GENRE ANALYSIS AND TRANSITIVITY ANALYSIS OF DENTAL RESEARCH ARTICLE ABSTRACTS: THAI AND INTERNATIONAL JOURNALS

BY

MR. KRIANGKRAI VATHANALAOHA

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY IN ENGLISH LANGUAGE TEACHING
(INTERNATIONAL PROGRAM)
LANGUAGE INSTITUTE
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ENTITLED

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ABSTRACT

Research article dental abstracts serve as a gateway for readers to filter information and play an important role in displaying the essence of scientific advancement in dentistry. However, dental students of international programs in Thai dental schools may lack a proper means of academic writing regarding generic structures and linguistic features. The aim of this study is to compare generic structures and process types of transitivity of Thai dental article abstracts with those of international for pedagogical implications in English for Specific Purposes (ESP) courses. There were 2 separate datasets, each including 120 abstracts, randomly selected and compiled from dental journals certified by Thai-Journal Citation Index (TCI) and Impact Factors (IF), respectively. On the one hand, Thai dental research article abstracts (TDRAAs) were contributed by Thai university students who had studied in international programs of Thai dental faculties. On the other hand, International dental research article abstracts (IDRAAs) were contributed by international dental researchers. As for generic structure, both datasets were analyzed by a modified framework (Hyland, 2004; Kanoksilapatham, 2013) under BPMRD (Background, Purpose, Methodology, Result, Discussion) nomenclature. As for transitivity analysis, both datasets were analyzed based on six process types of Halliday's (1994) and Thompson's (2000) verbal choices of transitivity. The results

from move analysis show that Move B is apparently disregarded by Thai writers while the other moves are comparatively similar. Regarding linguistic features, the Thai writers may elude subjective statements through the omission of self-reference pronouns and the lack of modalities. As for transitivity analysis, though both datasets share resemblances in terms of transitivity types found in each of the rhetorical moves, the process types used in Moves B and R are statistically different between the two datasets. These differences encompass cultural influences and religious belief in Thai contexts. It can be concluded that the present study raises awareness of generic structures for abstract writing and addresses the significance of narrative point of view propelled by the process types of transitivity. Since RA abstracts are considered as a separate genre and have its distinctive structure, the results offer international guidelines for academic discourse of dentistry.

Keywords: Genre Analysis, Transitivity, English for Specific Purpose, Dentistry

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Mr. Kriangkrai Vathanalaoha

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LIST OF ABBREVIATIONS

Symbols/Abbreviations	Terms
RA(s)	Research Article(s)
DRAA(s)	Dental Research Article Abstract(s)
SRAA(s)	Scientific Research Article bstract(s)
IDRAA(s)	International Dental Research Article Abstract(s)
TDRAA(s)	Thai Dental Research Article Abstract(s)
I	International
T	Thai
B	Background
P	Purpose
M	Methodology
R	Result
D	Discussion
L1	First Language
L2	Second Language
ESP	English for Specific Purposes
SFL	Systemic Functional inguistics
SFG	Systemic Functional Grammar
CARS	Create A Research Space
CDJ	Chulalongkorn University Dental Journal
MDJ	Mahidol Dental Journal
CMJ	Chiang Mai Dental Journal
KKJ	Kon Khaen Dental Journal
SWU	Srinakharinwirot University Dental Journal
SDJ	Songklanakarin Dental Journal
JDR	Journal of Dental Research
OO	Oral Oncology Journal
DM	Dental Materials Journal

JCP	Journal of Clinical Periodontology
JOE	Journal of Endodontics

CHAPTER 1
INTRODUCTION

1.1 Rationale

1.1.1 Research article abstracts

Research articles (RAs) are used to present and disseminate original knowledge from research studies or to display existing knowledge in a new form. RA abstracts (RAAs) are perceived as an indispensable part of RAs because they function as a gateway to the original text. They are used as a platform to transmit cutting-edge knowledge in a condensed space for intended readers. Moreover, RA abstracts are also measures for journal editors to evaluate the extent of appropriateness of the RA or for scientific committees to preview the research quality for inclusion in academic conferences (Lorés, 2004). To write an abstract in English, however, is a tremendous challenge for non-native-speaking writers. This may undeniably result from a first language (henceforth referred to as L1) interference while writing an academic paper, in which such writers have to transfer their thoughts in their original language into English as the second language. In addition, the question of how to find an appropriate writing strategy to tackle the dissimilarity of discourse communities among different cultures has been raised in teaching academic writing for non-native speakers of English. Regarding language and communication, a discourse community has a particular means to achieve a communicative purpose when the members of such a community interact or communicate with one another. The communicative purpose is a "discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse" (Swales, 2004, p. 228). Besides, Mckee (2003) also pointed out that "cultures ascribe different levels of value to things around them" (p. 63), which leads to diverse sense-making systems, where members from different communities see the world differently. As the communicative purpose is often culture-oriented and not always explicit, discourse analysts employ linguistic theories to decipher textual messages, not only for thorough comprehension, but also for the anticipation of plausible interpretive contrasts that could occur among diverse communities.

