

A Comparison of Entertain Strategies Used in English and Chinese Scientific Research Articles

Yang Yang

School of Foreign Languages and Literature, Beijing Normal University, Beijing, China

Abstract—Based on the engagement system of appraisal theory, this study made a comparative study of entertain strategies between English and Chinese scientific research articles. This study aimed to address the following two questions: (1) What are the similarities and differences of semantic resources expressing the meaning of entertain between English and Chinese scientific research articles? (2) Is there any quantitative difference in the entertain between English and Chinese scientific research articles? 30 English scientific research articles and 30 Chinese scientific research articles were compared from the qualitative and the quantitative perspectives. This article only focused on Result & Discussion section of English and Chinese scientific research articles. The results showed that English and Chinese scientific research articles generally use the similar semantic resources to express entertain meaning. As for the quantitative use, the frequency of entertain in English scientific research articles were significantly different from that in Chinese scientific research articles. This study may provide a new perspective for the comparative study of English and Chinese scientific discourses. These findings may also provide some pedagogical implications, especially for the teaching and learning of English academic writing.

Index Terms—appraisal theory, engagement system, entertain, scientific research articles

I. INTRODUCTION

Academic writing aims not only to represent the external reality, but also to engage with readers to challenge established knowledge and validate new claims (Xu & Nesi, 2019). As a formal academic writing, scientific research articles not only convey the objective scientific truth, but also have the important rhetorical function (Latour & Woolgar, 1979; Bazerman, 1988). In order to realize the rhetorical function, many strategies are employed in scientific articles, such as grammatical metaphor (Yu, 2006; Livnat, 2010), hedges (Lewin, 2005; Hidalgo-Downing, 2017), Thematic Progression (Yu, 2002; Ye & Wang, 2004), cohesive devices (Ji & Guo, 2017; He & Wang, 2018) and so on. In recent years, some researchers also pay attention to the appraisal resources used in scientific research articles (Xu, 2009; Yan & Xu, 2011; Yang, 2019). Appraisal is one of the discourse semantic resources construing interpersonal meaning, which is regionalized as three interacting domains — “attitude”, “engagement” and “graduation” (Martin & White, 2005). The most important function of appraisal is to construct relations of alignment and rapport between the writer/speaker and the actual or potential respondents, which is most obviously embodied by engagement system (Liu, 2010). As Xu et al. (2010) pointed out that scientific claims usually have a certain timeliness, so many viewpoints in scientific research articles must show their scope of application and thus avoid absolute assertions. Therefore, the nature and characteristics of scientific research articles determine the wide application of appraisal devices. Yang (2019) made a contrastive study of engagement resources between English and Chinese research articles, and found out that engagement resources are distributed unevenly both in each part of English and Chinese scientific research articles and that the types of engagement resources are used in different frequencies both in English and Chinese scientific research articles. Among these engagement resources, entertain devices are most frequently used both in English and Chinese scientific research articles.

The above studies concerned appraisal system only discuss the overall appraisal devices used in scientific research articles and do not deeply explore one subsystem and give a detailed explanation of it. In view of this, the current study focuses on the subsystem of engagement-entertain and makes a detailed comparative study of entertain devices used in English and Chinese scientific research articles. Besides, this article only focuses on Result & Discussion section of English and Chinese scientific research articles. The entertain devices of engagement system within Appraisal Theory (Martin & White, 2005) with a minor revision is used in this study, in the hope of improving the Appraisal Theory itself and giving some guide to the teaching of English academic writing. This study is concerned with the following two questions: (1) What are the similarities and differences of semantic resources expressing the meaning of entertain between English and Chinese scientific research articles? (2) Is there any quantitative difference in the entertain between English and Chinese scientific research articles?

II. THEORETICAL: ENTERTAIN OF ENGAGEMENT DOMAIN WITHIN APPRAISAL THEORY

Systemic Functional Linguistics believes that all languages have three meta-functions at the same time, namely, interpersonal function, ideational function and textual function. Based on interpersonal function, Martin & White (2005)

established the appraisal theory. Appraisal system is composed of three subsystems — attitude, engagement and graduation.

Among them, engagement was proposed under the influence of Bakhtin's (1986) and Voloshinov's (1995) notions of dialogism and heteroglossia. According to White (2019), engagement is used to describe and explain the various styles or strategies of intersubjective positioning that have been observed operating recurrently within different discourse domains. Specifically, it is concerned with mapping the value relationships between the values and hence with understanding the way different choices of values from the system have different consequences for rhetorical potential, understanding the rhetorical consequences of the interaction of these positioning values with other meanings, most notably with values from the attitude subsystems, and understanding the possible interaction between such values both within utterances and within the text as a whole as meanings accumulate as the text unfolds.

