A GENRE ANALYSIS OF ENGLISH AND CHINESE RESEARCH ARTICLE
ABSTRACTS IN LINGUISTICS AND CHEMISTRY

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ABSTRACT OF THE THESIS

A Genre Analysis of English and Chinese Research Article Abstracts in Linguistics and Chemistry
by
Yun Li
Master of Arts in Linguistics
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As an important part-genre in the research article (RA), the abstract has gained significant attention from the academic community. A well-written abstract can attract more readers and increase the chances of the accompanying RA being indexed and cited. Previous genre analyses of RA abstracts have tended to focus on English and European languages, and on social science disciplines, such as linguistics. However, abstracts written in Chinese and in the hard sciences, such as chemistry, have been less analyzed.

This study is a genre analysis on 40 RA abstracts written in two languages, English and Chinese and from two disciplines, chemistry and linguistics. The cross-disciplinary and cross-linguistic analyses reveal that linguistics abstracts follow a conventional scheme, but chemistry abstracts in these two languages do not exhibit the usual norms in terms of moves. Besides, greater difference in move structure is seen across languages in chemistry. The abstracts also manifest differences in sentence-level grammatical features such as the use of the first person pronoun and the passive voice.

The results indicate that RA abstracts display differences in structure due to the differences in the writers’ disciplinary and linguistic background. The results of this study can be drawn on in academic writing courses for graduate students and novice writers, especially those from non-English backgrounds in order to facilitate their successful acculturation into these disciplinary communities.
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CHAPTER 1

INTRODUCTION

The research article (RA) is produced to communicate new knowledge to members of the academic community and persuade them to accept the claims (Hyland, 2000). As the most important genre in the academic community, the RA has received broad attention in genre analysis. Most studies have focused on the analysis of the organizational patterns of RA sections in terms of their constituent moves, such as the study of the introduction section (Samraj, 2002, 2005; Swales, 1990, 2004), the methods section (Lim, 2006), the results section (Taylor & Chen, 1991; Yang & Allison, 2003), and the discussion section (e.g., Yang & Allison, 2003). Furthermore, the studies sometimes have been accompanied by analysis of the grammatical and stylistic features that characterize these moves on the sentence level, such as the uses of hedging (Hyland, 1996), modality (Salager-Meyer, 1992), personal pronouns (Pho, 2008), and citations (Swales, 1990).

A genre has been defined by Swales and Feak (2009) as “a type of text or discourse designed to achieve a set of communicative purposes” (p. 1). They also pointed that the RA is a genre, and other components of the RA are part-genres, for example, the abstract of the RA (Swales & Feak, 2009). The abstract, a part-genre of the RA, has gained significant attention in recent years. An abstract is a brief summary accompanying the RA. The American National Standards Institute (ANSI) defines it as follows: “[it] is an abbreviated, accurate representation of the contents of a document, preferably prepared by its author(s) for publication with it” (Lorés 2004, p. 281). The importance of abstracts has been increasing in recent years due to the explosion of information in the academic world. Abstracts have been stated to “constitute the gateway that leads readers to take up an article, journals to select contributions, or organizers of conferences to accept or reject papers” (Lorés, 2004, p. 281). This is especially true in today’s busy information world. Nowadays, more and more research articles are accompanied by an informative abstract.
Move analysis has also been employed in contrastive rhetoric (CR), studying cultural variation in discourse structure. Kaplan stated, “the cultural background of the author might lead to variation of the rhetorical structures of texts, and that such variation should be considered in ESL teaching programs” (Taylor & Chen, 1991, p. 319). Considering the variations of RA structures among languages, researchers who wish to succeed through publication in the international community will need to acquire awareness of cross-linguistic differences in text structures. With the growing internationalization of the academic community, more and more non-native speakers (NNS) of English want to develop awareness and mastery over the writing conventions of the Anglo-American academic community in order to acquire international recognition. Due to this fact, in the majority of cross-linguistic analyses of the RA structure, English RAs have always been compared with RAs in other languages.

As mentioned earlier, NNSs of English try to acquire English writing conventions. However, rhetorical variations across disciplines cannot be ignored. Up to now, discourse analysts have been studying RAs in broad disciplines, such as the genre analysis of software engineering, biochemistry, sociology (Brett, 1994) and applied linguistics (Ozturk, 2007). Although these studies only focused on a single discipline, they still indicated differences among disciplines. In addition, Samraj (2000) conducted a genre analysis on wildlife behavior and conservation biology, two closely related disciplines. In this interdisciplinary genre study, she found variations as well.

Previous studies have investigated RA abstracts from a specific discipline, such as medicine (Salger-Meyer, 1992), applied linguistics (Santos, 1996), and psychology. However, there have also been a few cross-disciplinary studies. As far as I know, little comparative work has been done on RA abstracts from chemistry and other disciplines. The current cross-linguistic studies of abstracts have mainly considered English and European language abstracts in specialized fields, such as Spanish (Martin-Martin, 2003, in experimental social sciences), and French (Van Bonn & Swales, 2007, in language science). The comparison of the macro- and micro- structure of Chinese and English RA abstracts has also been very limited in number (Jiang, 2010, in applied linguistics; Ju, 2004, in language science).
The widely used framework on RA abstract analyses in previous studies has been Introduction, Methods, Results and Discussion (IMRD), following the sections of a RA. In my study, a more elaborate model proposed by Hyland (2000) will be employed, which includes five moves: Introduction, Purpose, Method, Product and Conclusion. Compared with the IMRD model, this framework distinguishes the abstract’s purpose from the introduction, because it has a different role from the introduction’s typical purpose of providing a justification for the research. In this framework, a product move is adopted instead of the result move, as Hyland (2000) clarified that this move can better account for abstracts from the social science fields, which sometimes include not only a statement of empirical results but also a statement of the argument.

The goal of this study is to examine the rhetorical structures of RA abstracts written in English for an international linguistics journal and an international chemistry journal, and those written in Chinese, which were published in a Chinese linguistics journal and a Chinese chemistry journal. The analysis will employ the 5-move framework. Following other studies on contrastive academic writing, such as Melander, Swales and Fredrickson (1997), this paper demonstrates that there are cultural and disciplinary factors which may create preferences for certain rhetorical strategies by members of different academic discourse communities. Then I will also discuss some variations at the sentence level, such as the tense and voice of the verbs, and the subjects of the reporting clauses. Before discussing the Methods and Results of the present study, I will discuss genre analysis of RAs and review some previous studies in the field in Chapter 2.
CHAPTER 2

LITERATURE REVIEW

This present study can be called a dual contrastive genre analysis, comparing the effects of languages and disciplines on RA abstracts. It involves four sets of RA abstracts from two different disciplines, linguistics and chemistry, written in two languages, English and Chinese. First, general information about the move-step framework used in research article analysis will be introduced. Then, previous studies that have informed this present study will be discussed. These studies involve analyses of rhetorical divisions of RAs, especially RA abstracts. Lastly, a review of studies on the comparison of writing in different languages and different disciplines will be presented.

MOVE-STEP ANALYSIS IN RA

The early definition of genre is “a class of communicative events, the members of which share some set of communicative purposes” (Swales, 1990, p. 58). The definition shows that a genre is categorized according to its communicative purpose. A description of the rhetorical structure of a genre in terms of moves has played an important role in the genre analysis field. As one of the pioneers, Swales (1981, 1990) conducted a move-step analysis on the structure of RA introductions. After that, genre analysts have been carrying out numerous studies of RA discourse in terms of the move structures, such as Santos (1996), Samraj (2002, 2005), and Lorés (2004). However, identifying genres according to Swales’ (1990) definition has been problematic. Askehave and Swales (2001) noted that the common purpose of a text is not always clear and some texts may have multiple communicative purposes. Even so, genre study in terms of move-step analysis has been growing in importance in the last two decades, because such analysis has great value in understanding the nature of discourse. In addition, the results of move-step analyses have valuable pedagogical implications for reading and writing classes.
A move in genre analysis is defined as a “discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse” (Swales, 2004, p. 228-9). Pho (2009) indicated, “each move has its own communicative purpose, which, together with other moves, contributes to the general communicative purpose of the text” (p. 17). Each rhetorical move can be realized by one or more steps, but not all moves comprise constituent steps (Samraj, 2009). Both moves and steps are functional units, and can be optional or obligatory in a genre. Some moves or steps occurring regularly in a genre are considered obligatory; others occurring less frequently are considered optional. However, criteria for defining an obligatory unit are not consistent. In some studies, an obligatory move or step, which refers to a unit, occurs in over 50% of a set of texts, or over 60% of a set of texts, or even above 80% of a set of texts.

The identification of moves is a crucial step in a rhetorical structure analysis. Swales (2004) indicated that the identification of moves, and consequently the setting of move boundaries, is established by “a mixed bag of criteria” (Swales, 2004, p. 229). Researchers have also turned to linguistic features to help them identify moves and their boundaries. The analyses of micro-level features of RAs have been the subject of many genre studies (Lim, 2006; Pho, 2008).