As a discourse community is one of the imperative factors leading to success in academic writing, Swales (1990, 2004) introduced how texts could be analyzed in academic settings, namely through "move analysis," and defined a "rhetorical move" as a discoursal segment conveying a communicative purpose toward readers. Pioneering his ideas through the introductions of academic journals, he found that each discipline has a unique set of moves. The concept of move analysis in introductions has since been variously adopted in the study of other disciplines, such as biochemistry (Kanoksilapatham, 2005), applied linguistics (Amnuai, 2012; Lorés, 2004; Pho, 2008), social sciences (Holmes, 1997), and medical sciences (Huang, 2014; Nwogu, 1997; Salager-Meyer, 1990, 1992).

Since then, Swales's (1994, 2004) move analysis has inspired the succeeding generations of applied linguists and educators working in the area of English for specific purposes (henceforth referred to as ESP), where it is used as a coding protocol providing pedagogical implications for students learning English as a second language (henceforth referred to as L2). It has also been adapted and implemented to other sections of RAs: the abstract, methods, results, and discussion. Each move-based study has further facilitated researchers' comprehension of rhetorical organizations through the linguistic features appearing throughout particular sections of RAs. Some examples of the seminal work in this field can be seen covering the introduction section (Samraj, 2002b; Swales, 1990), the methods section (Peacock, 2011), and the discussion section (Holmes, 1997; Yang & Allison, 2003). Besides, many researchers have analyzed all four sections: introduction, methods, results, and discussion (IMRD) (Kanoksilapatham, 2005, 2007; Nwogu, 1997; Pho, 2008), and some have took account of both the macrostructure (move-based analysis) and microstructure (e.g., text cohesion, linguistic features) (Lorés, 2004; Saeeaw & Tangkiengsirisin, 2014).

As with comparative and contrastive genre analysis, move analysis has been expansively employed to compare the rhetorical organization of English academic text produced by non-native English-speaking (NNES) writers, such as Iranian (Nasseri & Nematollahi, 2014), Chinese (Qian, 2010; Taylor & Chen, 1991; Zhao & Wu, 2013), Slavic (Yakhontova, 2006), and Spanish (Soler-Monreal et al., 2011), to texts written by native English-speaking (NES) writers. In Thailand, comparative and contrastive genre studies between academic text written by Thai writers and present in international RAs

are gaining increasing attention due to the growth of ESP courses in higher education. In contrastive genre studies, researchers (e.g., Jogthong, 2001; Kanoksilapatham, 2007) compare the rhetorical organization in RAs written in English and Thai languages, whereas comparative genre analysis (Pasavoravate, 2011; Amnuai, 2012; Jirapanakorn et al., 2014) compares English language RAs written by Thai students to those written by students from other nations.

In addition to the comparative and contrastive studies, several researchers (e.g., Martinez, 2001; Pang & Chen, 2007; Zheng et al., 2014) have used the concept of transitivity, based on Halliday's (1967, 1971, 1976, 1978, 1994) systemic functional grammar (SFG) model, in the RAs of various disciplines to illustrate an alternative reality or a worldview of the situations uttered by writers from different cultures. Though the concept is recognized in several literary studies, where the "mind style" (Bonifacio, 2011; Cunanan, 2011; Halliday, 1971; Short, 1976) of fictional characters is the center of attention, it can be applied in genre studies by identifying the types of verbs, or "ideational process," used in each of the rhetorical moves. While move analysis is used to identify communicative purposes agreed by the members of a discourse community, the results gained from transitivity analysis, centralizing the relationship among "participants," "process," and "circumstances," can explain how the members "see" certain situations through their experiential viewpoints.

Though move analysis has been widely used to analyze various sections of RAs, it can be said that the abstract section ostensibly foregrounds the others because it captures the essence of the RA's original content, while also reflecting a promotional quality (Dahl, 2004; Gillaerts & van de Velde, 2010; Hyland & Tse, 2004; Yakhontova, 2002), through its textual brevity. In spite of its economic extent of usually approximately 150 words to 500 words, readers are enriched with the content and should be able to attain a brief comprehension of the research study in the RA. As such, RA abstracts serve as a global platform for presenting current trends in different fields. It would this be intriguing to investigate how discoursal segments in RA abstracts are rhetorically organized and influenced by cultural diversity. A comparison through genre analysis and transitivity could pave the way for learners, if not specifically for NNES writers, to reach the goal of international standards.

To date, the rhetorical organization of scientific RA abstracts has been widely investigated due to the high demand for ESP courses, specifically designed for using English in academic and professional settings. Regarding medical RAs, however, investigations of their rhetorical organization are limited and need more attention (Huang, 2014). Moreover, when comparing medical subdisciplines, the studies of academic writing in dental sciences are very limited. According to Basturkmen (2012), It is likely to have only a few studies analyzing the rhetorical organization of academic journals in dental sciences, as "dentistry does not appear to have attracted this kind of research interest" (p. 134). In fact, Basturkmen's work is the only study focused on the generic structure of the discussion sections of international dental journals compared to studies carried out on applied linguistics. Therefore, as of now, the pedagogical insights regarding academic writing for Thai dental students might be, possibly, on the verge of ambiguity.

As can be seen from the above, genre analysis is useful for grasping the essence of discourse components and the generic structures subsisting in various academic disciplines. Transitivity, in addition, is a stylistic device that can provide information in terms of the narrative point of view used in each rhetorical move. The narrative point of view can display the tonal style of writing used in each rhetorical move. The present study thus investigates the similarities and differences in rhetorical structures and process types through a genre analysis and transitivity analysis of two datasets comprising Thai and international abstracts appearing in dental journals. The expected outcomes of the analyses will contribute to not only pedagogical implications in ESP courses, but also provide judicious information to the discourse community in dental sciences.

