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A contrastive study of grammatical metaphors in abstracts of Chinese MA theses and expert academic writing

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Abstract: As a significant indicator of College students' ability in academic English communication, academic papers, especially their condensed abstracts require various writing techniques among which the use of grammatical metaphors (GMs) is typical. To improve the English academic writing level of Chinese postgraduate students, it is significant to compare their use of GMs with that in expert research articles. On the basis of Halliday's reclassification of GMs, this study aims to compare the characteristics of GMs in abstracts of MA theses and expert research articles (RAs). It is found that there is universal use of nearly all GM types in both groups. The two groups are similar in that they share the top five most frequently used GMs, and there are no significant differences in the use of more than half of the GM types. However, the overall GM frequency of expert RAs is significantly higher than that of MA theses. Significant differences are also found in the use of six GM types. Furthermore, some correlations between certain GM types found in expert RAs are missing in MA theses. Reasons for these differences may include the limited understanding of GM, the underdeveloped cognitive ability, the genre differences, and the first language differences. Based on these findings, implications for teaching and learning are discussed.

Keywords: contrastive study; EAP writing; English abstracts; functional linguistics; grammatical metaphor

1 Introduction

The abstract is a crucial part of the academic thesis, and the necessity of writing a good abstract has been pointed out by many scholars. Abstracts have become a tool of mastering and managing the ever-increasing information flow in the

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scientific community (Ventola 1994: 333). They are of great significance since they enable readers to decide whether articles are worth reading or not. In this way, abstracts need to be highly condensed, as factual representation of the details of a paper which facilitates readers' understanding of the main ideas. Although abstracts as an essential genre have been investigated from an interdisciplinary perspective, most of the research has focused on Research Article (RA) abstracts published in journals and little on students' thesis abstracts.

In the context of China, although theses often represent the highest level of students' current English for Academic Purposes (EAP) literacy, it is a relatively weak genre in academic writing. However, despite the status of ideational GM as the typical and unique grammar of EAP, the main form of communication in science (Halliday 2004; Reeves 2005), only a limited number of studies have examined students' GM use in their academic writings. Therefore, to improve Chinese students' EAP writing, it may be helpful to look into GM use in their theses.

It is hoped the current research can help enrich the research on abstracts and GM and give an insight into students' use of GMs as a crucial linguistic resource for achieving valued academic writings (Liardét 2016a). This study may also shed light on the teaching practice of EAP writing and the reform of postgraduate education in China, thus helping Chinese academic writers improve their EAP writing ability by better understanding GM, which plays an important role in improving the formality, objectiveness, and coherence of the discourse.

The study aims to investigate the use of ideational GMs in MA theses and expert RAs and then discuss their similarities and differences. First, the frequency and usage characteristics of ideational GMs are identified in the abstracts of Chinese college students' MA theses and those of RAs in the international academic journal. Then similarities and differences are summarized between MA thesis abstracts and RA abstracts from the perspective of ideational GM use. Besides, possible factors are indicated on the differences in GM distribution and how the use of ideational GMs affects the abstracts of academic papers in this field. Finally, possible reasons for the different features of the two groups' GM use are discussed.

2 Literature review

Since the 1990s, academics have begun to focus their attention on the research of academic writing especially the generic structure of abstracts (Bhatia 1993; Graetz 1985; Hyland 2001; Salager-Meyer 1990; Slade 2000). Genre analyses on the structure of a particular research region regarding various linguistic features, e.g. the

rhetorical structure and lexicogrammar, have been carried out (Swales 1990). Many other researchers have started their studies on abstracts from the perspective of contrastive linguistics, researching abstracts of different disciplines, cultures, regions, and so on (Cavalieri 2014; Johns 1992; Taylor and Chen 1991).

The concept of GM was first proposed by Halliday (1994), who distinguishes GM from the traditional idea of the cognitive metaphor. Halliday (2000 [1994]: 342) argues that "metaphorical variation is lexicogrammatical rather than simply lexical" and in GM "the variation is essentially in the grammatical level forms". As a significant part of the theory of Systemic Functional Grammar, GM is related to the *stratal tension* between discourse semantics and lexicogrammar (Halliday 1994, 1998; Halliday and Martin 1993). Different from the traditional theory of grammar, Halliday (1978) regards language as a semiotic system comprised of phonology, lexicogrammar, and semantics. Amongst the three levels, the lexicogrammatical level is realized by the phonetic level and the semantic one is realized by the lexicogrammatical one. Theoretically speaking, in the process of realization, there can be some variation, and agnate forms presented in the discourse get cross-couplings between semantics and lexicogrammar (Halliday 1996). Therefore, in GM, "meanings are multiply-coded at the level of grammar" (Martin 1993: 258), and hence the language needs to be interpreted in two perspectives, one reflecting the grammar, and the other symbolically concerning semantics (Martin 1993: 258).

Due to the stratal tension, the concepts of "congruent form" and the "metaphorical form" appear. Thompson (2014: 236) defines a congruent form as something "closer to the condition of things in the external world". It represents the natural or typical relationship between lexicogrammatical level and semantic categories (Thompson 2014: 233). For example, people use nominal groups to express participants, verbal groups to express processes, and nominal or adjective groups to express circumstantial features. When these conventional relationships are violated, e.g. using "verbal groups to realize participants, nominal or adjective groups to realize processes, and verbal or nominal groups to realize circumstantial elements" (Fan 2001: 18), the metaphorical forms, where GMs lie, are adopted. Halliday (2000 [1994]: 78) points out that in many instances, metaphorical representation is the norm, which is, actually, a natural process of linguistic changes. Meanwhile, as a meaningful choice itself, the selection of metaphor adds extra semantic features (Halliday 2000 [1994]: 95).