According to Martin & White (2005), the engagement system has two subsystems: monogloss and heterogloss. Monogloss has no acknowledgement for alternative voices while heterogloss acknowledges the existence of alternative positions (Martin & White, 2005). Heteroglossic resources can be further divided into two broad categories according to "whether they are 'dialogically expansive' or 'dialogically contractive' in their intersubjective functionality" (Martin & White, 2005, p.102). Dialogic expansion involves these resources employed by writers/speakers to entertain those alternative voices internally or externally manifested in written/spoken discourse. The dialogic expansion consists of entertain and attribute. Entertain refers to "those wordings by which the authorial voice indicates that its position is but one of a number of possible positions and thereby, to greater or lesser degrees, makes dialogic space for those possibilities" (Martin & White, 2005, p.104).

In scientific research articles, entertain is typically conveyed via modal auxiliaries (*may, could, etc.*), modal adjuncts (*probably, likely, etc.*), or modal attributes (*it's possible that..., it's likely that..., etc.*). It is also realized via mental verb/attribute projections (*we/author think, it is assumed that..., etc.*). Entertain in scientific articles also includes evidence/appearance-based postulations (*it appears, the research suggests..., etc.*). For example:

- (1) This bears a significant physical meaning that might hold the key to the answer to the longstanding puzzle...
- (2) ... which are assumed to be associated with the way in which the thiol binding group attaches to the surface.
- (3) 从表 5 可以看出 CMCSEN 所得到的秩和平均数最小, Single 最大。
(It can be seen from the Table 5 that CMCSEN...)
- (4) 从图 3 可以看到, 对于固定带宽的抽运光, 随着信号光脉冲宽度的减小, 解析解与数值解的偏离加大。
(It can be seen from the Figure 3 that...)

Xu (2015) proposed that modality of high probability such as *must* should be regarded as "pronounce" rather than "entertain". When *must* expresses deontic modality or epistemic modality, the semantic meaning can be explained as "it is necessary for..." or "it is necessary that...", which reject the different opinions and contract the dialogic space. For instance, "we must regard..." should not be identified as "entertain" since it contracts the dialogic space rather than expand it. However, in some cases, "must" is used to express a personal opinion and can be seen as a kind of speculation, which should be identified as "entertain". So in this study, Xu's opinion is partly adopted and *must* is identified according to the specific co-text and context.

It also should be noted that *can* is identified as entertain value only when it functions as deontic or epistemic modalities. In example (5), the word *can* is inscribed as entertain as it functions as epistemic modality that manages the probabilities of the current proposition. But in example (6), the word *can* is not an entertain value since it merely describes some abilities.

- (5) The result of this is that the system as studied here can be interpreted as two decoupled resistors ...
- (6) with this kind of tool, the collection procedure can work well.

III. METHODOLOGY

A. Data Collection

According to the statistical analysis data of Journal Citation Reports (JCR) on Web of Science (SCI), the research articles (review articles are not included) produced by universities or research institutions in the United States and the United Kingdom published during 2010-2014 by the engineering journals with the highest impact factors in the following five fields—electrical & electronic engineering, mechanical engineering, computer science & application, optics and telecommunications are selected. In each field, 20 papers are randomly selected, and a total of 100 papers are selected to build the English scientific research article corpus, or English Scientific Corpus (ESC) for short.

For the selection of Chinese corpus, in order to correspond with the fields of ESC, the top journals in the above five fields are selected respectively. In the same way, the research articles (review articles are not included) of Chinese authors published in these journals in the five years of 2010-2014 are collected. 20 articles are selected from each journal to form a corpus of 100 Chinese scientific research articles, which is called Chinese Scientific Corpus (CSC) for short.

In view of the comparability, discipline and genre characteristics of corpus selection (Connor & Moreno, 2005), this study limits the subject matter and length of the selected corpus: in terms of subject matter, both English and Chinese corpora are selected from the five fields of electrical & electronic engineering, mechanical engineering, computer

science & application, optics and telecommunications, and the themes of English and Chinese articles are similar; in terms of length, each article is limited to 4000-6000 words (the body part). This study only analyzes the Results & Discussion section. After the establishment of the corpora, 60 articles with the requested structure and length are selected from the English and Chinese Scientific Corpora for quantitative and qualitative analysis.