1.1.2 Dental research article abstracts

Dental research article abstracts (henceforth referred to as DRAAs) and other scientific research article abstracts (henceforth referred to as SRAAs) share similar structures, in which they can be categorized into five moves: background, purpose, methodology, results, and conclusion (Weissberg & Buker 1990). Similarly, Hyland (2000) classified the rhetorical moves in article abstracts; for instance, the introduction move, which is used to establish the context of the paper and to motivate the research discussion. The purpose move includes the hypothesis, thesis, purpose, and outlining of the intention behind the paper. The results move provides the significant findings, the results, the arguments, or the other successes of the work. The conclusion move includes

the interpretation or implications for future research. Gustavii (2007) divided scientific RA abstract writing into two types: conventional (unstructured) and formal (structured). Conventional abstracts lack both a background and conclusion, although this type is often used in the reporting of laboratory or case reports. Formally-structured abstracts are less reader-friendly than conventional ones because their formality leads to an integration of all the moves. DRAAs follow the norm of formally-structured abstracts with an IMRD (introduction, methods, results, discussion) nomenclature. Compared with SRAAs, DRAAs share similar characteristics as they potentially include the five main moves: introduction (I), purpose (Pu), method (M), product (Pr), and conclusion (C). Moves I and Pu can be combined in the introduction section and Move Pr can involve the results and discussion sections.

Overall, DRAAs and SRAAs specifically interact through "affinity spaces" (Gee, 2004), where communicative practices are shared in a common endeavor, but they are dissimilar in the actual detail included from discipline to discipline. Similarly, international dental resesarch article abstracts (IDRAAs) and Thai dental research article abstracts (TDRAAs) appear in dental journals. However, their communicative purposes may be different because the writing from international writers and Thai writers are contextualized within different discourse communities. The goal of the present research study is to assess how the generic structures of TDRAAs and IDRAAs affect the discourse community in dental sciences. The analysis performed comprised two key components: move analysis and transitivity analysis. Move analysis (Hyland, 2000; Kanoksilapatham, 2013) was conducted to establish the generic structures of the two datasets, while transitivity analysis (Halliday, 1994; Thompson, 2000) was performed to illustrate how writers represent their world views through their utterances.

1.2 Research questions

Two main research questions were identified for the research study, with each question comprising two subquestions as follows:

1.2.1) What are the similarities and differences in the generic structures as determined by move analysis in TDRAAs and IDRAAs?

1.2.1.1) What are the move frequencies used in the two datasets?

1.2.1.2) What are the move sequences in the two datasets?

1.2.2) What are the similarities and differences in the process types of transitivity used in TDRAAs and IDRAAs?

1.2.2.1) What are the types of transitivity used in each move in the two datasets?

1.2.2.2) In what way are the stylistic patterns, based on transitivity analysis, displayed in the two datasets?

1.3 Objectives of the research

This research study was conducted in order to achieve two objectives, as follows:

1.3.1) To compare the generic structures of TDRAAs and IDRAAs

1.3.2) To compare the process types of transitivity used in TDRAAs and IDRAAs.

1.4 Scope of the study

In terms of the sample size representing the two datasets, comprising Thai and international dental journals, only abstracts falling under the nomenclature of research article abstracts (i.e., background, purpose, methodology, results, and discussion) structure were selected for this study. In addition, each abstract must be classed as an "original contribution" and include a rigid experiment-based methodology. Other types of dental abstracts, such as "systematic reviews," "letters to the editor," "clinical techniques," and "case reports," were excluded, since they are considered as different text types conveying distinct purposes not in line with the present study's research focus.

The abstracts used in this present study were selected from the top 5 refereed international dental journals and from six refereed Thai dental journals. All of them were published during 2012–2016. As there are a large number of publications per year in both national and international dental journals, the designated 5-year period was chosen to embody the current trends in rhetoric structure and linguistic features used for displaying cutting-edge knowledge in the dental sciences discourse community.

This research study included both move analysis and transitivity analysis. To conduct move analysis for the generic structure of DRAAs, this study identified moves based on a coding protocol adapted from prominent frameworks in the literature (i.e., Hyland, 2000; Kanoksilapatham, 2013). Regarding transitivity analysis, identification of the process types (Halliday, 1994; Thompson, 2000) was performed to analyze the writer's ideational transmission in the abstracts. Further details and explanations of the

frameworks employed in the present study and the guidelines for move analysis and transitivity analysis are provided in Chapter 3.

1.5 Limitations of the study

This section highlights two important caveats of the study: the *generalizability* and *subjectivity*.