Halliday (1994) classifies GM into two types, interpersonal GM and ideational GM. Interpersonal GM is closely related to interpersonal function and is categorized into the metaphor of mood and modality (Halliday 1994). The ideational function of language refers to speakers' perception of the material world and humans' experiences (Halliday 1994). The ideational function is realized by the transitivity system, which contains diverse choices of processes, participants, and

circumstances. Ideational GM also takes place in the transitivity system and has two sub-divisions: experiential metaphor and logical metaphor. The theory of GM, especially ideational GM, has attracted wide attention from academics all over the world. By analyzing scientific discourses, Halliday (1996) reclassifies GM and summarizes 13 types of ideational GM, involving conversion of word classes and grammatical levels.

In recent years, both the theoretical and empirical research on GM has been enriched. The theoretical exploration is mainly concerned with the theoretical origin, categories, identification, interpretation, and development of GM (e.g. Cong and Wang 2013; Halliday 1998; Halliday and Matthiessen 2004; Jiang 2014; Lin and Yang 2016). The empirical research mainly focuses on two aspects. The first one is the acquisition and development of GM. There have been various studies on the relationship between L2 proficiency and metaphor production, and on how L1 linguistic and conceptual transfer positively or negatively affect L2 metaphor production. It is found that GM use is significantly affected by the staged characteristics of cognitive ability (Zhang and Liu 2013) and L1 transfer (He and Wang 2019; Xiong and Liu 2005). The second aspect is the study on the linguistic features of GM in academic subjects. GM is the symbolic feature of academic language as it can promote the development of argumentation and enhance the objectivity and authority of argumentation (Halliday and Martin 1993), and is one of the indicators of language complexity (Ryshina-Pankova 2015). Furthermore, the specific functions of GM for certain disciplines are discussed (e.g. Martin 2002).

Moreover, Chinese EFL (English as a Foreign Language) learners' deployment of GM in the academic discourse and the existing problems have also been studied. It is found that there are some usage errors in Chinese students' GM deployment, and the textual function of GM is not fully realized (Liardét 2013, 2016b). More specifically, in Chinese students' English academic papers, there are problems such as monotonous metaphor modes, collocation errors, and unclear causal relationships (Zhong and Chen 2015).

Furthermore, based on the reclassification of GM (Halliday and Matthiessen 1999), frequently-used GMs are grouped into broader categories and discussed. Zhu (2006) expounds the definition, classification of nominalization and verbalization and their differences, building up a foundation for subsequent studies. Liu and Lu (2004) indicate that for a proficient composition, the occurrence rate of nominalization in GM is generally higher. Although in Chinese students' English compositions, nominalization is used most frequently, followed by verbalization (Zhong and Chen 2015), the number of nominalizations is still much lower than that of native authors (Huo and Liu 2009).

With regard to contrastive studies of academic writing between novice writers and expert writers, they are mainly made from the aspects of discourse structure,

rhetorical devices, meta-discourse use, and linguistic expressions (phrases). Intaraprawat and Steffensen (1995) find that expert writers use more varieties of metadiscourse. Hyland (2004) also indicates that there is more metadiscourse in doctoral dissertations than in masters' dissertations. Song's (2018) study reveals the structural and functional features of English majors' dissertations and professional articles, and shows that the mean length of sentences written by students is shorter than that of international journal papers; besides, expert writers are more flexible in statement and description and more skilled in data mining and presenting personal viewpoints. In terms of comparative research on rhetorical devices between beginners and experts, Zhou and Lin (2018) find that the metaphor construction in academic discourse is not strictly restricted by the level of second language ability or the language background, while the cognitive experience of discipline concepts and culture is the primary factor. The results confirm the key role of cognitive experience in the construction of conceptual metaphors.

It is found that existing studies have mainly focused on journalistic English, while studies on abstracts of MA theses under the framework of GM are relatively limited. For GM research, the insufficiencies are as follows. First, research on students' GM competences is limited compared to the abundant studies on conceptual metaphorical competences. Second, there is a lack of research on the actual language used by EFL learners as many studies are conducted to obtain inductive data utilizing tests. Third, many scholars have focused on EFL learners' ability to recognize and understand metaphors, while research on metaphorical production is comparatively limited. Finally, corpus-based comparative research on GM usage characteristics still needs to be improved. It is, therefore, hoped this study using MA theses as research objects can supplement the GM research.

3 Theoretical foundation

The theoretical foundation of the article is Halliday and Matthiessen's (1999) reclassification of GM. The lack of a clear standard to distinguish the congruent form from the metaphorical form in the previous GM theories is first noted in Halliday (1996). Furthermore, Halliday (1998) illustrates that in a metaphoric process, one shift in rank and status is likely to have an influence on the whole clause and cause other shifts. Building on this view, the idea of the syndrome of GM is developed, which refers to the phenomenon that GM is usually "clustering of metaphorical effects among which there is some kind of interdependence" (Halliday and Matthiessen 1999: 244).