**Genre Analysis of RA Sections**

The RA is one of the most widely researched genres in academic writing. Within the studies examining the organizational patterns of RA sections, the main focus of interest has been on the introduction section of RAs. As early as in 1981, Swales analyzed the structure of RA introduction across a range of fields, and claimed that there was a basic four-move structure in the RA introduction: 1. Establishing the research field, 2. Reporting previous research, 3. Preparing for present research, and 4. Introducing present research. In 1990, Swales revised the structure to a three-move pattern, called the create-a-research-space model (CARS model): 1. Establishing a territory, 2. Establishing a niche, and 3. Occupying the niche. The CARS model has influenced numerous later studies on the structure of the introduction (Bhatia, 1997; Samraj, 2002, 2005). As Swales (2004) said, “the basically three-part model for English language introductions in many leading journals is or has become prototypical” (p.
Some scholars later modified the CARS model in order to account for the texts analyzed. For example, Samraj (2002) analyzed the RA introduction section from two disciplines, conservation biology and wildlife behavior, by using the CARS model. She revealed that one element “the discussion of previous research” was not only found in M1, Establishing a territory, but also played an important role in the other two moves, Establishing a niche and Occupying the niche. She called it “a freestanding sub-step” (p. 16) and claimed, “it can be employed in the realization of any step in the introduction” (p. 16). She presented a revised CARS model.

The method section is the most straightforward part of the RA, but it has gained the least attention from genre analysts. Lim (2006) conducted a detailed move-step analysis on the method section of business management RAs in order to demonstrate how the linguistic features relate to the writer’s communicative intentions and how the linguistic choices fulfill these intentions. He identified one move “preview the results”, which has never been mentioned in other analyses of the method section of RAs (Brett, 1994).

There have been several studies on the result and discussion sections, such as Yang & Allison (2003). Holmes (2001) conducted a cross-linguistic analysis on RA discussion section on agricultural economics, and the RAs were written by authors from the U.S., Canada, United Kingdom, Australian and India. He pointed out that cultural variations had influence on the sequence of the moves. Yang and Allison (2003) examined applied linguistics RAs. They identified specific organizational choices within the sections of results, results and discussion, discussion, conclusion, and pedagogic implications. They found there were primary moves in the sections, and also some overlapping moves between sections.

**Genre Analysis of RA Abstracts**

Millions of RAs are being published around the research world every year, and abstracts have become a crucial element to help readers make a decision in selecting readings. Lorés (2004) has stated that RA abstracts are different from RAs in the following three aspects: function, rhetorical structure and linguistic realizations. Because of the increasing interest in abstracts, quite a few analyses on the part-genre
have been conducted (Lorés, 2004; Pho, 2008; Samraj, 2005; Santos, 1996; Von Bonn & Swales, 2007). Santos (1996) chose to explore the textual organization of RA abstracts at two levels: first, the features that constitute abstracts at the macro-level of textual organization, and second, the sentence level features at the micro-level of textual analysis. Ninety-four RA abstracts from the field of applied linguistics were analyzed. Using his model of five main moves, he identified the RA abstracts as: situating the research (M1), presenting the research (M2), describing the methodology (M3), summarizing the results (M4), and discussing the research (M5). Santos reported that M2 and M3 were essentially obligatory moves in the genre, and different moves required different linguistic resources to realize their purposes in terms of thematization, tense choice, and voice choice.

Using the CARS model and the IMRD model, Lorés (2004) conducted a genre analysis on a corpus of 36 RA abstracts from the field of linguistics. She found that about 61% of RA abstracts followed the IMRD structure, about 31% of them followed the CARS structure, and 8% displayed the two structures. The three types fulfill three different functions: the informative, the indicative, and the informative-indicative function. Lorés indicated that the results of the study might explain why previous studies did not agree on the rhetorical organizations of abstracts and described them in very flexible terms.

Chinese linguists also have conducted some studies on English abstracts to help postgraduates improve their English writing. Ge and Yang (2005) have investigated English abstracts for the discourse structures and linguistic features in three disciplines (engineering, finance and surgery) using a 5-move model. The results showed that most of the abstracts followed the same move sequence but there was a significant difference in the frequency of moves in relation to disciplinary characteristics. For example, 45% of the surgery abstracts had a method move, but only 14% of the finance abstracts had this move.

**Contrastive Rhetoric in RA Abstracts**

The RA abstract has gained a lot of attention in the field of cross-linguistic studies (e.g., Martin-Martin, 2003; Van Bonn & Swales, 2007), because there is more
and more academic communication among countries in recent years. Research in CR has shown that writers express, structure, and present ideas and research differently from each other due to the diversity of their culture and backgrounds.

In a genre study of the abstract section of experimental social sciences, Martin-Martin (2003) compared RA abstracts written in English and Spanish. He investigated the macrostructure of these texts based on the IMRD model. The main distinction was the variation in the constituents of the introduction section and the frequency of the result section in Spanish. The general structures of the introduction were similar to those written in English. He applied the CARS model to the introduction unit, and identified three moves in this section. Spanish writers usually did not include Move 2, establishing a niche in the field, in introductions in their abstracts. He concluded that the rhetorical structure of scientific discourse is not universal. Socio-cultural factors lead to the differences in communities, and he suggested that the source of the rhetorical variation lay in the relationship between writers and the discourse community.

Van Bonn and Swales (2007) reported in their study that English and French RA abstracts in the language sciences follow the IMRD model. Instead of differences in the rhetorical structures of the RA abstracts, the variation emerged in linguistic features, including the voice of the verbs, and the choice of personal pronouns and transition words. They also revealed that English authors justify their research by indicating “why this research” (Van Bonn & Swales, 2007, p. 97), but French authors usually identify the aim of their work by answering “what the research attempts to do” (Van Bonn & Swales, 2007, p. 97).

**Contrastive Study in Chinese**

In China, there have also been some studies on the comparison of abstract writing or other part-genre writing in English and Chinese. Due to the different grammatical systems they belong to, as far as I know, no linguistic features analyses have ever been conducted on them.

Ju (2004) conducted a contrastive study of abstracts in English and Chinese RAs. She randomly selected 20 English abstracts and 20 Chinese abstracts in the field of
language sciences, and applied the IMRD model to identify their generic structures. She found that English abstracts usually have a more complete structure including all four moves, but Chinese abstracts tend to omit the introduction move and the discussion move. One striking difference lay in the way to state the purpose of the study in the introduction move. English authors typically open the abstract by stating *This paper discusses* or *This paper explains*, which can be considered a writer-responsible pattern, whereas Chinese authors choose a more indirect way to describe or discuss their purpose in several sentences, which can be considered a reader-responsible pattern.

In a very recent study, Jiang (2010) conducted a contrastive study on the rhetorical structure of introductions in English and Chinese applied linguistics RAs. He modified the CARS model by adding eight more steps according to the disciplinary features, and the modified model was used as the analytical framework in his study. The study showed that although English abstracts had a more complicated structure and more diversified and flexible options of steps in Move 3, occupying the niche, no significant differences were identified in both macro- and micro-structures between the introductions in the two languages. He also noticed that the literature review was adopted in English introductions more frequently than in Chinese introductions.

**CROSS-DISCIPLINARY STUDY OF RA ABSTRACTS**

Genre analysts have conducted studies on the structure of RA abstracts and the variation of the structures across disciplines (e.g., Melander, Swales & Fredrickson, 1997; Pho, 2008; Samraj, 2005). These studies have compared the rhetorical structures across various disciplines, and have shown differences in genre structure.

Samraj (2005) compared RA abstracts from two closely related disciplines: conservation biology and wildlife behavior. She analyzed a total of 24 RA abstracts randomly selected from two journals. She found that the overall layout of the RA abstracts was similar: Purpose-Methods-Results-Conclusions. However, when she examined aspects of the abstracts beyond the traditional moves, differences stood out. The rhetorical structure in conservative biology abstracts included some moves ascribed to RA introductions, for instance, centrality claims, but they were not present
in wildlife behavior abstracts. She concluded that the rhetorical structures of even closely related disciplines could vary.

Pho (2008) analyzed the rhetorical organization, the linguistic realization of moves and authorial stance in 30 abstracts from three journals in two disciplines: applied linguistics and educational technology. He noted that three moves, presenting the research, summarizing the findings and describing the methodology, were found in almost all the abstracts. He also pointed out that the combination of certain linguistic features would help distinguish one move from the other moves, such as the grammatical subjects, verb tense and voice. He believed that move identification should be based on the semantic meanings of each move rather than linguistic features which characterize the move, because it “avoids the circularity of move identification” (Pho, 2008, p. 246) and “makes the linguistic realizations of moves and authorial stance more objective” (Pho, 2008, p. 247).

Melander, Swales & Fredrickson (1997) analyzed RA abstracts writing from three disciplines: biology, medicine and linguistics, in English and Swedish. In the cross-disciplinary and cross-linguistic analysis, they found that both discipline and culture play important roles in writing. The answer to the question as to whether discipline or culture has a greater influence on writers is dependent on the fields; within linguistics there were strong cultural differences, within biology the texts were consistent, and within medicine they still had no clear answer to the question.