The first limitation of the present study relates to a tension between the sample size and the level of generalizability. In previous studies in genre analysis, the description of the sample size often appears vague and idiosyncratic. In fact, both genre analysis and transitivity analysis are considered as qualitative research, and thus dependent on a subjective interpretation as a means to explain a particular phenomenon. Qualitative research studies, for the most part, focus on in-depth exploration, and qualitative researchers are likely to agree that the actual sample size may not be as important as the representativeness of the data (Biber et al., 1998). Even when utilizing a small sample size, genre analysis could yield satisfactory results, as can be seen from the studies by Cross and Oppenheim (2006), Pho (2008), and Samraj (2002a). It is quite rare to indicate the degree of generalizability of the sample size presented. The present study, for instance, used 120 dental abstracts of each to build a dataset for TDRAAs and IDRAAs, where the quantity was merely based on the limited number of Thai dental abstracts available from 2012 to 2016. Such a number of abstracts seems sufficient for a qualitative study, yet it is probably insufficient to accurately determine if the results are generalizable. In other words, it is hard to evaluate if the sample size is adequate for the present study. This poses a potentially problematic issue since previous reports lacked an adequate explanation regarding the effect of the sample size (Cohen, 1988) or the effect on the statistical power. Therefore, the present study attempts to highlight the significance of the size effect by using Cramer's V statistics (see Appendix C) to see whether the results are generalizable.

The second limitation of this study relates to the degree of subjectivity while conducting this study. In fact, move analysis and transitivity analysis are interpretive despite the fact that coding protocols for move identification and process categorization are described. In addition, bias or inaccuracy can occur when dealing with large datasets. Thus, in the present study, an assessment of inter-coder reliability was used to decrease the degree of subjectivity. As for move analysis, this study used an expert with a Ph.D. in

dentistry and who was involved in English for academic purposes (EAP), such as journal publication and thesis/dissertation writing, to conduct move analysis in parallel with the researcher. As for the transitivity analysis, this study used a language expert with a Ph.D. in English language and linguistics and who was particularly specialized in discourse analysis, transitivity analysis, and genre analysis to identify the types of transitivity in parallel with the researcher. The results gained from each coder were compared with those of the author for assessing the inter-coder reliability. As reliability plays a vital role in the present study, the details of the inter-coder reliability assessment are elucidated in Chapter 3.

1.6 Definitions of key terms

(1) *Genre analysis*: The term used throughout this present study refers to a means of discourse analysis in the ESP school, where the original conventions of Swales's (1990, 2004) CARS model and Bhatia's (1993) genre analysis were established.

(2) *Discourse community*: A group of people who share a communicative purpose and certain conventions regarding the language used in a particular domain at a particular time. Each discourse community has an agreed set of common public goals, mechanisms for intercommunication among its members, and discoursal expectation (Swales, 1990, pp. 25–26). Discourse community, as used in this present study, refers to that of experiment-based research articles in dental sciences.

(3) *Generic structure or rhetorical organization*: A schematic structure that is operative within a particular community of language users as community members. The schematic structure used in this research was constructed upon layers of moves, as explained in the proceeding term.

(4) *Move*: A text segment, or discoursal unit, that acts as a coherent communicative function in a written or spoken discourse (Swales, 2004). The moves in this present study were identified using a top-down approach. Hyland's (2005) metadiscourse and Pho's (2008) linguistic realizations were dominantly used as linguistic clues to substantiate move analysis.

(5) *Obligatory move*: A move that appears in 100% of cases in a dataset.

(6) *Conventional move*: A move that appears in at least 60% of cases in a dataset.

(7) *Optional move*: A move that appears in less than 60% of cases in a dataset.

(8) *Move sequence*: an arrangement of moves in a particular order.

(9) *Transitivity*: Halliday's (1971, 1976, 1978, 1994) ideational metafunction in his systemic functional grammar (SFG) model. Ideational metafunction refers to the way that a writer's worldview or reality is represented at the semantic level as categorized by Halliday (1994) and Thompson (2000). The categorization of transitivity used in this research study was: *material*, *verbal*, *relational*, *behavioral*, *mental*, and *existential*.

(10) *Dental research article abstracts* (*DRAAs*): A sub-genre of scientific research article abstracts.

(11) *Thai dental research article abstracts (TDRAAs)*: DRAAs that are peer-reviewed and published locally by Thai dental faculties. These were drawn from six Thai dental journals, recognized by the Thai-Journal Citation Index (TCI).

(12) *International dental research article abstracts (IDRAAs)*: DRAAs that are peer-reviewed and published internationally. These were drawn from five international dental journals, particularly selected based on the scores of their impact factors, as recognized by the Institute for Scientific Information (ISI).

1.7 Significance of the study

Academic writing is always a perplexing task for Thai students. This is no exception for undergraduate and postgraduate Thai dental students. However, to complete a Doctor of Dental Surgery (D.D.S.) degree, Thai dental students are required to publish a paper in, but not limited to, a national dental journal. At the postgraduate level, students must publish their Master's or Doctoral research studies in an international dental journal as a partial fulfillment of the requirements for their degree completion. However, the growing worldwide number of dental research studies simultaneously aiming for publication via international journals is leading to increased global competition. Among international researchers in dental sciences, high-impact international journals attract the most potential writers because being accepted for publication in such journals can be seen as an endorsement of their professional development and make the authors names recognizable in the field. All abstracts to such

journals are evaluated and screened by a committee, typically based on both originality and English quality. According to Silyn-Roberts (2000), RA abstracts are used to "provide a navigational tool for the whole document" (p. 53) and to convey original thoughts through productive or innovative research studies to an expert audience. As a result, readers should be able to grasp the essence of the key points and the results of the research without needing to scrutinize the whole article. It has also been mooted that increased global competition also has a commercial agenda, whereby abstracts are selected for publishing if they can also reflect the excellent image of the international publishers (Rowley, 1988). To counter this, the criteria for abstract selection are strictly regulated by, at least, a double-blind peer review as well as an editorial process, which has been perceived as extensive, tough, and demanding (Kravitz et al., 2010).