On the basis of the congruent and metaphorical realization of semantic categories, Halliday and Matthiessen (1999: 244) raise the notion of the semantic

junction, which means that metaphoric elements are junctional as "they embody a junction of two semantic categories." In this way, junctional elements are composed of two categories when described, e.g. "process thing," "circumstantial quality," and "relator process." Therefore, from this point of view, GMs are the grammatical structures caused by semantic junction rather than stratal tension (Halliday and Matthiessen 1999).

To conform to the updated theory, Halliday and Matthiessen (1999), through the analysis of scientific discourse, renew the GM categorization and present 13 types of ideational metaphors on the basis of elemental semantic categories and the notion of the semantic junction, as shown in Table 1. Table 1 is adapted from Halliday and Matthiessen's (1999: 246–248) reclassification with supplement information (Li and Jiao 2013; Zhu 2006).

Compared to the previous GM model, the new one has innovations in some points. The metaphorical relation is close to inter-stratal realization as it "construes a token-value type of relation" (Halliday and Matthiessen 1999: 288), while for the updated semantic junction, the relation is intra-stratal in that "the identity holds between different meanings, not between meanings and wordings" (Halliday and Matthiessen 1999: 288). This opinion is opposed to the previous stratal model, which suggests that GM comes from the tension between discourse semantics and lexicogrammar. Moreover, the preceding GM model is composed of ideational GM and interpersonal GM, while in the renewed mode, the transference of conjunctional elements into other elements, such as nouns, adjectives, and verbs, is included, thus showing that metaphorical means of expression can exist beyond clauses.

4 Methodology

This part introduces the research methodology of the study.

4.1 Research questions

The present research aims to conduct a corpus-based study of ideational GM use in abstracts of MA theses and expert academic writing which consists of quantitative and qualitative analyses. The research questions of this study are presented as follows: (1) What are the frequency and usage characteristics of ideational GMs in the abstracts of MA theses and expert RAs? (2) What are the similarities and differences between abstracts of MA theses and expert RAs in ideational GM use?

Table 1: The reclassification of ideational GMs (adapted from Halliday and Matthiessen 1999: 246–248).

Shift in semantic element	Shift in grammatical class	Shift in grammatical function	Examples
1. Quality → entity	Adjective → noun	Epithet = thing	Unstable = instability
2. Process → entity	Verb → noun	(1) Event = thing	Transform = transformation
	Tense/modality → noun	(2) Auxiliary (tense, phase, modality) = thing	Will/going to = prospect Can/could = possibility
3. Circumstance → entity	Preposition → noun	Minor process = thing	With = accompaniment To = destination
4. Relator → entity	Conjunction → noun	Conjunctive = thing	So = cause/proof If = condition
5. Process → quality	Verb → adjective	(1) Event = epithet	[Poverty] is increasing = increasing [poverty] Begin to = initial
	Tense/modality → adjective	(2) Auxiliary (tense, phase, modality) = epithet	Was/used to = previous Must/will [always] = constant
6. Circumstance → quality	Adverb/prepositional phrase → adjective	(1) Manner = epithet	[Decide] hastily = hasty [decision]
		(2) Other = epithet	[Argued] for a long time = lengthy [argument]
		(3) Other = classifier	[Cracked] on the surface = surface [cracks]
7. Relator → quality	Conjunction → adjective	Conjunctive = epithet	Then = subsequent; So = resulting
8. Circumstance → process	Be/go + preposition → verb	Minor process = process	Be about = concern; Be instead of = replace
9. Relator → process	Conjunction→ verb	Conjunctive = event	then = follow; So = cause, lead to, bring out, result in, make, urge And = complement Before = precede While = coincide, accompany If = depend on Unless = determine Even though/although/even so = (not) preclude, not mean, not stop Because = result from, attribute to, contribute to

Table 1: (continued)

Shift in semantic element	Shift in grammatical class	Shift in grammatical function	Examples
10. Relator → circumstance	Conjunction → preposition/-al group	Conjunctive = minor process	When = in times of/in … times While = at the same time/in the mean time If = under conditions of/under … conditions
11. [zero] → entity			[zero] = the phenomenon of
12. [zero] → process			[zero] = … occurs/ensues
13. Entity→ expansion	Noun→ [various]	Head = modifier	The government [decided] = the government's [decision], [a/the decision] of/by the government, [a] government (al) [decision]

4.2 Data collection

The present research selected from the library database 30 MA theses abstracts written by English majors in a top Chinese university from 2017 to 2018, and 30 abstracts of the research articles published from 2019 to 2020 in the journal of *Applied Linguistics*.

4.3 Instruments

The research instruments consist mainly of AntConc and SPSS. AntConc is a multiplatform instrument for conducting corpus research and the use of it helps to process data accurately, thus improving the scientificity and reliability of this study. By referring to the previous studies on formulaic language (Li and Jiao 2013; Zhou and Liu 2017), this study used AntConc to research some typical formulaic language to help make annotations. In the process of retrieval, the changes of morphemes were considered and the wildcard was used. Data analyses were conducted with SPSS 20.0 such as the paired samples *t*-test, the independent *t*-test, and the Pearson correlation test.

4.4 Procedure and data analysis

The study is a combination of quantitative and qualitative analysis based on the self-built corpus. The procedure is shown as follows.