In addition, in order to ensure the validity of the results, this study strictly controls the selection of articles and ensure that the collected articles are really written by authors that are native speakers of Chinese or English. This study judges it according to the authors' self-introduction, name, and organization. Therefore, the data in this study are representative.

TABLE I.
THE ENGLISH AND CHINESE SCIENTIFIC CORPORA

	<i>English Corpus (words)</i>	<i>Chinese Corpus (words)</i>
Results & Discussion	41746	39251

Table I shows the make-up of the two corpora. The reason why only the Result & Discussion sections of English and Chinese scientific research articles are studied is that according to the previous studies (Yang, 2019), due to the specific rhetorical function of Result & Discussion section, engagement resources especially entertain are most frequently used in this section among the whole article. Therefore, it is necessary to have a detailed study of entertain device in Result & Discussion section.

B. Data Analysis

The entertain resource of this study were annotated according to Martin & White's Appraisal Theory (2005). At the same time, the context was also considered when identifying the entertain resource, since context is an important element which should be taken into account when examining appraisal expressions in the text because a word may have multiple meanings in different contexts (Martin & Rose, 2003). Considering the fact that evaluation values are at the semantic level which the computer can hardly handle exactly, the author identified and marked the entertain resource manually.

To minimize the level of subjective judgements and inconsistency, the data were annotated three times within three months. After the annotation, the author discussed the doubt with the professors in this field and made sure that each one was correctly identified.

In this study, the author analyzed entertain resource in 60 selected English and Chinese scientific research articles. The entertain devices were counted and calculated for the frequencies. Based on the calculated frequencies, data were processed in quantitative uses. Independent-sample t-tests by SPSS were applied to compare English and Chinese scientific research articles to see whether there would be significant differences in frequency between English and Chinese scientific research articles.

IV. RESULTS AND DISCUSSION

A. Similarities and Differences of Semantic Resources Expressing the Meaning of Entertain between English and Chinese Scientific Research Articles

TABLE II.
ENTERTAIN ITEMS IN THE TWO CORPORA

<i>English Corpus</i>	<i>Chinese Corpus</i>
may	从图/表可以发现...
might	(it can be found from...)
can	从图/表可以看出...
could	(it can be seen from...)
would	被认为...
perhaps	(is believed that...)
likely/unlikely	可以认为...
probably/possibly	(we believe that...)
appear	由...可知...
seem	(we can know... from...)
it's possible/probable that ...	应特别注意...
is assumed to be/that...	(it should be noted that...)
is believed to be/that...	可能
is considered to be/as...	(may /perhaps, etc.)
is supposed to be...	
the results suggest that...	
it should be noted that...	

Table II shows the main semantic resources expressing the meaning of entertain in English and Chinese scientific research articles. In scientific research articles, entertain devices are often used by authors to show the respect for the readers as well as used for the negotiation between authors and readers. It is a kind of device that helps the authors to influence the readers' judgement and eventually persuade the readers to accept the viewpoints in the articles.

In English scientific research articles, the most frequently used semantic resources that express entertain meaning are modality. A large number of modal auxiliaries, modal adjuncts and modal attributes are used to make the discourse be dialogic and interactive. For example,

(7) Hence, the bright spots in the dark area of the SEM graphs may originate from this topography being transposed in the oxide underneath, or from some Cr residues.

(8) The results shown here indicate that when a molecule is left to self-assemble it is more likely to display one of the lower resistance groups although further experiments...

(9) Thus, it is possible to compare the damping injection for each controller in relation to the uncontrolled case.

Besides, formulations like “we/author(s)+mental process” and “it is assumed/believed” are used by authors to show that they allow for other possible points and thus expand the interpersonal space for negotiation of different views. And some evidence/appearance-based postulations like “it appears that...” also can open up the dialogistic space and persuade the readers to accept the authors’ viewpoints. For example,

(10) We believe that a good post-fault voltage regulation is accomplished by the strategies, confirming the correct value of the load angle reference...

(11) It appears that heating rates affected the heat flow rates of the coal samples studied.

(12) However it should be noted that a higher bsfc reduction has been observed at 1300 rpm engine speed estimated at ~8–8.5%.

In Chinese scientific research articles, the most frequently used semantic resources expressing entertain meaning are auxiliary verb in Chinese, such as “可以(can)”, “应该(should)”. Authors used this kind of expressions to weaken the subjectivity and make the discussion more objective and reasonable. For example,

(13) ...那么比较图 4 和图 5 即可得如 6 所示的解调相位的绝对误差。

(...then compare Fig. 4 and Fig. 5, we can obtain the absolute error of demodulation phase as shown in Fig. 6.)