To teach abstract writing in ESP courses is one of the pedagogical challenges for English Language Teaching (henceforth referred to as ELT) as the curricula of ESP courses are usually geared to either a particular professional or academic orientation, which requires profound experience in that specific discipline. To write successful abstracts in dental sciences is a challenge because it requires more empirical data from genre-based research studies to develop a handbook for ESP writing. It is thus important to establish concrete frameworks as practical guidelines for educators whose responsibilities are focused on teaching writing article abstracts to dental students in Thailand. Centered on comparative genre analysis, this research study was motivated by the very thought of creating such a genre-based framework for Thai dental students, for whom abstract writing may be one of the requirements for degree completion. Further, it aimed to suggest a means of determining the stylistic preferences that are most appealing to international dental journals and to establish a genre-based framework that Thai students could abide by.

The present study was thus conducted to understand the differences in the generic structure of RAAs for pedagogical implications in teaching ESP for dental students. Move analysis and transitivity analysis were performed on TDRAAs and IDRAAs to inform submission guidelines for Thai dental students regarding the preferable writing styles used in leading international dental journals. Comparative genre analysis was also performed to not only identify the differences or similarities in the generic structures between the two datasets, but also to point out how the writers'

experiential worldviews are represented in the two discourse communities. The interpretation of experiential worldview offers a fresh perspective in academic writing and differs from traditional comparative genre analysis as it includes transitivity, which reflects how writers recount their experience through an ad hoc semantic choice. Regarding cultural diversity, the study also raises the awareness of contrastive rhetoric, wherein Thai students can encounter stylistic differences found across disciplines (Connor, 1996, 2002).

Overall, this chapter has presented a broad overview of the current research study. The rationale, the research questions, the objectives of the research, and the significance of the study have been outlined to highlight the ELT issues so as to determine the pedagogical implications for improving academic writing in dental sciences. In addition, definitions of the key terms and cautious optimism of both the limitations and the scope of the study have been spelled out, as these are crucial for conducting a Ph.D. project in a timely manner. Other key terms and seminal studies related to genre analysis and transitivity are provided in the following chapter.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Overview

This chapter comprises three sections. The first section begins with the key concepts and a brief history of the discourse around genre analysis. The second section discusses the effect of culture on language, whereby textual analysis is fundamentally related to comprehension of the writers' cultural values and perspectives. The third section discusses the significance of abstracts in research articles and highlights some seminal studies on the rhetorical organization of abstracts.

2.2 Genre analysis

2.2.1 Definition of the genre analysis

Genre analysis is a branch of discourse analysis, or a means of performing textual analysis (see further discussion in section 2.3.1), which aims to locate the communication purpose veiled in an utterance, either spoken or written. At the outset, scholars designing ESP courses brought the notion of the genre to draw a line between general English and ESP (see further discussion in section 2.2.2). Genres accommodate readers in that they allow realizing moves and predicting linguistic and paralinguistic patterns from texts, e.g., lexical choice, headlines, or formats. Mckee (2003) addressed how the more readers are acquainted with the genre of a text, the more they can avoid "making guesses at interpretations that don't work within that genre" (p. 97).

The goal of genre analysis, specifically "move analysis," is to understand how members of a particular community make sense of the events around them and how they convey a message. The definition of genre can be captured as follows:

> "a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains the choice of content and style" (Swales 1990, p. 58).

2.2.2 Traditions of genre studies

Genre studies can contribute to pedagogic values regarding the development of learning English as a second language **(**L2**)**, Current genre theories can be divided into three research areas **(**Hyon, 1996**):** ESP, New Rhetoric, and Australian systemic functional linguistics**.**

2.2.2.1 Swales's genre analysis

Since Swales's (1981) pioneering framework was first introduced, RAs have generally included an introduction section due to his original model in "Create a Research Space" (CARS) (1990, 2004). This section elaborates on the development and application of Swales's rhetorical move model on the introduction.

(1) The concept of moves

Swales (1981, 1990, 2004) pioneered and addressed the significance of move analysis as an analytical tool to provide pedagogical insights for ESP teaching. Move analysis is thus employed to elucidate a rhetorical, or generic, structure appearing in academic writing. A basic principle for move analysis is to comprehend the communicative purpose of the text by locating the discourse units within it. At the sentence level, each discourse unit carries its own unique communicative function. In particular, these discourse units in genre analysis are constructed as a "series of moves," which can be further subdivided into conventional (more frequent) and ephemeral moves (less frequent). Each move is linguistically constructed to convey its subcommunicative purpose, or "steps." There has been a significant number of studies on "moves" and "steps," such as Amnuai (2012), Crookes (1986), Hopkins and Dudley-Evans (1988), Jogthong (2001), Kanoksilapatham (2005, 2007), Samraj (2002a, 2002b), and Swales (1990, 2004).