4.4.1 Metaphor identification

The identification is based on the three criteria recommended by Derewianka (2003): derivation (with an obvious suffix), rank shift, and agnation (corresponding congruent forms can be traced back to). This standard is also acclaimed by scholars such as Byrnes (2009) and Zhou and Liu (2017). Also, this research follows the Metaphor Identification Procedure (MIP) (Pragglejaz Group 2007), which has been formally tested and recommended as a research tool to metaphor researchers (Zhong and Chen 2013), to help make a preliminary GM identification.

4.4.2 Clause identification

The Process in a clause is realized by the Main Verb, the core and an important indicator of a clause (Fawcett 2010; He et al. 2015). Each clause must have a Main Verb (Quirk et al. 1985: 50) and that is the most basic principle of syntactic analysis (Fawcett 2008: 49). The Main Verb can determine the distribution of other components (He and Wang 2019). Therefore, this research used the Main Verbs, which consist of predicate verbs and non-predicate verbs, to identify clauses.

4.4.3 Annotation

The number of clauses in each abstract was calculated and labeled at the beginning of the abstract. Also, all the 13 types of ideational GM in every abstract were labeled by underlining the words relating to any type of ideational GM and numbering them according to the reclassification of GM (Halliday and Matthiessen 1999). The annotation of some special conditions is explained as follows:

- The annotated GMs do not include terminology and abstract nouns that cannot be traced to its congruent form.
- If the metaphorical form used repeatedly in the paper belongs to the subject of the paper it will only be marked in its first appearance.
- If the metaphorical form is cited from other authors' articles directly, it will not be marked.
- If the phrase or word represents more than one GM type at the same time, it will be marked with all the numbers corresponding to the various types.

4.4.4 File import

The marked corpus files from "Word" were imported into AntConc 3.5.8 to retrieve ideational GM instances, count the occurrence frequency and record the data in Excel.

4.4.5 Data analysis

The paired samples *t*-test by SPSS was used to examine the overall GM use of the two groups. Subsequently, the contrastive analysis of each kind of GM was conducted with independent *t*-tests. Finally, the Pearson correlation analysis was carried out to figure out the correlations between GM types within each author group. Based on these data analyses, similarities and differences between MA thesis abstracts and RA abstracts were summarized and explained with concrete examples taken from the data.

5 Results and discussion

According to the collected data, this part presents the results and findings, as well as a discussion on the distribution, similarities, differences, etc. of the two groups of abstracts.

5.1 Data analysis of ideational GMs in the abstracts

In this part, GM frequencies in MA theses and expert RAs, distribution of 13 types of GM, as well as the correlations between different GM types, are presented by charts and graphs through the use of SPSS.

5.1.1 GM frequencies in MA theses and expert RAs

Table 2 shows that the frequency of GMs in expert RAs is higher than that of MA theses, which means that experts use various GMs more frequently than student researchers.

A paired samples *t*-test was conducted. Results suggest that the two groups (expert RAs vs. MA theses) differ significantly in terms of the overall GM use ($r = 0.998$, $t\ (12) = 2.39$, $p = 0.03$). Expert RAs ($M = 0.27$, $SD = 0.46$) have a higher mean GM frequency than MA theses ($M = 0.22$, $SD = 0.39$).

To further analyze the usage of every type of GM, the independent *t*-test was used to examine whether there are differences between expert RAs and MA theses in the usage of every single GM type and the result is shown in Table 3. To represent the characteristics of distribution visually, the comparative usage conditions of every type of GMs are shown in Figure 1. *Paper type1* represents the expert group and *Paper type2* stands for the student group.

Table 2: The overall GM frequency.

	Total numbers of GMs	Total numbers of clauses	Frequencies of GMs
Expert RAs	1,557	447	3.48
MA theses	2,290	802	2.86

Table 3: Descriptive statistics and independent *t*-test results.

Variable: GM types	Paper types	M ± SD	*t* (df)	*P* (2-tailed)	CI (*d*)
T1	1	0.22 ± 0.37	1.62 (58)	0.11	−0.03, 0.25
	2	0.11 ± 0.09			
T2	1	1.88 ± 3.84	1.31 (58)	0.20	−0.49, 2.32
	2	0.96 ± 0.25			
T3	1	0.05 ± 0.07	0.25 (58)	0.80	−0.03, 0.04
	2	0.05 ± 0.06			
T4	1	0.00 ± 0.00	−2.10 (58)	0.04	−0.01, 0.00
	2	0.00 ± 0.01			
T5	1	0.35 ± 0.24	2.48 (58)	0.02	0.02,0.21
	2	0.23 ± 0.10			
T6	1	0.20 ± 0.18	1.96 (58)	0.05	0.00, 0.15
	2	0.12 ± 0.10			
T7	1	0.00 ± 0.00	−2.82 (58)	0.01	−0.02, 0.00
	2	0.01 ± 0.02			
T8	1	0.04 ± 0.06	−0.75 (58)	0.46	−0.03, 0.02
	2	0.04 ± 0.04			
T9	1	0.06 ± 0.06	2.5 (58)	0.02	0.01, 0.06
	2	0.03 ± 0.04			
T10	1	0.07 ± 0.10	−0.36 (58)	0.72	−0.05, 0.04
	2	0.08 ± 0.06			
T11	1	0.02 ± 0.04	1.66 (58)	0.10	0.00, 0.03
	2	0.01 ± 0.02			
T12	1	0.00 ± 0.02	1.44 (58)	0.16	0.00, 0.01
	2	0.00 ± 0.00			
T13	1	1.52 ± 0.66	2.18 (58)	0.03	0.02, 0.54
	2	1.23 ± 0.27			

As can be seen from the descriptive statistics section of Table 2 and Figure 1, for most GM types, the frequency in expert RAs is higher than that in MA theses (e.g. T1, T2, T5, T6, T13, etc.), which indicates the inadequacy of students' use of various GMs. Moreover, it is shown that most standard deviations of the expert RA group are higher than that of the MA theses group, indicating that the experts have more individual differences in GM choices.