(14) 不论是哪种情况下, 原先的 EPLR 公式都应做一定的修正。

(In either case, the original EPLR formula should be modified.)

Comparing the semantic resources expressing entertain meaning in English and Chinese scientific research articles, we can find that English scientific research articles use more kinds of semantic resources than Chinese ones. Specifically, in English scientific research articles, more kinds of modality are used while in Chinese ones, it is mostly realized by volitive auxiliary. Therefore, compared with the Chinese scientific research articles, English ones have more choice and used more abundant semantic resources with a more flexible way to open up the dialogic space and make the articles more objective and reasonable.

Another difference is that in English scientific research articles, authors sometimes combine two kinds of entertain resources to enhance the rhetorical effect, such as “would + seem” and “may + probably”. However, in Chinese scientific research articles, this phenomenon seldom occurs.

However, there is the similarity in English and Chinese scientific research articles in terms of the effect of entertain strategies. Both of them are used to help the authors to persuade the readers to accept their viewpoints in a more objective and reasonable way.

In a word, both English and Chinese scientific research articles are more likely to employ modality to realize the function of persuasion in Result & Discussion section.

B. Quantitative Differences in the Entertain between English and Chinese Scientific Research Articles

As shown in Table III, the frequency of entertain in English and Chinese scientific research articles were significantly different ($t [58] = 6.611, p < .05$). This means that there were significantly different quantitative uses of entertain between English and Chinese scientific research articles. To be specific, entertain was employed more frequently in English scientific research articles than in Chinese scientific research articles. It can also be proved by the means of entertain in English and Chinese scientific research articles (19.40 vs. 8.07).

TABLE III.
ENTERTAIN IN ENGLISH AND CHINESE SCIENTIFIC RESEARCH ARTICLES, AND THEIR DIFFERENCES IN FREQUENCY

	English articles (N=30)		Chinese articles (N=30)		Differences	
	Mean	SD	Mean	SD	T (df=58)	P
Entertain	19.40	8.011	8.07	4.899	6.611	0.000

All values are significant at $p < 0.05$

For scientific articles, “Result & Discussion” is the most important part in the whole article, which is used to present and explain the experiment results, verify the author’s viewpoint, emphasize the new findings and persuade readers to accept the findings and viewpoints. In the process of persuasion, the authors try their best to be rigorous and allow for other voices. In order to avoid subjective assertion, the authors sometimes need to explain and argue from the presumptive, suggestive and suspected perspectives. Therefore, the large amount of entertain devices could make the expression more objective and reliable. It can make the discussion humbler and more sufficient, and thus be more easily to be accepted by readers (Xu et al., 2010).

It can be seen that the mean frequency of entertain resource in Chinese scientific research articles is less than half of

the entertain resource in English scientific research articles (8.07 vs. 19.40). As discussed above, the entertain resource could help the author to persuade the reader in a more objective way. It means that more entertain resources used in English scientific research articles makes it be more objective than the Chinese scientific research articles.

V. CONCLUSION

In this study, the employment of entertain devices in English and Chinese scientific research articles was investigated from the qualitative and quantitative perspectives. As for the qualitative analysis, this study explored similarities and differences of semantic resources expressing the meaning of entertain between English and Chinese scientific research articles. As for the quantitative uses, it is found that entertain was employed more frequently in English scientific research articles than in Chinese scientific research articles.

The findings of the current study may provide some pedagogical implications, especially for the teaching and learning of English academic writing. As the most important part in research articles, Results & Discussion section use a large number of entertain resources to enhance the objectivity and rationality. According to the different thinking patterns, Westerner and Chinese use different kinds of semantic resources and their amount are also different. When teaching English academic writing, teachers could compare the employment entertain resources in English and Chinese scientific research articles, and teach students to write English articles with the western writing style.

The present study is far from perfect and there is room for improvement since it includes only five fields of scientific research articles and the number of English and Chinese scientific research articles may not be sufficient. It is supposed that a larger scale data may better reflect the whole picture of the employment of entertain in English and Chinese scientific research articles. Therefore, the further studies may establish a bigger database which includes diversified typical and representative English and Chinese scientific research articles.

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Yang Yang received her M.A. degree in Linguistics and Applied Linguistics from Chang'an University, Xi'an, China.

She is currently a Ph.D. student in Beijing Normal University, Beijing, China. Her research fields are Systemic Functional Linguistics and Discourse Analysis.