**SUMMARY OF THE LITERATURE REVIEW**

Move analysis has been broadly employed in identifying the connection and variation among genres and part-genres in the academic world. The influences of disciplines and languages on a genre’s move structure have been explored in quite a few previous studies. In addition, genre analysts have conducted a number of studies on the abstract, an important part-genre. However, most of the studies concern the abstracts of social sciences, for example, the language sciences. Little has been done on natural sciences such as chemistry. As mentioned earlier, abstracts produced in English and European languages have been analyzed in several studies. Chinese, as the most widely used language, has seldom been involved in cross-cultural studies on genre analysis.
This study is intended to fill the gap in the genre analysis field by examining the rhetorical structures of abstracts in two disciplines, linguistics and chemistry, and across two languages, English and Chinese. The next chapter, Chapter 3, will present the methodology employed in the study.
CHAPTER 3

METHODOLOGY

This chapter introduces the methodology employed in this study. It begins with a description of the data set, then the analytic framework for the study, and the procedures to determine the abstracts’ rhetorical structure.

THE DATA SET

The texts in my data set include in total 40 RA abstracts as shown in Table 1 from two disciplines, linguistics and chemistry, in two languages, English, the lingua franca of academic publications, and Chinese, the most widely used language. Linguistics belongs to the social science or “soft discipline” (Hyland, 2000, p. 9), and chemistry belongs to the natural science or “hard discipline” (Hyland, 2000, p. 9).

Table 1. Four Groups of Abstracts

<table>
<thead>
<tr>
<th></th>
<th>Linguistics</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Applied Linguistics (AL)</td>
<td>Journal of American Chemistry Society (JACS)</td>
</tr>
<tr>
<td>Chinese</td>
<td>Foreign Language Teaching and Research (FLTR)</td>
<td>ACTA CHIMICA SINICA (ACS)</td>
</tr>
</tbody>
</table>

RA abstracts were randomly chosen from recent publications in leading journals in their respective fields. The RA abstracts in the data set were published between 2008 and 2010. The English texts include 20 RA abstracts published in the United States: 10 selected from an international linguistics journal Applied Linguistics (AL) and 10 from an international chemistry journal Journal of American Chemistry Society (JACS). Likewise, the Chinese texts constitute 20 RA abstracts published in the People’s Republic of China: 10 from a linguistics journal Foreign Language Teaching and
Research (FLTR) and 10 from a chemistry journal ACTA CHIMICA SINICA (ACS). All selected abstracts from linguistic journals are from the field of applied linguistics, and the chemistry abstracts focus on organic chemistry.

When conducting studies in contrastive analysis, Connor, Nagelhout and Rozycki (2008) pointed out that it is important to establish a valid criterion of comparison between corpora, in other words, to examine sets of comparable original texts with “maximum similarity” written in two or more languages. The selected journals are leading journals in their academic societies, and publications in the journals are widely cited in their subject field. Although the international RA abstracts were written by authors from different countries, including native and nonnative writers, their English writing proficiency can be taken to be at a native or near-native level since the articles have been published in these leading academic journals. The authors of the Chinese RAs wrote the abstracts in their native language, that is, Chinese. The examples from the Chinese abstracts have been translated and will be presented in English.

Each abstract contains one single paragraph. The linguistics RA abstracts in English have an average of 173.5 words, and in Chinese the abstracts have 128.95 words (257.9 characters) on average, while the chemistry RA abstracts contain an average of 164.7 words in English and 112.65 words (225.3 characters) in Chinese. Chinese words are typically two syllables (characters) long, so Chinese abstracts are shorter. The difference between the numbers of the words has no influence on the rhetorical analysis.

Usually, a move unit is composed of one or more sentences or at least a clause. However, in the present study, there are some moves that appear in the form of a noun phrase as in Example 1:

1. This study focused on a Chinese-speaking graduate student [M3-Method] in electrical engineering who analyzed genre exemplars in preparation for writing [M2- Purpose]. [En-AL 8]¹

The embedded M3, which describes the subject of the study, is part of the major move, M2. Some researchers have discussed this phenomenon in their studies. Santos

¹ En= English The number refers to the abstracts listed in the Appendix.
(1996) found that Describing the methodology move in applied linguistics RA abstracts merges with other moves partially or totally. Pho (2008) found that Describing the methodology move could be embedded in either the Presenting the research move or Summarizing the findings move in the RA abstracts of applied linguistics and educational technology. They both attributed the hybrid move to the condensed structure of abstracts. Therefore, for the RA abstracts in the present study, a move will be defined as a structure ranging from several sentences to a clause or even a noun phrase.

**THE ANALYTICAL FRAMEWORK**

In this study, Hyland’s (2000) five-move model was used to identify the rhetorical structure of the four sets of texts. Each move performs a specific rhetorical function. According to this model, the five moves are: Introduction (M1), Purpose (M2), Method (M3), Product (M4), and Conclusion (M5). As shown in Table 2, each move represents the realization of a communicative purpose (Hyland, 2000). In contrast to the traditional IMRD model, he distinguished the writer's purpose from the introduction move, where it is often located.

The linear order of moves can be seen in the following English linguistics RA abstract from *Applied Linguistics* as in Example 2:

2. **Abstract**

This paper investigates whether any difference exists in the degree of second language attrition between two siblings in terms of grammatical complexity, grammatical accuracy, lexical complexity, and lexical productivity based on their storytelling data collected over the period of 31 months. [M2- Purpose] The subjects' L1 and L2 are Japanese and English, respectively. The siblings (one male, one female) have similar L2 profiles with respect to attained proficiency, including literacy, but differ in age. [M3-Method] The ages of returning home were 7;0, an age reported to be more vulnerable to attrition and 10;0, an age reported to be more resistant. The siblings showed similar attrition patterns suggesting that an attained high proficiency level including the acquisition of literacy skills is an important factor in the maintenance of L2. One exception was grammatical accuracy, but the difference surfaced only after the second year, indicating that the period of disuse was differentially affected according to their ages. [M4-Product] The younger sibling's data also suggest that maturational factors may play a role in successfully handling grammatical complexity and accuracy simultaneously. [M5-Conclusion]
Table 2. A Framework for Abstract Analysis

<table>
<thead>
<tr>
<th>Moves</th>
<th>Function</th>
</tr>
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<tbody>
<tr>
<td>1. Introduction</td>
<td>Establishes context of the paper and motivates the research or discussion.</td>
</tr>
<tr>
<td>2. Purpose</td>
<td>Indicates purpose, thesis or hypothesis, outlines the intention behind the paper.</td>
</tr>
<tr>
<td>3. Method</td>
<td>Provides information on design, procedures, assumptions, approach, data, etc.</td>
</tr>
<tr>
<td>4. Product</td>
<td>States main findings or results, the argument, or what was accomplished</td>
</tr>
<tr>
<td>5. Conclusion</td>
<td>Interprets or extends results beyond scope of paper, draws inferences, points to applications or wider implications.</td>
</tr>
</tbody>
</table>


**Method of Analyses**

In the analysis of the texts, first I examined the rhetorical structure of abstracts by examining the overall textual organization of each abstract as shown in Table 2, following Hyland’s (2000) model. As discussed by Ackland (2009), the identification of moves and consequently the setting of move boundaries in abstracts were usually accomplished through two approaches, one was based on the content of the abstract, called a “top-down” approach, and the other one is based on linguistic signals, called a “bottom-up” approach. In this study, the textual boundaries of these units were identified primarily on the basis of semantic criteria, that is, the “top-down” approach.

The identification of each move in the data sets was quite straightforward on the whole. However, I had a hard time distinguishing the boundary between the product unit (M4) and the conclusion unit (M5) in linguistics RA abstracts. In the end, the units that summarize the results by answering, “What did you find?” were categorized as the product, which usually summarize briefly the main findings of the research together with a basic generalization and/or provide the main argument as in Example 3; on the other hand, those units that discuss the research by evaluating the findings, relating the
reported research to the broad field, research or real life were categorized as conclusions as in Example 4:

3. My analysis of the data reveals this student's two prominent and interrelated ways of analyzing the discourse-level generic features in discipline-specific genre exemplars. They are (a) rhetorical, as evidenced in his consistent attention not only to the generic features, but also to the underlying rhetorical parameters, such as reader, writer, and purpose and (b) evaluative, as shown in his increasingly sophisticated evaluation of the discourse-level generic features in the genre exemplars. [En-AL 9]

4. The student's rhetorical and evaluative reading of the genre exemplars highlights the potential power of genre as an explicit, supportive tool for building academic literacy. [En-AL 9]

In the chemistry RA abstract analysis, it was not easy to distinguish the purpose move (M2) from the product move (M4). There are two criteria for me to follow: one is at the semantics level. The purpose move usually answers the question, “What is the study about?” In contrast, the product move answers the question, “What do you find?” The other level is the use of presentation verbs, such as discuss, describe, detail, explore and address to mark the purpose move, and the use of verbs such as show, demonstrate, find and establish to indicate the result move. Examples 5 and 6 show the purpose move and result move respectively:

5. The stereocontrolled total synthesis of 4-hydroxydictyolactone...a member of the xenicane diterpene family of natural products, is described. [En-JACS 6]

6. The first total synthesis of the Akuamililine akaloid...has been accomplished in about 1% overall yield in 31 steps. [En- JACS 5]

In previous studies, different researchers have used various measures for whether a move should be considered obligatory as discussed in chapter 1. In my study, a particular move is considered obligatory when it happens in the texts over 80 percent of the cases. In this regard, to be recognized as a conventional move, a move must occur in 80% of the appropriate sections in the corpus. Otherwise, it is considered optional.