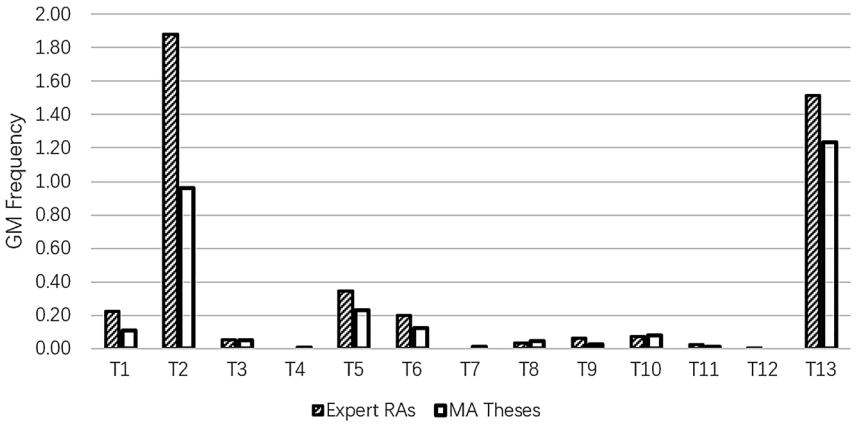

Figure 1: Distribution of 13 GMs in both kinds of articles.

The independent *t*-test results show that there are significant differences in GM use between the two author groups in T4, T5, T6, T7, T9, and T13 (p [*2-tailed*] < 0.05).

5.1.2 Distribution of 13 types of GMs in MA theses and expert RAs

Annular charts are used to present the percentage of 13 types of GMs in each abstract group to show the usage structures.

From Figures 2 and 3, it can be seen that the usage structures of the two groups are quite similar, with T13, T2, T5, T6, and T1 occupying the top five most frequently used GMs and sharing an alike percentage with its counterpart in the other group.

Among all the GM types, T13 and T2 are the most dominant ones, with a total percentage of over 70%. T5 and T6, as means of adjectivization, also cover a relatively big proportion at 12 and 14% respectively.

5.1.3 The correlations between different GM types

Pearson's correlation analyses were conducted to quantify the potential link of diverse GM types within each group. Results suggest that in the expert RAs group, there are significant correlations between T1 and T2 ($r = 0.922$, $p < 0.01$), as well as T8 and T9 ($r = 0.592$, $p < 0.01$).

In the MA theses group, there are significant correlations between T8 and T11 ($r = 0.383$, $p < 0.05$). A comparison chart with all the three pairs involved (T1–T2, T8–T9, T8–T11) is given in Table 4.

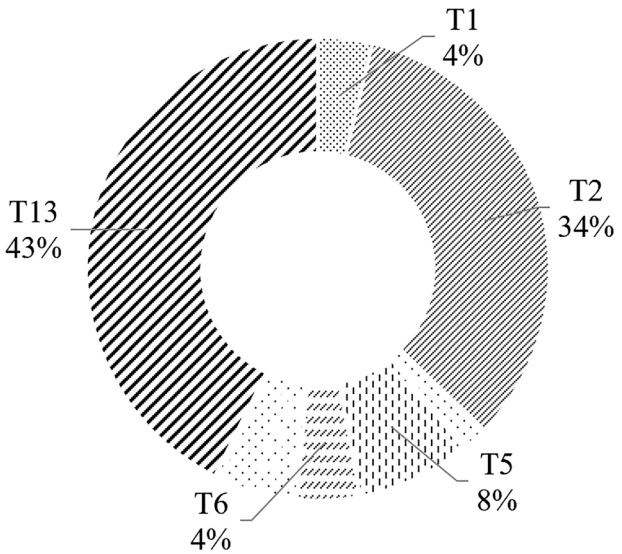

Figure 2: The GM usage structure of MA theses.

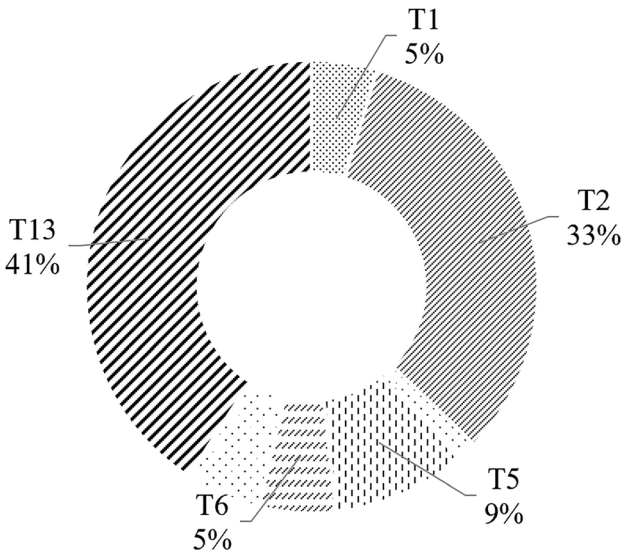

Figure 3: The GM usage structure of expert RAs.