Moves can be identified by two approaches: top-down and bottom-up (Biber et al., 2007). In the top-down approach, researchers subjectively attempt to identify communicative purposes through text segmentation and subsequently build up move structures, followed by performing an investigation of a text's linguistic features to substantiate move analysis and to locate the steps. In the bottom-up approach, researchers objectively analyze the foregrounding linguistic features through text segmentation and subsequently build up moves and steps, followed by elucidating a description of the communicative purpose. Lieungnapar and Watson Todd (2011)

compared both approaches and found that the moves formed by both approaches were similar; however, the top-down approach was considered as more subjective, while scrutinizing linguistic features through the bottom-up approach could make the coding process more objective (pp. 9–10). Overall, the top-down approach seems to be more practical as it focuses more on the communicative purposes, and less on the linguistic features.

(2) Development of Swales's CARS model

Swales (1981) primarily proposed a framework for move analysis as guidance for non-native writers to recognize the conventions of native writing in ESP courses. He pioneered the idea by analyzing 48 introductions in various kinds of journal articles, e.g., physics, medicine, and sociology, and found that there were repetitive patterns of moves throughout those various genres, specifically: Move 1: "Establishing a territory," Move 2: "Summarizing previous research," Move 3: "Establishing a niche," and Move 4: "Occupying the niche."

The framework he developed, however, posed an issue that the first and second moves occasionally overlapped and were difficult to demarcate and that the definition and descriptive nature of both "establishing" and "summarizing" are vague. In 1990, Swales consequently reduced the number of moves by combining the first and second and proposed a new model as "CARS," which represented the classic rhetorical moves and steps for the introduction sections in journal articles.

Table 2.1: Swales's CARS model for article Introductions (Swales, 1990, p.141)

Move 1:	**Establishing a territory**
Step 1	Claiming centrality and/or
Step 2	Making topic generalization(s) and/or
Step 3	Reviewing items of previous research
Move 2:	**Establishing a niche**
Step 1A	Counter-claiming or
Step 1B	Indicating a gap or
Step 1C	Question raising or
Step 1D	Continuing a tradition
Move 3:	**Occupying the niche**
Step 1A	Outlining purposes or
Step 1B	Announcing present research
Step 2	Announcing principle findings
Step 3	Indicating RA structure

Move 1: Establishing a territory is a means of giving the basis or background information related to the issue to be discussed.

Move 1, Step 1: Claiming centrality is a means of attracting readers' attention by elaborating the significance of the research study to academic peers and readers.

Move 1, Step 2: Making topic generalizations defines the limitations or scope of the knowledge or issues discussed within the research study by showing the generalizability or universality of the knowledge discussed.

Move 1, Step 3: Reviewing items in previous research is a means of showing how the writer has knowledge of previous studies through documentation or literature review and points out the academic significance of the research.

Move 2: Establishing a niche is a means of identifying the main issue discussed from the writer's own perspective. The writer should argue, question, or challenge what has been studied. This move can be categorized into 1A: Counter claiming, 1B: Indicating a gap, 1C: Question raising, and 1D: Continuing a tradition.

Move 3: Occupying the niche is a means of indicating the structures, content, or aims of the writer regarding the background information and main issue. It is divided into four steps as follows: 1A: Outlining the purpose, 1B: Announcing the present research, 2: Announcing the principal findings, and 3: Indicating the RA structure.

Swales's framework has been applied to various fields of journal articles since Swales's first presented it in 1990. He further revised his framework in 2004 in order to make it applicable to wider genres of journal articles. This revision (see Table 2.2) combined the three steps previously in Move 1 into only one step (Topic generalizations of increasing specificity).

Table 2.2: Swales's revised CARS model

<table>
<tr><th>Move 1: Establishing a territory</th><th>Move 2: Establishing a niche</th><th>Move 3: Occupying the niche</th></tr>
<tr><td rowspan="2">Step 1: Topic generalizations of increasing specificity</td><td rowspan="2">Step 1: Counter claiming
OR
Indicating a gap
OR
Question Raising
OR
Counting a tradition</td><td>Step 1: Outlining Purposes
OR
Announcing present research</td></tr>
<tr><td>Step 2: Indicating research article structure</td></tr>
</table>

Swales's (1990) model of move analysis could be applied to various studies of genre analysis, as we can see from, for example, Bhatia's (1993) application to business letters, Hopkins and Dudley-Evans's (1988) to master of sciences theses, and Kanoksilapatham's (2005) application to the rhetorical structure of biochemistry journals. Move analysis can also be applied in separate sections of RAs (e.g., Crookes, 1986; Jogthong, 2001; Kanoksilapatham, 2009, 2013; Saeeaw & Tangkiengsirisin, 2014; Samraj, 2002b) or the RAs (IMRD) of scientific RAs (Huang, 2014; Kanoksilapatham, 2005, 2007; Nwogu, 1997). As the introduction and abstract sections of RAs are somewhat related (Bhatia, 1993) and share a number of common features, and as the former is an idealistic platform for Swales's CARS model, notable studies on the introductions have also been reviewed as guidance for abstract analysis.

One of the essential studies on the introduction section was done by Crookes (1986), who studied 96 introductions through stratified random sampling from 12 well-established academic journals. The journals were collected from three academic branches: the hard sciences, the biological/medical sciences, and the social sciences. The journals were selected according to the criterion of popularity with regard

to the frequency of citation (a.k.a. citation index). Interestingly, Crookes pioneered the crossover *coder* to flesh out the *inter-coder reliability* as a key means to reduce the subjectivity, by using an expert who had graduated in ESL to code the moves and steps. The research methodology was comprehensibly "explained to the selected raters" (1986, p. 62). Therefore, Crookes's address on inter-coder reliability was both thought-provoking and applicable because there was before a chance that the coder could misunderstand the communicative functions used in specific disciplines.