Secondly, a few linguistic features, namely the tense and the voice of verbs and first personal pronouns, which characterize each move on the sentence level were identified. However, Li and Thompson (1976) stated that English is a subject-prominent (SP) language and Chinese is a topic-prominent (TP) language. The distinctions of the two languages are “in SP languages, the structure of sentences favors a description in
which the grammatical relation subject-predicate plays major roles; in TP language, the basic structure of sentences favors a description in which the grammatical relation topic-comment plays a major role” (Li & Thompson, 1976, p. 459). The analyses of the linguistic features of the RA abstracts were mainly carried out to identify the features in English linguistics and chemistry RA abstracts since Chinese has a significantly different grammatical system from English (Li & Thompson, 1976).

**SUMMARY OF THE METHODOLOGY**

In summary, 40 RA abstracts from two disciplines in two languages were randomly chosen from recent published leading journals. First, the overall organization of the RA abstracts was analyzed based on Hyland's (2000) five-move model. Then, certain linguistic features of the moves were analyzed in the English abstracts. The results of these analyses are presented in Chapter 4.
CHAPTER 4

RHETORICAL ORGANIZATION OF ABSTRACTS

This chapter discusses the variation in rhetorical structure and linguistic features of RA abstracts across languages and across disciplines. The cross-linguistic analyses are conducted in two languages: English and Chinese, and the cross-disciplinary analyses are conducted on RA abstracts in two disciplines: linguistics, which belongs to the social science or “soft discipline” (Hyland, 2000) and chemistry, which is a natural science or “hard discipline” (Hyland, 2000). This chapter reports the results of these two kinds of analyses in five sections.

CROSS-LINGUISTIC ANALYSIS OF LINGUISTICS ABSTRACTS

Hyland (2000) determined that more than 95 percent of the abstracts had all five moves in his study on 800 abstracts. Similar to his finding, in this study, most of the linguistics abstracts only have four basic structural components: the purpose move (M2), the method move (M3), the product move (M4) and the conclusion move (M5) in both English and Chinese, as shown in Table 3. The M2-M3-M4-M5 pattern emerges as the conventional schema in the abstracts in both languages.

<table>
<thead>
<tr>
<th>Move</th>
<th>English</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>4 (40%)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td>2. Purpose</td>
<td>10(100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>3. Method</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>4. Product</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>5. Conclusion</td>
<td>10 (100%)</td>
<td>7 (70%)</td>
</tr>
</tbody>
</table>

The results in Table 3 show that the purpose move (M2), the method move (M3) and the product move (M4) are the most frequent and obligatory moves in both groups...
of abstracts. Such findings are in line with those of Santos’s (1996) with the purpose move and the method move occurring in almost all the abstracts. In contrast, the other two moves, the introduction move (M1) and the conclusion move (M5) occur less frequently.

It is apparent that not all of the abstracts follow the conventional structure. As shown in Table 4, variations exist in abstracts irrespective of authorship in terms of addition or deletion of one or two moves or reordering of moves. An embedding subordinate move within a major move is indicated in Table 4 by square brackets.

### Table 4. Move Structure of Twenty Linguistics Abstracts in English and Chinese

<table>
<thead>
<tr>
<th>Journal</th>
<th>Structure</th>
<th>Journal</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL English</td>
<td><strong>English:</strong></td>
<td>FLTR Chinese</td>
<td><strong>Chinese:</strong></td>
</tr>
<tr>
<td></td>
<td>1. M2-M3-M1-M4-M5</td>
<td></td>
<td>1. M2-M3-M4-M5</td>
</tr>
<tr>
<td></td>
<td>2. M2-M3-M4-M5</td>
<td></td>
<td>2. M2-M3-M4-M5</td>
</tr>
<tr>
<td></td>
<td>3. M2-M3-M4-M5</td>
<td></td>
<td>3. M2-M3-M4-M5</td>
</tr>
<tr>
<td></td>
<td>4. M2-M3-M4-M5</td>
<td></td>
<td>4. [M2/M3]-M4-M5</td>
</tr>
<tr>
<td></td>
<td>5. M2-M3-M4-M5</td>
<td></td>
<td>5. [M2/M3]-M1-M4-M5</td>
</tr>
<tr>
<td></td>
<td>7. M2-M3-M2-M4-M5</td>
<td></td>
<td>7. M1-[M2/M3]--M4-M5</td>
</tr>
<tr>
<td></td>
<td>8. M1-[M2/M3]-M4-M5</td>
<td></td>
<td>8. M2-M3-M4</td>
</tr>
<tr>
<td></td>
<td>9. M1-[M2/M3]-M4-M5</td>
<td></td>
<td>9. M2-M3-M4</td>
</tr>
<tr>
<td></td>
<td>10. M1-M2-M3-M4-M5</td>
<td></td>
<td>10. M2-M3-M4</td>
</tr>
</tbody>
</table>

A few abstracts contain more than one of these variations as seen in Table 4 (e.g., Chinese 5, which embeds M3 within M2, and reorders the normal sequence with the insertion of M1). Basically, the M2-M3-M4-M5 pattern is the most common structure. Of the 20 abstracts, nine follow it, which is consistent with Hyland’s (2000) result, and six have a more complete structure with M1. Only a few texts contain all five moves. This trend is similar in each of the two groups. The move deletion pattern constitutes three
out of the twenty RA abstracts (e.g., Chinese 8, 9, 10). The move-reordering pattern is caused by the post-posing of M1 (e.g., Chinese 5, English 1).

Move embedding occurs only with M3, and this move is usually embedded in M2 as shown in Table 4. Santos (1996) referred to the embedded move as a “hybrid move” (p. 492). Pho (2008) also noted the flexibility of this particular move in his study and stated that, “the methods of the study can be expressed in a participial phrase at the beginning of a sentence presenting the research” (p. 238).

The majority of the abstracts follow the same sequence of rhetorical structure: M1-M2-M3-M4-M5. However, the post-posing of M1 results in a reordering of the move pattern. The phenomenon of reordering is more common in English abstracts than in Chinese abstracts as shown in Table 4.

**Move 1 - Introduction**

The initial move usually locates the current research by stating current knowledge and by providing a discussion of previous research. Additionally, the author may justify his/her research after presenting a problem or a gap.

There are only six instances of M1 found in the abstracts, four in English, and two in Chinese. Most of the M1s in the abstracts function as a statement of current knowledge as shown in Example 7 and/or identify a problem or a gap as shown in Example 8:

7. The study builds on earlier research arguing that interactional routines facilitate children’s participation in social activities, and therefore promote language learning. [En-AL 5]

8. Some researchers believe that the ESP genre-based framework of writing instruction is effective in teaching discipline-specific English EAP writing to L2 learners, especially to advanced L2 graduate students [current knowledge]. However, studies examining students’ genre-based learning in such a framework are still underrepresented in current ESP genre-based literature [problem /gap]. [En-AL 9]

Samraj (2009) stated this move could either serve a persuasive or a neutral contextualizing function. As can be seen from the data, five out of six M1s try to “sell” their research to a busy readership except for one M1 in Chinese. In order to fulfill the persuasive function, these M1s discuss previous research or state current knowledge to
motivate the readers. One Chinese M1 merely provides background knowledge to readers to make the abstract more accessible to readers, and contextualizes the study. As shown in Example 9, M1 just defines “syntactic complexity”:

9. Syntactic complexity is categorized into unit length, measured by T-unit length and clause length, and clausal density or degree of embeddedness, measured by T-unit complexity ratio and dependent clause ratio.) [Ch-FLTR 5]

Previous researchers have claimed that M1 is usually the opening move in RA abstracts, while in my study, only four occurrences of M1 (3 in English, 1 in Chinese) are initial, and the other two are placed before M4 or after M3, indicating variation in the linear order in RA abstracts in linguistics. The authors have the freedom to decide what move they will first highlight. In linguistics RA abstracts, authors usually pick the purpose move (M2) or introduction move (M1) as the initial move.

M1 is included in 40% of the English abstracts, but only in 20% of Chinese abstracts, indicating that international journal authors may consider situating the research as an important part of the abstract while Chinese authors do so much less.

**Move 2 - Purpose**

The purpose move is used to foreground the purpose of the study. Van Bonn & Swales (2007) stated that M2 is usually categorized into two forms: the descriptive form, which focuses on describing the features of the study, or the purposive form, which is marked by the use of an expression such as ‘the aim’ or ‘the goal’. It is interesting to see that descriptive M2s constitute all of the cases in the study as shown in Examples 10 and 11. Santos (1996) and Van Bonn & Swales (2007) had similar findings when they analyzed English abstracts in their study.