Table 4: The correlation of GM types of expert RAs and MA theses.

		T1-T2	T8-T9	T8-T11
Expert RAS	Pearson correlation	0.922**	0.592**	−0.11
	Significance (2-tailed)	0.00	0.00	0.57
MA theses	Pearson correlation	−0.32	0.086	0.383*
	Significance (2-tailed)	0.87	0.65	0.04

Note: *$p < 0.05$, **$p < 0.01$.

5.2 Similarities between abstracts of MA theses and RAs in ideational GM use

According to the data analyses above, some similarities between the two groups can be found.

In both groups, approximately all of the 13 types of ideational GM are used in the abstracts, which gives evidence to the universal existence of ideational GMs in academic writing and shows that advanced English learners in China have a basic awareness of GM use. Also, expert RAs and MA theses share similar GM usage structures. Both the types of the most frequently used GMs and their corresponding percentages in MA theses are comparable to those in expert RAs. T13 and T2 are the most frequently used types and they are both concerned with noun transference: T2 transfers process to entity by rewording the processes as nouns which function as Thing in the nominal group rather than Process or Attribute (Halliday 2000 [1994]: 352); T13 transfers entity into expansion forms. Thus, T2 and T13 can constitute a whole procedure of packing a process into an entity which is then flexibly used to modify other components to greatly improve the information density of the academic papers. The similar dominant position of T2 and T13 in the two groups may indicate that advanced English learners in China have basically mastered such GM use to compact information in academic discourse by effectively simplifying the narrative level and structure and express the logical relationship between things more accurately and concisely. For instance, in the sentence "[…] to elicit multiple demonstrations [T2] and confirmations [T2] of understanding [T2] [T13]", the action of "demonstrate," "confirm," and "understand" are transferred into an entity and discuss them concisely or use them as a modifier to better convey meanings. Also, the expression, "migrants' [T13] settlement [T2]", is more concise and flexible than the expression "migrants settled down here and this […]".

Moreover, the combined use of T2 and T13 can improve the degree of objectivity and coherence. Such use can materialize processes, phenomena and characteristics, and turn them into describable objects, thereby enhancing the objectivity of the

statement. In terms of coherence, the combination of T2 and T13 demonstrates logical relations among words, clauses, and sentences and plays an important role in the coherence and fluency of texts, because it condenses the information of the former expressions into nouns and uses the nouns as modifiers in the latter discourse, thus highlighting the logical relationship between the sentences. Also, students' use of T5 and T6, as means of adjectivization, share a similar proportion with the experts' papers, which may suggest students' relatively mature ability to use adjectivization GMs.

As for the GM types, T1, T2, T3, T8, T10, T11, and T12, no significant differences emerge, which indicates student authors' basic command of these GM usages. Furthermore, T1, T2, and T3 are all about nominalization, which suggests that learners already have the consciousness and ability to use nominalization GMs. However, it is found that certain T10 expressions belong to set phrases memorized by students. For example, the use of "at the same time," "besides this," and "in the meantime" instead of the congruent forms of "while" and "and". Such memorized GMs may lack flexibility and conciseness, and cannot simplify the grammatical structure, thus deviating from the original intention of concise language expression of academic discourse.

5.3 Differences between abstracts of MA theses and RAs in indeational GM use

Based on the data analyses, some differences between the two groups have been identified.

5.3.1 Frequency of total GMs

The overall GM frequency, the frequency of total GMs without 13-type-categorization, of expert RAs is higher than that of MA theses, which means that experts use various GMs more frequently than student researchers. Meanwhile, a paired samples *t*-test was conducted and it reveals that the two groups differ significantly in terms of the overall GM use.

This result indicates that student authors lack the use of ideational GMs in general, which shows a gap with the requirement of the academic paper genre, where the use of GMs is very important as it helps the author compress, classify and organize relevant information. Thus, the use of GMs is a basic sign of writers' academic literacy and professional level. Halliday and Martin (1993) argue that GM usage realizes abstraction and distance in academic texts of humanities and social sciences. However, the lack of GM use as shown in the students' group reduces the

language complexity of academic texts and makes it difficult to extract the abstraction of propositions and to effectively enhance the information load of texts. GM deficiency also hinders student authors from decreasing subjectivity and building objective authority.

5.3.2 Frequency of different GM types

For many GM types, the frequency in expert RAs is higher than that in MA theses (e.g. T1, T2, T5, T6, T13, etc.) indicating the students' inadequate use of various GMs. Although as discussed above, T2 and T13 make up a large proportion of students' GM use, they are still inadequate compared with those of expert group. The independent *t*-test results show significant differences in GM use between the two author groups in T4 (relator→entity), T5 (process→quality), T6 (circumstance→quality), T7 (relator→quality), T9 (relator→process), and T13 (entity→expansion). Among them, T5, T6, T9, and T13 are less used by students while T4 and T7 are used more in MA theses, showing that professional authors tend to use conjunctions or verbs to represent relations rather than by nouns or adjectives. This is probably because by doing so, the author can present the logical connections and reasoning more clearly and plainly. On the other hand, the lack of T5, T6, and T9 suggests that students may not be good at connecting relator to process, or transferring process and circumstance into quality. This indicates that learners may not have been fully aware of the use of these forms of GM devices to achieve the communicative needs of academic texts.