Regarding the medical sciences, Nwogu (1997) studied medical RAs in all sections based on Swales's (1990) model. The corpus comprised a randomized selection of 15 out of 30 texts from five refereed medical journals, which were chosen based on three factors: representivity, reputation, and accessibility. However, the journal selection was short of applying objective criteria since there was no attempt to measure these factors, only a formal discussion on them by medical practitioners at Birmingham University. All 15 papers were constructed upon the IMRD sections of the RA. The analysis revealed that, in total, 11 moves existed in all the medical research papers, but only 9 out of the 11 moves were "normally required" (p. 124). The other moves were found less frequently and were categorized as optional moves. Each move also contained submoves that were characterized by distinctive linguistic features. Although he proposed 11 possible moves found in medical RAs, Huang's (2014) findings came from a reinvestigation of all the sections in five international medical RAs randomly selected from *The Lancet*. The findings revealed that there were actually 12 moves in total, but Move 2 (presenting past research) was optional, while Move 1 and Moves 3–12 were conventional. He also pointed out that several steps could be considered optional and that these varied. However, because the results were only based on five RAs from one journal, Huang's sample size is considered too small and limited in terms of generalizability.

2.2.2.2 Bhatia's genre analysis

Dissimilar to Swale's (1990, 2004) emphasis on academic writing, Bhatia's (1993) definition on genre analysis originated from a professional setting through an analysis of the text in sales promotion letters. Bhatia's concept has since been applied in other areas, for instance, in Henry and Roseberry's (1996) analysis of promotional texts and Boonchayaanant's (2003) genre-based study of tourist leaflets in

the U.S. According to Bhatia's, in order to investigate any genre, one should comply with the following seven steps (Bhatia, 1993, p. 22–34):

(1) *Place the given genre text in a situational context*: one needs to investigate the genre in question through one's own encyclopedic intuition, or text perception, irrespective of whether the text belongs to a particular genre.

(2) *Survey the existing literature*: one needs to survey the existing literature of the genre in question, such as samples, methodologies, and theories of linguistic/discourse/genre analysis relevant to the situation analyzed.

(3) *Redefine the situational/contextual analysis*: one needs to investigate the author of the text in question. The author's positivistic viewpoint should be explored in order to understand their background or purpose.

(4) *Select an appropriate corpus*: one needs to compile an appropriate corpus for the genre in question and understand any limitations of the corpus for providing relevant answers to the research questions.

(5) *Study the institutional context*: one needs to study the context (e.g., linguistic, social, cultural, academic, or professional perspectives) governing the language use in the settings of the genre in question.

(6) *Consider the levels of linguistic analysis*: one needs to consider the lexicogrammatical, textualization, and cognitive aspects of the language organization.

(7) Reassure the findings with specialist informants: one needs to consult an expert or a specialist of the genre in question for improving the reliability of the results.

Though Bhatia's genre analysis was conceptualized based on a professional setting, the concept shares common similarities to that of Swales (1994). Both approaches are discursive, extensively contextualized, and aim to unveil the communicative purpose that the writer/speaker intends to convey. In addition, the trend in discourse analysis is moving from a surface-level analysis to a functional description, where one needs to be

aware of both the micro- and macrostructures to locate the moves/steps for the genre in question.

2.2.2.3 ESP school

English for Specific Purposes (ESP) focuses on English usage in academic or professional disciplinary genres, medical professions, or engineering sciences. Hutchinson and Waters (1987) pointed out the uniqueness of each discipline and categorized ESP into three branches: English for Science and Technology (EST), English for Business and Economics (EBE), and English for Social Studies (ESS). Each branch could be further subcategorized into English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). As for linguistic theories, studies in ESP first applied genre analysis as a pedagogical approach around the 1980s, i.e., the era when Swales (1984) first posed the significance of a genre-based approach to uncover the communicative purpose used in an academic discourse community. The focus of the ESP school was to provide genre descriptions to develop ESP materials and to establish relations between communicative purposes and text types (Flowerdew, 2013).

Table 2.3: ESP and sub-branches (Hutchinson & Waters, 1987, p. 16)

<table>
<tr><td rowspan="6">ESP (English for Specific Purposes)</td><td rowspan="2">EST (English for Science and Technology)</td><td>EAP: English for Medicine</td></tr>
<tr><td>EOP: English for Nurses</td></tr>
<tr><td rowspan="2">EBE (English for Business and Economics)</td><td>EAP: English for Economics</td></tr>
<tr><td>EOP: English for Secretaries</td></tr>
<tr><td rowspan="2">ESS (English for Social Studies)</td><td>EAP: English for Psychology</td></tr>
<tr><td>EOP: English for Teachers</td></tr>
</table>

2.2.2.4 New rhetoric studies

New rhetoric studies are centered on the socio-contextual aspects of genres. Work in this field is motivated by the research studies on L1 writing pedagogy,

including composition, professional writing, and rhetoric. The concept of new rhetoric is based on Miller's (1984) *Genre as Social Action*, in which he viewed how situational contexts were the essence of genres and allowed focusing more on a functional basis, which later became known as Bhatia's (1993) "thick" description. Miller pointed out that "a rhetorical sound definition of genre must be centered not on the substance or the form of discourse but on the action it is used to accomplish" (p. 151). Unlike ESP, new rhetoric studies dislodged all kinds of "thin" descriptions (Bhatia, 1993), such as form, surface-level analysis and text cohesion, and extensively depended on ethnographic data as a means to understand genres as verbal actions performed by members within a discourse community. Hyon (1996) mentioned how new rhetoric scholars had "begun to influence ESP genre theory and practice" (Swales, 1990; Bhatia, 1993) to take into account the contextual aspects of genre-based instructions and pedagogy.