10. The study investigates the effect of explicit contrastive analysis and translation activities on the incidental acquisition of single words and collocations. [En-AL 4]

11. This paper reports a cross-sectional study of the changing patterns of syntactic complexity in the essays by EFL learners across grades and writing quality levels. [Ch-FLTR 5]

—

2 Ch = Chinese The number refers to the abstract listed in the Appendix.
Both Chinese and English authors show a strong preference to open the RA abstracts with M2; this occurs in seven English and nine Chinese abstracts. Moreover, all abstracts contain M2s, which means that this is an obligatory move in the linguistics abstract genre.

M2s of the English abstracts are signaled by a subject that refers to the study or the paper itself with the determiner (*this, the*) together with a head noun (*paper, article, study, research*) as shown in Example 12. The M2s in Chinese abstracts are marked by a determiner *本*, which means *this* or *the*, along with a noun which means *paper* or *study*, as shown in Example 13. The reporting verb of M2 used in both data sets is usually one of the following: *investigate, report, study and examine.*

12. *This article examines* the conceptions of research held by 505 teachers of English from 13 countries around the world. [En- AL 1]

13. 本文 ... 探讨...水平。

This paper ... studies the effects on ... [Ch-FLTR 2]

As shown above, most of the authors follow the same sequence to begin the abstracts regardless of whether the abstract is written in English or Chinese. The construction of M2 is similar in both groups of abstracts: Determiner + *study/paper* + reporting verb (active voice).

**Move 3 - Method**

It is usually in the method move that the authors offer some description of how the research was actually carried out by indicating the subjects, procedures, materials, instruments, and/or the design of the study. In my study, M3 is an obligatory move in the linguistics RA abstracts, which is in line with Santos’s (1996) and Pho’s (2008) findings. They both reported that almost all abstracts contained M3 in their studies. The length of M3 in my study ranges from one phrase to several sentences, and the longest M3 is in AL 9, which includes nine sentences and constitutes 2/3 of the abstract. It is not difficult to understand because the abstract of AL 9 reports on an experimental study and usually this kind of abstract devotes more space to M3 than other kinds of abstracts.
M3 can occur by itself (e.g., Example 8) or merge with the other main moves (e.g., Example 9) as observed in previous studies (e.g., Santos, 1996). In my study, five out of twenty M3s are embedded in M2, two in English and three in Chinese. In Example 14, M2 is the main move in the sentence describing the purpose of the study, but the phrase containing the methodology of the study is embedded in this move. It is easy to see that the communicative purpose of M3 differs from that of M2 in Example 15. The strategy of merging M3 with another main move suggests that the authors of RA abstracts in both languages use the strategy due to space constraints.

14. 90 Chinese learners of English at three proficiency levels and 24 native speakers of English participated in the study. An Error Correction Task (ECT) was developed to elicit L2 learner behavior. [Ch-FLTR 1]

15. This study focused on a Chinese-speaking graduate student [M3-Method] in electrical engineering who analyzed genre exemplars in preparation for writing [M2- Purpose]. [En-AL 8]

**Move 4 - Product**

The product move briefly summarizes the main findings or results of the study, and can also include the presentation of an argument or a description of the accomplishments of the study, as in Example 16. The frequency of occurrence of M4 is 100% in both languages.

16. The results show that modified output and noticing are significant predictors of EFL question development, while neither recast nor clarification is a significant predict or of EFL question development. [ Ch- FLTR 10 ]

An interesting point to note is that M4 occurs as the last move in three Chinese abstracts as shown in Example 17, while it is never utilized as the last move in the English abstracts. As found in my study, describing the findings or results of their study in M4 is not a typical way to “sell” the research article, because the majority of the abstracts include a conclusion move to promote their research, as in Example 18:

17. The results show that modified output and noticing are significant predictors of EFL question development, while neither recast nor clarification is a significant predict or of EFL question development [M4-Product]. [Ch-FLTR 10]

18. The CAT (contrastive analysis and translation) group significantly outperformed the other two groups on all the tests [M4- Product]. These superior results are discussed in light of the 'noticing' hypothesis, 'pushed output', 'task-induced
involvement load’, and the influence that L1 exerts on the acquisition of L2 vocabulary [M5-Conclusion]. [En-AL 4]

The Chinese authors may believe that their studies are well-known enough to attract a good deal of attention in their discourse community without a conclusion. Another possibility is the authors may not follow the conventional rhetorical structure, because in the Chinese culture, people are not encouraged to “sell” their ideas.

**Move 5 - Conclusion**

In the conclusion move, authors make their final claims about the importance of their research or summarize the implications drawn from the results. This unit includes the evaluation of findings, as in Example 19, and also links the current study to the real world or research world at large as in Example 20. The main function of this move is to draw the readers into the article.

19. The results confirm those of previous studies that teachers’ reactions to language policy is not a straightforward process and as such it is important to understand the role teachers play in the enactment of language policy. [En-AL 8]

20. The findings, both quantitative and qualitative, are interpreted using the Willingness to Communicate framework; we also discuss implications for the language classroom. [Ch-FLTR 6]

In both English and Chinese abstracts, there is a kind of conclusion that does not generalize the findings or link the findings to the research world or real world, but only indicates the structure of the discussion as shown in Examples 21.

21. These superior results are discussed in light of the ‘noticing’ hypothesis, ‘pushed output’, ‘task-induced involvement load’, and the influence that L1 exerts on the acquisition of L2 vocabulary. [En-AL 4]

English linguists use this move considerably more often than Chinese linguists because M5 was found in 100% of the English abstracts, but only in 70% of the Chinese abstracts.

**CROSS-LINGUISTIC ANALYSIS OF CHEMISTRY ABSTRACTS**

Generally, the five moves are present to some degree in chemistry abstracts. Move frequency is shown in Table 5: the introduction move (M1) is the least frequent in both groups of abstracts (20% in English, 10% in Chinese); the method move (M3) is found in 100% of the analyzed abstracts; the frequency of occurrence of the purpose
Table 5. Frequency of the Occurrence of Moves in the Chemistry Abstracts

<table>
<thead>
<tr>
<th>Move</th>
<th>English</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>2 (20%)</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>2. Purpose</td>
<td>8 (80%)</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>3. Method</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>4. Product</td>
<td>3 (30%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>5. Conclusion</td>
<td>5 (50%)</td>
<td>8 (80%)</td>
</tr>
</tbody>
</table>

Move (M2) (80% in English, 10% in Chinese), the product move (M4) (30% in English, 100% in Chinese) and the conclusion move (M5) (50% in English, 80% in Chinese) vary greatly across languages. The analysis reveals a strong tendency to omit the purpose move in the Chinese abstracts (10% of the cases contain M2), and the product move in the English abstracts (30% of the cases contain M4); the difference in the conclusion move is relatively less significant (50% in English, 80% in Chinese).

The language used influences the frequency of the occurrence of the moves. The results in Table 6 show that the chemistry RA abstracts in English basically follow a M2-M3 pattern, and the chemistry RA abstracts in Chinese have the M3-M4-M5 structure as the conventional schema.

Move 1 - Introduction

In the sample of twenty chemistry abstracts, the introduction move occurs only in three abstracts, two in English and one in Chinese. Each M1 is constituted by one individual sentence, and it can be a short and simple sentence or a long and complex sentence. A close examination of the move reveals that M1 in chemistry abstracts states current knowledge to claim the centrality of the study, but none of them indicates any gap or problem, as shown in Example 22 and 23:

22. Platensimycin is the flagship member of a new and growing class of antibiotics with promising antibacterial properties against drug-resistant bacteria. [JACS 3]

23. The topoisomerase-based design and development for the shift from an antibacterial to an anti-tumor agent have been a new strategy in the fluoroquinolone field. [ACS 3]
Table 6. Move Structure of Chemistry Abstracts in English and Chinese

<table>
<thead>
<tr>
<th>Journal</th>
<th>Structure</th>
<th>Journal</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>JACS English</td>
<td><strong>English:</strong></td>
<td>ACS Chinese</td>
<td><strong>Chinese:</strong></td>
</tr>
<tr>
<td></td>
<td>1. M2-M3</td>
<td></td>
<td>1. M3- M4-M5</td>
</tr>
<tr>
<td></td>
<td>2. M2-M3-M4</td>
<td></td>
<td>2. M3-M4</td>
</tr>
<tr>
<td></td>
<td>4. M2-M3-M5</td>
<td></td>
<td>4. M3-M4</td>
</tr>
<tr>
<td></td>
<td>5. M4-M3</td>
<td></td>
<td>5. M3-M4-M5</td>
</tr>
<tr>
<td></td>
<td>10. M4-M3-M5</td>
<td></td>
<td>10. M3-M4-M5</td>
</tr>
</tbody>
</table>

An exception to note is that there is one M1 in English abstracts which presents current knowledge by referring to the state of previous studies and also names specific researchers, given in Example 24. Santos (1996) believed that citing previous research is a common way to “gain credibility from the person who has claimed the statement” (p. 486). In other words, citing previous research serves a persuasive function to attract a bigger readership.