Additionally, as most standard deviations in the expert RA group exceed those of the MA thesis group, the experts have more individual differences in GM choices. This can be accounted for by the possibility that experts can adjust GM use strategies flexibly to meet the diverse needs of various research topics.

5.3.3 Correlations between different GM types

Differences in the correlations between two GM types are identified in the two groups. In the group of expert RAs, there are very significant correlations between T1 (quality→entity) and T2 (process→entity), as well as T8 (circumstance→process) and T9 (relator→process). It is noticeable that T1 and T2 both belong to nominalization concerning the use of a verb or an adjective as the head of a noun phrase; T8 and T9 are both verbalizations which regard circumstance and relation, such as time relation, causality relation, conditional relation, or compromise relation, as a dynamic process. Thus, such strong correlations are reasonable since they involve similar thinking process. However, those correlations are not found in the MA theses group.

5.4 Discussion

As shown in the above sections, there are differences between the abstracts of the two groups. In the following part, several possible factors are given to explain these differences.

Due to the limited learning and understanding of GM, students may not be able to use various GMs freely and appropriately, which leads to a narrow range of GM use and many repetitions. The study finds that the realization ways of GM in students' theses lack diversity when compared to those in expert RAs. For example, a large proportion of T2 in MA theses is achieved by adding common suffixes, such as "-ing" and "-ation", to a verb, or by using common T2 expressions, such as "practice" and "design", which are just part of the many ways to realize T2. For instance, in the following sentences, the student writers frequently and monotonously used the common suffixes to achieve T2:

> Excerpt (1): […] student's [T13] vocabulary [T13] learning [T2], reading [T2] and listening [T2] [T13] practice [T2] than on their writing [T2], translation [T2] [T13] and oral [T5] practice [T2].

> Excerpt (2): […] task [T13] presentation [T2] on students' [T13] critical thinking [T2] performance [T2] with a view to [T10] providing [T2] some suggestions [T2] concerning [8] the cultivation [T2] of [T13] critical thinking [T2] skills via English [T13] writings [T2].

It is also found that, when discussing the thesis topics, students tend to repeatedly use the same expressions and phrases through the whole abstracts while such repetitions were annotated once according to the counting principle, which leads to lower GM frequency. This suggests students' limited GM resources to draw upon when constructing academic discourse. The missing GM use such as T5, T6 and T9 in some MA theses also indicates that students may not have fully comprehended such GM devices so they fail to apply them properly in the abstracts.

Also, the underdevelopment of the cognitive ability required by those GM transferences may result in the deficiency of learners' GM use and can explain why in MA theses those significant correlations between different GM types found in expert RAs are missing and why the frequency of a set of GM types is significantly lower than that in professional papers. As mentioned above, in expert RA group, there are significant correlations between T1 (quality→entity) and T2 (process→entity), as well as T8 (circumstance→process) and T9 (relator→process). The correlated types share the same elemental semantic category, *entity* for T1–T2 and *process* for T8–T9. T1 and T2 both concern nominalization, while T8 and T9 concern verbalization. Therefore, experts may possess more mature GM thinking systems so they can employ various means to achieve specific metaphorical purposes.

Moreover, according to the independent *t*-test, there are significant differences in GM use between the two groups in T4, T5, T6, T7, T9, and T13. It is worth mentioning that T5, T6, and T7 all belong to the same category, adjectivization, and T13 is concerned with transferring nouns to various forms and using nouns as a modifier, which shares similarities with the nature of adjectives. Thus, this gap in quasi-adjectivization may indicate a certain deficiency of the language thinking ability by which one transfers various concepts into adjectives or phrases so that they can be used to describe the character or quality of people or things. Such ability is indispensable when giving criticism and analyses in academic papers.

Learners' underdeveloped cognitive ability may result from the lack of systematic GM training or their young age. For instance, nominalization is related to the age of users, and as Halliday (1998) points out, generally speaking, people begin to be exposed to nominalization after entering the middle school, so nominalization is a phenomenon of adult discourse. Therefore, learners may not be proficient at the relevant GM types.

On the other hand, because of the limited cognitive ability related to GM, students may regard GM usage more as an external requirement of academic writing rather than an internal and spontaneous expression device to organize one's academic language. Therefore, part of students may use GMs for GMs' sake instead of treating GM as a method to achieve the ultimate goal of presenting the logical connections and reasoning more clearly and plainly, which is the case in experts' RAs. This can explain why student writers tend to overuse certain GM types and their discourse is relatively lengthy compared with experts' writings. Meanwhile, this possibly accounts for the higher standard deviation of the expert RA group. Since professional scholars make use of various GMs as needed with flexible adjustments to various research topics, they tend to have more individual differences in GM choices.

Another possible factor may be the genre difference. According to Halliday (1996), generally speaking, the more technical the text is, the more frequently nominalization occurs; conversely, the more nominalization is used, the more technical the text becomes. Compared with abstracts of expert RAs, which introduce the frontier research results of the academia, MA theses are less complex and professional. Therefore more GMs may be needed to realize the complicated genre features of expert RAs.

