study of student and published writing in applied linguistics. *Iranian Journal of Language Studies, 3*(2), 177–194.

[40] Lassen, I. (2003). Imperative readings of grammatical metaphor: A study of congruency in the imperative. In A. M. Simon-Vandenbergen, M. Taverniers & L. J. Ravelli (Eds.), *Grammatical metaphor: Views from systemic functional linguistics* (pp. 279–308). John Benjamins. https://doi.org/10.1075/cilt.236.15las

[41] Liardét, C. L. (2018). "As we all know": Examining Chinese EFL learners' use of interpersonal grammatical metaphor in academic writing. *English for Specific Purposes, 50*, 64–80. https://doi.org/10.1016/j.esp.2017.11.005

[42] MacDonald, S. P. (1994). *Professional academic writing in the humanities and social sciences*. Southern Illinois University Press.

[43] Martin, J. R. (1992). *English text: System and structure*. John Benjamins. https://doi.org/10.1075/z.59

[44] Martin, J. R. (1993). Life as a noun: Arresting the universe in science and humanities. In M. A. K. Halliday & J. R. Martin (Eds.), *Writing science: Literary and discursive power* (pp. 242–293). Palmer Press.

[45] Martin, J. R., & Rose, D. (2003). *Working with discourse: Meaning beyond the clause*. Continuum.

[46] Martin, J. R. & White, P. R. R. (2005). *The language of evaluation: Appraisal in English. Palgrave Macmillan*. https://doi.org/10.1057/9780230511910

[47] Matthiessen, C. M. I. M. (1993). The object of study in cognitive science in relation to its construal and enactment in language. *Cultural Dynamics, 6*(1), 187–242. https://doi.org/10.1177/092137409300600106

[48] Matthiessen, C. M. I. M. (1995a). Theme as an enabling resource in ideational knowledge construction. In M. Ghadessy (Ed.), *Thematic development in English text* (pp. 20–55). Pinter.

[49] Matthiessen, C. M. I. M. (1995b). *Lexico-grammatical cartography: English systems*. International Language Sciences Publishers.

[50] Matthiessen, C. M. I. M. (1998). Construing processes of consciousness: From the common-sense model to the uncommonsense model of cognitive science. In J. R. Martin & R. Veel (Eds.), *Reading science: Critical and functional perspectives on discourses of science* (pp. 329–357). Routledge.

[51] Matthiessen, C. M. I. M., & Nesbitt, C. (1996). On the idea of theory-neutral descriptions. In R. Hasan, C. Cloran & D. G. Butt (Eds.), *Functional descriptions: Theory in practice* (pp. 39–83). John Benjamins. https://doi.org/10.1075/cilt.121.04mat

[52] Painter, C. (1999). *Learning through language in early childhood*. Cassell.
[53] Ravelli, L. J. (1996). Making language accessible: Successful text writing for museum visitors. *Linguistics and Education, 8*(4), 367–387. https://doi.org/10.1016/S0898-5898(96)90017-0
[54] Ravelli, L. J. (1998). The consequences of choice: Discursive positioning in an art institution. In A. Sánchez-Macarro & R. Carter (Eds.), *Linguistic choice across registers: Variation in spoken and written English* (pp. 137–154). John Benjamins. https://doi.org/10.1075/cilt.158.11rav
[55] Schleppegrell, M. J. (2001). Linguistic features of the language of schooling. *Linguistics and Education, 12*(4), 431–459. https://doi.org/10.1016/S0898-5898(01)00073-0
[56] Simon-Vandenbergen, A. M. (2003). Lexical metaphor and interpersonal meaning. In A. M. Simon-Vandenbergen, M. Taverniers & L. J. Ravelli (Eds.), *Grammatical metaphor: Views from systemic functional linguistics* (pp. 223–256). John Benjamins. https://doi.org/10.1075/cilt.236.13sim
[57] Swales, J. M. (1998). *Other floors, other voices: A textography of a small university building*. Lawrence Erlbaum.
[58] Taverniers, M. (2002). *Systemic-functional linguistics and the notion of grammatical metaphor: A theoretical study and a proposal for a semiotic-functional integrative model* (Unpublished doctoral dissertation). Universiteit Gent.
[59] Taverniers, M. (2003). Grammatical metaphor in SFL: A historiography of the introduction and initial study of the concept. In A. M. Simon-Vandenbergen, M. Taverniers & L. J. Ravelli (Eds.), *Grammatical metaphor: Views from systemic functional linguistics* (pp. 5–34). John Benjamins. https://doi.org/10.1075/cilt.236.02tav
[60] Taverniers, M. (2006). Grammatical metaphor and lexical metaphor: different perspective on semantic variation. *Neophilologus, 90*(2), 321–332. https://doi.org/10.1007/s11061-005-0531-y
[61] Taverniers, M. (2008). Interpersonal grammatical metaphor as double scoping and double grounding. *Word, 59*(1–2), 83–109. https://doi.org/10.1080/00437956.2008.11432582
[62] Unsworth, L. (1997). "Sound" explanations in school science: A functional linguistic perspective on effective apprenticing texts. *Linguistics and Education, 9*(2), 199–226. https://doi.org/10.1016/S0898-5898(97)90013-9
[63] Wu, S. M. (2007). The use of engagement resources in high-and low-rated undergraduate geography essays. *Journal of English for Academic Purposes, 6*(3), 254–271. https://doi.org/10.1016/j.jeap.2007.09.006
[64] Yang, B. (2019). Interpersonal metaphor revisited: Identification, categorization, and syndrome. *Social Semiotics, 29*(2), 186–203.
[65] Yang, Y. (2013). A corpus-based study of interpersonal grammatical metaphor in spoken Chinese. *Language Sciences, 38*, 1–21. https://doi.org/10.1016/j.langsci.2012.12.003