24. The bisanthraquinone antibiotic BE-43472B [(+)-1] was isolated by Rowley and co-workers from a streptomycete strain found in a blue-green algae associated with the ascidian *Ecteinascidia turbinata* and has shown promising antibacterial activity against clinically derived isolates of methicillin-susceptible, methicillin-resistant, and tetracyclin-resistant *Staphylococcus aureus* (MSSA, MRSA, and TRSA, respectively) and vancomycin-resistant *Enterococcus faecalis* (VRE). [En-JACS 7]

M1s, when they are presented in abstracts, are the initial move, which is similar to Martin-Martin’s (2003) findings in experimental social science abstracts. However, in Martin Martin's findings, the introduction unit is the longest and most significant rhetorical unit, while two out of three M1s in this study are composed of just one simple sentence.
There is one possible reason for this difference. Chemistry is a well-developed and mature discipline. The members in the discourse community know the field very well, and the authors do not seem to need to remind them of the background information or identify any gap or problem in the field, which is “a characteristic of abstracts in ‘normal’ or ‘mature’ research areas in a Kuhnian sense” (Melander, Swales & Fredrickson, 1997, p. 258).

**Move 2 - Purpose**

The frequency of the occurrence of the purpose move in the abstracts from the two journals emerges as being significantly different. M2 was consistently found in 80% of the abstracts written in English. However, only 20% was found in Chinese abstracts. All the M2s in chemistry abstracts describe features of the research, that is to say, they fulfill a descriptive function, as shown in Examples 25 and 26:

25. Abstract presented here is a new convenient synthetic protocol to (1-propynyl) arenes. [Ch- ACS 8]

26. An account of the total synthesis of celogentin C is presented. [En- JACS 2]

In most of the cases in both sets of texts, M2 is presented in a simple and brief description as in Example 26, or in a more elaborated construction as shown in Example 27, which includes more detailed information such as the material of the experiment.

27. The stereocontrolled total synthesis of 4-hydroxydictyolactone (4), a member of the xenicane diterpene family of natural products, is described. [En- JACS 6]

It is found that the majority of M2s in the abstracts are clearly kept impersonal with the presence of passive verbs. One of the following reporting verbs was usually used: describe, detail, report and present, which serves as a signal of M2 as in Example 28. Eight out of nine abstracts were in a passive construction. There is only one exception in Example 29. In this sentence, a first person pronoun and an active verb describe the purpose of the abstract and also show the author’s stance in the study.

28. An account of the total synthesis of celogentin C is presented. [En- JACS 2]

29. We report the determination of the full stereostructure of (-)-ushikulide A (1), a spiroketal containing macrolide by total synthesis. [En- JACS 4]
Most of the M2s are the opening moves in abstracts, except for two written in English. Basically, M2 in the study foregrounds the main purpose of the research to readers as discussed in many previous studies (Martin-Martin, 2003; Santos, 1996). Chinese authors tend to omit M2 in their abstracts. They prefer to present the procedure of their experiment to audience in M4 instead of stating the purpose beforehand.

Move 3 - Method

The method move is the only obligatory move in both sets of abstracts. M3 in chemistry RA abstracts offers a detailed description of how the research was actually conducted. It includes information about data, procedures, materials, instruments, and variables as shown in Example 30:

30. A novel potential plant elicitor N-phenyl-N'-{1,3-thiazol-2-yl}-1,2,3-benzothiadiazole-7-carboxamidine was designed, synthesized, and structurally characterized by 1H NMR, IR, MS and elemental analysis. The structure optimization and frequency calculation were carried out at B3LYP/6-311+G* level by the density functional theory. [Ch- ACS 6]

In the sample of 20 abstracts, it was found that most of the M3s are very long, and include more than one sentence. Numerous M3s in both sets of abstracts occur as a completely independent unit and no embedding structure is seen in chemistry abstracts. As shown in Table 7, if it is measured in the number of words/characters, M3 constitutes 72.3% of English abstracts, and 50.3% of Chinese abstracts; if it is measured in terms of the number of sentences, M3 constitutes 67.7% of the English abstracts, and 47.4% of the Chinese abstracts. As such, M3 is the most important component of chemistry abstracts.

In contrast to what was found in some previous studies (Martin-Martin, 2003; Santos, 1996), the results indicate that, in chemistry, M3 is the longest and most frequent rhetorical unit and occupies considerable textual space. The major contribution of chemistry RAs lies principally in the methodology of the study. A more careful examination shows that the position of M3 varies: M3 either follows M2 (9 out of 20 cases) or is the initial move (8 out of 20 cases), occurs after M4 (2 out of 20 cases), or follows M1 (1 out of 20 cases).
Table 7. The Average Number of Words and Sentences in Chemistry Abstracts and in the Method Move

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Average # of words/characters</th>
<th>Average # of sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abstract</td>
<td>Method move (M3)</td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>164.7</td>
<td>119</td>
</tr>
<tr>
<td>Chinese</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>112.7</td>
<td>56.7</td>
</tr>
</tbody>
</table>

Regarding the verb voice and tense in M3, in the chemistry texts analyzed, passive verbs were dominant. Among the 10 abstracts in English, passive verbs were the major verbs in eight abstracts (Example 31). Similar to my findings, Santos (1996) and Pho (2008) found there were more passive verbs in M3 than in the other moves of the abstract; however, the predominant tense used in the abstracts was the past tense in their studies.

31. A right-to-left synthetic approach to this bicyclic octapeptide was unsuccessful due to an inability to elaborate derivatives of the right-hand ring. In the course of these efforts, it was discovered that the mild Braslau modification of the McFadyen-Stevens reaction offers a useful method of reducing recalcitrant esters to aldehydes. A left-to-right synthetic strategy was then examined. The unusual Leu-Trp side-chain cross-link present in the left-hand macrocycle was fashioned via a three-step sequence comprised of an intermolecular Knoevenagel condensation, a radical conjugate addition, and a SmI2-mediated nitro reduction... [En- JACS 2]

In contrast to previous findings in similar studies, I found that verbs in present tense occur in most of the M3s in English abstracts. Present tense is central in six out of ten M3s as in Example 32:

32. Central to the synthetic approach is a powerful intramolecular [4+2]/[3+2] cycloaddition cascade of a 1,3,4-oxadiazole in which the pentacyclic skeleton and all the stereochemistry of the natural products are assembled in a reaction that forms three rings, four C-C bonds, and five stereogenic centers including three contiguous quaternary centers, and introduces the correct oxidation state at C19
in a single synthetic operation. The final tetrahydrofuran bridge is subsequently installed in one step, enlisting an intramolecular alcohol addition to an iminium ion generated by nitrogen-assisted opening of the cycloadduct oxido bridge, with a modification that permits release of useful functionality (a ketone) at the cleavage termini. [En- JACS 1]

**Move 4 - Product**

As an experimental discipline, the chemistry RA abstracts usually report empirical results to readers. M4 would be expected to occur after M3, and also be an obligatory move in both groups of RA abstracts. However, as mentioned earlier, all Chinese abstracts contain M4, and M4 follows M3, but only three out of ten English abstracts include this move. Among the three M4s, only one occurs after M3.

The ten instances of M4 in Chinese follow M3, and begin with a subject referring to the results of the study, which also signals the move as in Example 33:

33. The results of theoretical investigation and thermal analysis indicate that DNMT presents lower thermal stability. [Ch- ACS 4]

Two M4s are the opening moves of the abstract as in Examples 34 and 35, which makes me reconsider my analysis. Are these really M4s? Are they possibly M2s? As discussed in the methodology chapter, M2 usually answers the question, “What is the study about?” In contrast, M4 answers, “What was discovered?” Since the two initial moves describe the main results of the experiments, they were analyzed as M4 instead of M2. The two foregrounded M4s have obvious overlap in function with M2.

34. The first total synthesis of the *akuammiline* alkaloid ((-)vincorine (6) has been accomplished in about 1% overall yield in 31 steps. [En- JACS 5]

35. The N,C-coupled naphthyldehydroisoquinoline alkaloids ancistrocladinium A (3) and B (4), which possess an unprecedented iminium-aryl axis and show high in vitro antileishmanial activities, have been synthesized via a short sequence of eight linear steps, without the need of protecting groups. [En- JACS 10]

The low frequency of occurrence of M4 and the reordering of it in English RA abstracts could be due to the overlap between the product move (M4) and the purpose move (M2). When the authors answer the question, “what is the study about?” in M2, the answer can be “The study is about what was discovered in the study.” This explains why, in most of the cases, when there is a M2, M4 is always omitted in English chemistry abstracts. As shown in Table 6, there are eight M2s in English Chemistry
abstracts, and two M4s are fronted to the initial position to promote their research. The same thing does not happen to Chinese RA abstracts. The authors usually present the product move after the method move. Hyland (2000) discussed the phenomenon of English authors increasing the use of promotional elements in their abstracts because of the competitive pressure from leading journals in the international academic community, which may be taken as a tentative explanation to the reordering of M4 in English chemistry abstracts. I believe if there is no purpose move to promote the study, the result move will be foregrounded to fulfill this function based on the result of my study. Chinese authors have a relatively small discourse community, so they may feel less stress, and also in the Chinese culture, “promoting” is not encouraged. Most Chinese abstracts follow the conventional sequence M3-M4, and never foreground the content of the product move in M2.