Furthermore, first language effects may contribute to the differences in GM use. It is worth mentioning that English and Chinese are different in the conceptualization of adjectives. Chinese adjectives contain semantic structures of dynamic time processes, which can be extended into verb usage more easily, while English adjectives lack dynamic time processes and are more likely to be transferred into an adverb or noun usage (Huo and Liu 2009). Therefore, the deficiency of students' use

of certain GM types, such as T1 (quality→entity), may be attributed to the effects of their first language, Chinese.

6 Conclusion

This part demonstrates the conclusions of this study consisting of the major findings, implications, limitations, as well as suggestions for future research.

6.1 Major findings

The major findings of this research involve the similarities, differences, and interpretation.

In both groups, almost all of the 13 types of ideational GMs are used indicating the universal existence of ideational GMs in academic writing and Chinese advanced English learners' basic awareness of GMs. Expert RAs and MA theses also share similar GM usage structures with T13, T2, T5, T6 and T1 occupying the top five most frequently used GM types. Meanwhile, T2 and T13 make up a completed procedure of packing a process into an entity to be used to modify other sentence components to significantly increase the information density. For T1, T2, T3, T8, T10, T11, and T12, there are no significant differences in the two groups, showing students' basic command of these GMs and especially their consciousness and ability to use nominalization GMs, although sometimes such use comes from memorized phrases and expressions which lack flexibility and conciseness.

Some differences have been identified. GMs are used more frequently in expert RAs and there is a statistically significant difference in GM use between the groups. The frequencies of many GM types (e.g. T1, T2, T5, T6, T13, etc.) are higher in expert RAs than in MA theses and significant differences exist particularly in T4 (relator→ entity), T5 (process→ quality), T6 (circumstance→ quality), T7 (relator→ quality), T9 (relator→ process), and T13 (entity→ expansion). The very significant correlations between T1 (quality→ entity) and T2 (process→ entity), as well as T8 (circumstance→ process) and T9 (relator→ process), are missing in MA theses group. There are also more individual differences in expert RAs' GM use.

The students' inability to apply GMs freely and appropriately may come from their limited knowledge of GM. Their cognitive ability, which is indispensable for GM transferences, may be inadequate due to a lack of systematic GM training or their young age, thus leading to (1) the use of different GM types as split approaches rather than a whole where elements are correlated with one another, and (2) the treatment

of GM as an external requirement of academic writing rather than an internal and spontaneous expression device to organize one's academic language. Consequently, students may neglect the ultimate goal of presenting research logically and clearly and blindly pursue GM despite the consequence of lengthy discourse. In contrast, experts tend to use GMs flexibly by adjusting the GM strategy as needed in different contexts thus having more individual differences in GM choices. Furthermore, the use of certain GM types is related to the technical levels of articles and therefore, probably due to the intricacy of the genre of professional RAs, more GMs are applied. The insufficiency of Chinese students' GM use may also be attributed to the L1 effects which concern different ways of language conceptualization.

6.2 Implications

As shown above, Chinese students' academic writing needs to be improved. However, there has been little literature on the research and teaching of writing and publication in international journals (Cai 2019) in college English education. Thus, there is a need for more training in academic English writing. In the process of teaching, academic English teachers should explain and emphasize different types of GMs, so as to improve students' GM awareness and help them increase GM output. By analyzing GM examples in academic discourse, teachers can direct learners' attention to the application of various GM types and the expressive effects achieved, laying the foundation for students' making full use of different GM types to effectively construct professionalism and authority in academic writing. Meanwhile, the theoretical foundation of GM should be explained so that students can fully comprehend how GMs work to increase the information density and to make academic discourse more concise and professional, instead of simply memorizing phrases and blindly overusing GM expressions. Teachers may also help students develop their cognitive ability required by GM transferences to enhance their GM ability fundamentally since the significant deficiency of several GM types in students' theses tends to involve specific cognitive processes in common. Especially, teachers can give a detailed explanation of the differences in conceptualization between English and Chinese to help students form English GM thinking. Furthermore, student researchers should be advised to read a large number of expert academic papers in English in the relevant academic field to get acquainted with GMs and process GM information proficiently, which is the basis of free and appropriate GM use.

6.3 Limitations

Despite the findings and implications, there are still limitations worth noticing. The limited sample size, 60 abstracts in total, affects the research universality; moreover, this study involves only one discipline, *linguistics*, while for different disciplines, the generic structures, rhetoric devices, meta-discourse use, and language expressions of abstracts may be different. Besides, GM identification and annotation were made by one researcher, which may affect the internal reliability.

6.4 Suggestions for future study

Future studies can increase the sample size to build bigger corpora containing a larger number of abstracts from different authoritative journals and student theses. Likewise, further research can extend the research scope to articles from a wider range of disciplines and may explore disciplinary differences in terms of the contrast between expert RAs and novice writings. Apart from the writers' professional level, researchers can examine other variables such as gender and age, to find out more about GM use. Multiple identification and annotation are also advised, where researchers can first unify the annotation standards, then carry out trial labeling, discuss the differences after comparison until reaching a consensus, and subsequently start independent labeling. After the independent labeling, researchers may compare and discuss the results, and analyze the doubts together to obtain consistent results. In this way, the reliability of the research can be greatly improved.

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