**Move 5 - Conclusion**

Numerous chemistry abstracts contain the final conclusion move, which usually discusses the research, interprets the results, and points to the applications or wider implications of the research. M5 is found in five of the ten English abstracts as in Example 36, and eight out of ten Chinese abstracts as in Example 37.

36. The rhodium-catalyzed asymmetric reaction involving a terminal acetylene was developed as a general method for the asymmetric cycloisomerization of terminal enynes. [En-JACS 3]

37. The virtues of this present protocol are facile available starting materials, convenient operation, and easy separation of desired products. [Ch- ACS 8]

The majority of the M5s comprise one single sentence, and the function of the move is similar in both sets of texts. Chinese authors seem to have a greater propensity to generalize from their results than English authors.

**SUMMARY OF THE CROSS-LINGUISTIC ANALYSIS**

The cross-linguistic analysis on linguistics RA abstracts has shown that all the abstracts fundamentally follow an M2-M3-M4-M5 pattern. The purpose move (M2) and the method move (M3) are obligatory in both sets of texts. While the result move (M4) and the discussion move (M5) are fairly common in English abstracts, the same cannot
be said for Chinese abstracts. The Introduction move (M1) is the least frequent move in abstracts from both journals. A striking difference in the rhetorical structure is identified in the product move (M4). M4 is a final move in Chinese RA abstracts but never in English RA abstracts.

The rhetorical structure analysis on chemistry abstracts in English and Chinese has demonstrated that abstracts in English basically follow a M2-M3 pattern, but those in Chinese have a different structure, that is, M3-M4-M5. The method move (M3) is the only obligatory move in the Chemistry abstracts in both languages. Similar to the findings in Linguistics, the introduction move (M1) is the least frequent move. The most significant differences lie in the frequency of the occurrence of the purpose move (M2), the product move (M4) and the conclusion move (M5). English abstracts are more likely to include M2 but Chinese abstracts contain M4 and M5 more often.

The analyses reveal that less promotion is used in the Chinese abstracts. This may be attributed to the relatively small discourse community in the Chinese academic world. It may also points to a cultural distinction because in the Chinese culture, authors are not encouraged to promote their studies.

**CROSS-DISCIPLINARY ANALYSIS OF RA ABSTRACTS**

In this section, cross-disciplinary analysis is conducted in order to identify the variations of RA abstracts in terms of rhetorical structure across disciplines. Table 8 shows the frequency of different moves in both disciplines. The introduction move (M1) is the least frequent move in both sets of RA abstracts, the method move (M3) is the most frequently occurring section in all RA abstracts. The conclusion move (M5) is found more frequently in linguistics RA abstracts, the frequency of the occurrence of purpose move (M2), product move (M4) shows great variations according to the discipline.

As shown in Table 9, the most frequent move structure in linguistics is M2-M3-M4-M5 (85% of the cases); however, no conventional structure could be identified in chemistry: Chinese chemists usually follow the M3-M4-M5 pattern (80% of the cases), whereas English chemists commonly prefer the M2-M3 model (80% of the cases). This phenomenon may be due to the disciplinary variation. Chemistry, as an old and mature
Table 8. Summary of Move Frequency

<table>
<thead>
<tr>
<th>Moves</th>
<th>Linguistics</th>
<th>Chemistry</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English</td>
<td>Chinese</td>
<td>English</td>
</tr>
<tr>
<td>Introduction</td>
<td>4 (40%)</td>
<td>2 (20%)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Purpose</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Method</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Product</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Conclusion</td>
<td>10 (100%)</td>
<td>10 (100%)</td>
<td>5 (50%)</td>
</tr>
</tbody>
</table>

Discipline, has existed and been studied for many years in Chinese and Anglo-American academic communities. Therefore, chemists in both countries seemed to have developed their own unique academic writing norms. However, linguistics, especially applied linguistics, is a relatively new discipline in China, and the majority of the RA abstracts in my study are about English teaching. It would not be surprising if Chinese linguists have been greatly influenced by the English authors in this field, and usually follow the rhetorical norms established by English writers.

In Pho’s (2008) study, the occurrence of M1 is low in frequency, which is consistent with the results of my study. Although the authors in both linguistics and chemistry have a strong tendency to omit M1 in their abstracts, the distribution of M1s appears to be imbalanced: the occurrence of M1 in linguistics RA abstracts is twice as frequent as in chemistry RA abstracts. The relatively high frequency of M1 in linguistics may be explained by Hyland’s (2000) claim that research in soft disciplines usually
need to provide more context due to its diversity and permeable boundaries, and
readers would expect a clear introduction to help them make a decision on whether
they will devote time to reading the RA abstracts or not; however, it usually does not
happen in the field of hard disciplines, which usually place more emphasis on the
method move.

Regarding the low occurrence of M1s in both disciplines, there is a possible
explanation. Although as a discipline, chemistry has a longer history in both discourse
communities, both chemistry and linguistics are well-developed scientific disciplines,

<table>
<thead>
<tr>
<th>English</th>
<th>Chinese</th>
<th>English</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. M2-M3-M1-M4-M5</td>
<td>1. M2-M3-M4-M5</td>
<td>1. M2-M3-M4-M5</td>
<td>1. M3-M4-M5</td>
</tr>
<tr>
<td>5. M2-M3-M4-M5</td>
<td>5.[M2/M3]-M1-M4-M5</td>
<td>5. M4-M3</td>
<td>5. M3-M4-M5</td>
</tr>
</tbody>
</table>

| M2-M3-M4-M5 | M2-M3 | M3-M4-M5 |
| (85%) | (80%) | (80%) |
and both involve large quantities of experimental studies. Both chemists and linguists may believe that the readers are familiar with the field, and have access to background information about their current study.

As stated earlier, M3 is the only obligatory functional move shown in both disciplines. Although it occurs in 100% of the RA abstracts, there are certain aspects of dissimilarity in this move between the two disciplines. As shown in Table 2, most of the M3s in linguistic RA abstracts occur as an independent move (75% of the cases), but in the rest of the RA abstracts (25% of the case), M3 is embedded within M2, that is to say, M2 is the major move and M3 is part of M2.

Many authors such as Hyland (2000) and Martin-Martin (2003) have reported on the packed method unit. They attributed this to space constraints in abstracts. As an explanation for this phenomenon, Swales and Feak (2009, p. 14) stated, “unless the contribution made by the paper lies principally in the methodology, method descriptions in RA abstracts may have to be squeezed to make room for more information in other moves.” Contrary to the packed method move in Hyland’s (2000) and Martin-Martin’s (2003) studies, M3 occupies over 60% of the space in the chemistry abstracts, and dominates the text. It is evident that chemistry, an empirical hard discipline, usually indicates how the study is conducted rather than provides information in other moves. In other words, the research “lies principally in the methodology” (Swales and Feak, 2009, p. 14). It is not surprising then to find that chemistry abstracts provide more room to M3 than linguistics abstracts do.

With regard to M4, there is a strong expectation that the abstracts in chemistry would contain it as an obligatory move according to what Hyland (2000) proposed. He said that hard disciplines tend to promote the significance of their results. In a study where he compared the percentage of particular moves of abstracts from 1980 with those from 1997, Hyland (2000) claimed that M4 in RA abstracts were very common in both years, and concluded that M4 was the most frequent move, especially in experimental hard disciplines. Contrary to these findings, M4 is found in 100% of the linguistics abstracts, but only in 65% of the chemistry abstracts; in English chemistry abstracts only 3 out of 10 abstracts employ M4. As discussed before, there is overlapping of function between M2 and M4 in chemistry abstracts written in English.
Authors seem to present the purpose of their study by stating what they found in the study, which is the content of the result move as well.

**LINGUISTIC FEATURES ANALYSIS**

Hyland (2003) stated that using self-mention is a powerful rhetorical strategy to emphasize writers’ personal contribution to the research and strengthen his/her research credibility and standing in the discipline. The use of first person pronoun is a common way to show the stance of the author in the research. Table 10 shows the distribution of singular (*I, me, my*) and plural (*we, us, our*) first person pronouns in the texts.

**Table 10. First Person Pronouns in Abstracts**

<table>
<thead>
<tr>
<th>First Person Pronouns</th>
<th>Linguistics</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English</td>
<td>Chinese</td>
</tr>
<tr>
<td>Singular</td>
<td>1</td>
<td>Ø</td>
</tr>
<tr>
<td>Plural</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

Among the forty abstracts, there are a total of nine first person pronouns: eight in linguistics abstracts and one in chemistry abstracts. The result is consistent with what Hyland and Bondi (2006) found in his study that soft disciplines contain 75% more stance items than the hard disciplines. In my data set, authors’ rhetorical visibility in their abstract writing varies according to disciplines. Authors in hard disciplines, such as chemistry, tend to hide their author stances in the study. Instead, they prefer to indicate the subjects, procedures, materials, and instruments of the study as the subject of the sentence to strengthen the objectivity of their study. Hyland and Bondi (2006) believed that, “this strategy conveys an empiricist ideology that suggests research outcomes would be the same irrespective of the individual conducting it” (p. 32). Authors in linguistics are more willing to expose their presence in the study. Employing the first person pronoun in the study will present the author as “an informed and
reliable colleague” (Hyland, 2003, p. 257), and gain credit for “one’s individual perspective or research decisions” (Hyland, 2003, p. 257).

Four out of nine first person pronouns are in M3 to demonstrate how the author conducts the experiment to solve a problem or show the procedure of the experiment. Three out of nine are in M4 to report the product or result of the study. One is in M2 to state the purpose of the study and the other one is in M5 to further discuss the result of the study. All the first person pronouns are used as the subject, as in Example 38.

38. We also conducted interviews at the last data collection session. [En-AL 6]

In addition to the use of the first person pronouns, the other interesting difference is the subject nouns, and the tense and voice of verbs in M2. The majority of the subjects in linguistics are a determiner with a head noun, for example, *this/the study,* *this/the paper* as in Example 39. Since most sentences in this move begin with such subjects, it is not surprising that the active voice is more common than passive voice in M2. However, most subjects in chemistry are in the form of *total synthesis of*... as in Example 39, which signals the report of an experiment and also takes a present tense but uses passive voice.

39. *This paper* examines the beliefs and practices about the integration of grammar and skills teaching reported by 176 English language teachers from 18 countries. [Ch-AL 1]

40. *A total synthesis of the Aspidosperma* alkaloids ... acetylaspidoalbidine is detailed, providing access to both enantiomers of the natural products and establishing their absolute configuration. [En-JACS 1]

**SUMMARY OF THE CROSS-DISCIPLINARY ANALYSIS**

The cross-disciplinary analysis of RA abstracts in two disciplines reveals that a conventional rhetorical structure of M2-M3-M4-M5 is found in linguistics RA abstracts, but such a format was not identified in chemistry RA abstracts. Instead, M2-M3 was found in English abstracts, and M3-M4-M5 in Chinese abstracts. As an obligatory move in both disciplines, M3 has been provided more space in chemistry RA abstracts than in linguistics RA abstracts. The most striking difference is that chemistry RA abstracts put less emphasis on M4. On the contrary, in chemistry RA abstracts, it is very common to foreground the content of the result in the purpose move.
CHAPTER 5

CONCLUSION

Through the cross-linguistic and cross-disciplinary analysis of RA abstracts, this study has revealed the existence of variations in textual structure and linguistic features in RA abstracts. This chapter begins with a brief summary of the main findings of the analyses, then I will discuss the pedagogical implications of these findings, and finally I will consider the possibilities for future research that would lead to a better understanding of multi-level analyses on genres in academic writing.

SUMMARY OF FINDINGS

The results of the study indicate that variation in writing can be found at different levels of texts across disciplines and languages. The main difference in the cross-disciplinary comparison of RA abstracts lay in the textual organization. Based on Hyland’s (2000) framework, linguistic RA abstracts fundamentally follow the international convention based on the norms of the English academic discourse community M2-M3-M4-M5 pattern. While chemistry RA abstracts do not have a conventional structure, international writers follow a M2-M3 format, and Chinese writers follow a M3-M4 structure.

The method move is present in every abstract and thus is the only obligatory move in both disciplines. This indicates that describing the methodology of the study is an important part of the abstracts in these two disciplines. However, the use of the method move shows some disciplinary variations in the abstracts. The method move (M3) in chemistry abstracts occurs in the form of an independent move, but one quarter of the M3s in linguistic abstracts are embedded within the purpose move (M2) in a packed form, so chemistry abstracts are more likely to provide more space to M3 than linguistics abstracts. This shows that the emphasis of the chemistry abstracts lies principally in the method move.
The comparison of the move-step structure of RA abstracts in two languages reveals that English abstracts are more likely to contain the canonical moves while there are more move deletions in Chinese abstracts. Although usually Chinese abstracts are longer than English ones on average, Chinese authors have a stronger tendency to omit one or more moves in abstract writing. In linguistics abstracts, no significant difference in rhetorical structure was identified. Basically, Chinese authors followed the international scheme in terms of moves, although English abstracts include the conclusion move (M5) more frequently than Chinese abstracts.

A striking difference was found in chemistry abstracts. The purpose move (M2) is fairly common in English abstracts, while the same cannot be said for Chinese abstracts. The product move (M4) is much more frequently used in Chinese abstracts than in English abstracts. English authors like presenting their results earlier by including results of the study in M2 or pre-posing M4 as the initial move; however, Chinese writers prefer describing the results in the product move rather than foregrounding the product of the study in M2. M2 and M4 fulfill an overlapping function in certain English abstracts. In other words, M2 is a salient move in English RA abstracts, but not in Chinese RA abstracts. However, M4 appears more frequently in Chinese RA abstracts than in English RA abstracts.

These genre variations may be attributed to the size of the Chinese academic discourse society and certain feature of Chinese culture. For historical reasons, China was isolated from the outside world, especially western countries, until 30 years ago, and Chinese writers seldom participated in international communication, which may lead to their ignorance of the international norms for academic writing. They also constitute a smaller academic discourse community. Furthermore, the basic function of abstracts is to promote the study to bigger readerships. The traditional values in Chinese culture, such as Chinese authors usually prefer writing in an indirect way to in a direct way, may hinder the promotion function of abstracts. On the contrary, English authors have to face more challenging competition in the bigger international community, and have to try to “stand out” in their academic community.
PEDAGOGICAL IMPLICATION

The results of the study have pedagogical implications to help students, especially post-graduate students, and non-native writers in their academic writing. Hyland (2002) stated that the mastery of genre knowledge would help students in becoming members of their disciplinary community. Bhatia (1997) has shown that genre analysis is able to provide useful information to novice writers by exposing them to the conventions of a particular genre, and they will be able to explore and produce more complex genres as they acquire genre knowledge. Loi and Evans (2010) claimed that with the awareness of genre practices, novice writers may not only produce more complex genres based on genre exemplars but also gain long term benefits from the explicit knowledge of genre conventions because genre knowledge will provide learners with a thorough and complete understanding of specific texts. They further stated that ESP teachers or the university writing teachers may select RAs or parts of RA to show the macrostructure of the genre and discuss the function of each move and/or constituent steps with students’ participation.

The results from the cross-disciplinary analysis in the study can be a guide in helping students to realize disciplinary variations in terms of moves, the linear sequence, and the function of each move in abstract writing.

The knowledge gained from the cross-linguistic analysis has shown how move-step analysis is a useful analytical tool for understanding cultural differences in the rhetorical structure of RA abstracts. The rhetorical structure of English academic writing will become more visible to Chinese writers because they will realize the expectations from native English readers as they acquire the knowledge of the different rhetorical features in English and Chinese. Teaching the prototypical rhetorical structure of an RA abstract (e.g., Swales & Feak, 2009) to students, especially to non-native authors, would help them recognize these specific features of each move and how moves are used in writing. ESP writing instructors should be aware that the preferred rhetorical strategies in both languages are different, and guide non-native authors writing to produce academic discourse following the norms of the international academic community.
The findings of this study may help Chinese authors better understand the changes or development of RA abstracts in linguistics and chemistry fields, both structurally and linguistically. Hopefully, by being aware of the linguistic and disciplinary variation in terms of rhetorical structure, students and non-native writers will increase their chances for publication and effectively participate in the international academic discourse communities.

**FUTURE STUDY**

The current study is a dual contrastive study of RA abstracts, including the contrastive analysis in two languages, English and Chinese, and the comparative analysis in two disciplines, linguistics and chemistry. The rhetorical structure of the RA abstracts and linguistic features of the moves in the abstracts were analyzed. As discussed in the introduction chapter, the majority of contrastive studies have focused on the comparison of RA abstracts written in English and European language abstracts and soft disciplines, like linguistics, which have attracted the attention of numerous analysts. Chinese as the most widely used language and chemistry as one of the hard disciplines have seldom been involved in such kinds of studies.

Since only 40 abstracts were analyzed in the present study, future research should be conducted on a bigger corpus. The number of abstracts in each set of data can be increased. The number of disciplines, especially hard disciplines, can also be increased in a cross-linguistic analysis of Chinese and English.

The current study only includes written discourse analysis. In order to explore more socio-cultural factors and reader’s expectations on writing academic abstracts, it would be helpful to carry out interviews or conduct surveys with disciplinary informants and authors in future studies.
REFERENCES


APPENDIX

SOURCES OF DATA: ABSTRACTS BY LANGUAGE BY DISCIPLINES
English Linguistics Abstracts References


Chinese Linguistics Abstracts References


**English Chemistry Abstracts References**

**B.1. The Journal of American Chemistry Society**


Chinese Chemistry Abstracts References