2.2.2.5 Australian systemic functional linguistics

The context for genre-based pedagogy in the Australian system is different from in both ESP and new rhetoric studies as the system was originally designed as an experiment directed toward child and adolescent contexts in the educational settings of primary and secondary schools. The experiment giving rise to the system was conducted based on systemic functional linguistics (henceforth referred to as SF) by researchers at the University of Sydney, Australia, and focused on the relationship among language, cognition, and literacy education for young learners closely working with complex text. Among the many movements of SFL, the systemic functional grammar (henceforth referred to as SFG) model is noteworthy. It was proposed by M.A.K. Halliday, who established that individuals make linguistic choices based on their own ideology, which is constructed and affected by their discourse community. Here, context is important for *meaning making*, or in a social semiotic approach, and can lead to "situation types" (Halliday, 1978, p.32), where people in the community learn to adapt accordingly. The "situation types" were rooted in Martin and Rose's (2008) definition of genre as "staged, goal-oriented social processes." In other words, they explained that genres required multiple steps to accomplish tasks (staged), motivated readers to see the stages to the end (goal-oriented), and addressed their textual messages to specific audiences (social process).

ESP and SFL share similar characteristics because both schools link the social context to the linguistic perspective to assist learners to be more aware of the relationship between language and the discourse community. Using genre analysis, students subsequently learn how a particular community uses language and gain a recognition of its salient features to reproduce ways of performing academic writing that could achieve a similar communicative goal. However, SFL consists of metafunctions (see section 2.3.2) and focuses more on how the language works through a multidimensional semiotic system, while ESP is rather bound to the study of how mechanisms of intercommunication are established by members of a discourse community and, thus, scope down to genres and their specific contexts.

2.2.3 Shortcomings of genre analysis

Although genre analysis enables rhetorical consciousness-raising with both pedagogical implications in ESP courses and for a mutual understanding among discourse communities, move analysis has been questioned due to its subjectivity while identifying each move/step in RAs. The demarcations between each move/step have been criticized as unclear and dependent upon the subjective decision of the genre analysts performing the analysis. Crooks (1986) reiterated this point by pointing out the issue of subjectivity, whereby "Swales's model is open to the criticism that, however explicit its criteria and its exemplification, it remains in the end based on personal and individual judgment" (p. 61). Since then, more objective approaches have been applied and adopted to overcome this weakness of genre analysis. For example, a corpus-based methodology through corpus analysis tools (Amnuai, 2012; Xiao & McEnery, 2010) and inter-coder reliability (Crooks, 1986; Kanoksilapatham, 2005, 2007; Pasavoravate, 2011) has been embraced to reduce the subjectivity, to a certain extent, of genre analysis.

2.3 Cognitive Grammar

2.3.1 Textual analysis

It is difficult to draw the line between the two terms: discourse analysis and textual analysis. For example, "text" could be seen as a smaller unit (words or sentences), while "discourse" could be seen as a larger unit (dialogs or paragraphs) representing "a stretch of language" (Crystal, 1992, p. 25). Both terms have been used interchangeably as a way to analyze how human beings make sense of the world through text. In addition, both can be recognized as involving a distinct research methodology because data

collection is required and systematically conducted to help researchers understand how particular members of various cultures make sense of who they are and how their worldviews are represented.

As textual analysis primarily focuses on texts as parts of social events and how they are ethnologically produced, it lacks the involvement of textual structure, forms, or intertextuality dimensions in a process of meaning making. Forms, meanings, and the effects of texts are related to stylistics as they cognitively relate to how language deviates from our expectation and subsequently affects our textual interpretations. Leech and Short (2007) demonstrated that a foregrounding effect, acting at the core of stylistics, could be achieved through a deviation or parallelism of the genre in question. Deviations can occur on multiple linguistic levels, e.g., lexical, semantic, and graphological. For example, nominalization[1] (van Leeuwen, 2008) is one type of lexical deviation that can often be seen in the media as they tend to create new lexical terms to draw our attention to unexpected parts of speech. Other kinds of alternative forms can be observed, such as parallelism or word repetition as heard in nursery rhymes or political slogans[2] (Stockwell, 2004).

Fairclough (2003) reiterated a weakness of textual analysis in that it cannot be used alone without considering other contexts (e.g., the effects of texts, the ideological effects of texts, organization analysis, the relationship between micro and macro analysis, linguistic features) because "one needs to look at interpretations of texts as well as texts themselves, and more generally at how texts practically figure in particular areas of social life" (p. 15). Therefore, text, meanings, and interpretations are inseparable from one another. Unlike textual analysis, genre-based analysis includes other contexts, such as rhetorical organizations and stylistic features, where meanings are achieved through observing and analyzing the salient or foregrounding patterns in texts.

[1] For instance, "interference"/ "preference"/ "conference" are nominalizations of "interfere"/ "prefer"/ "confer."

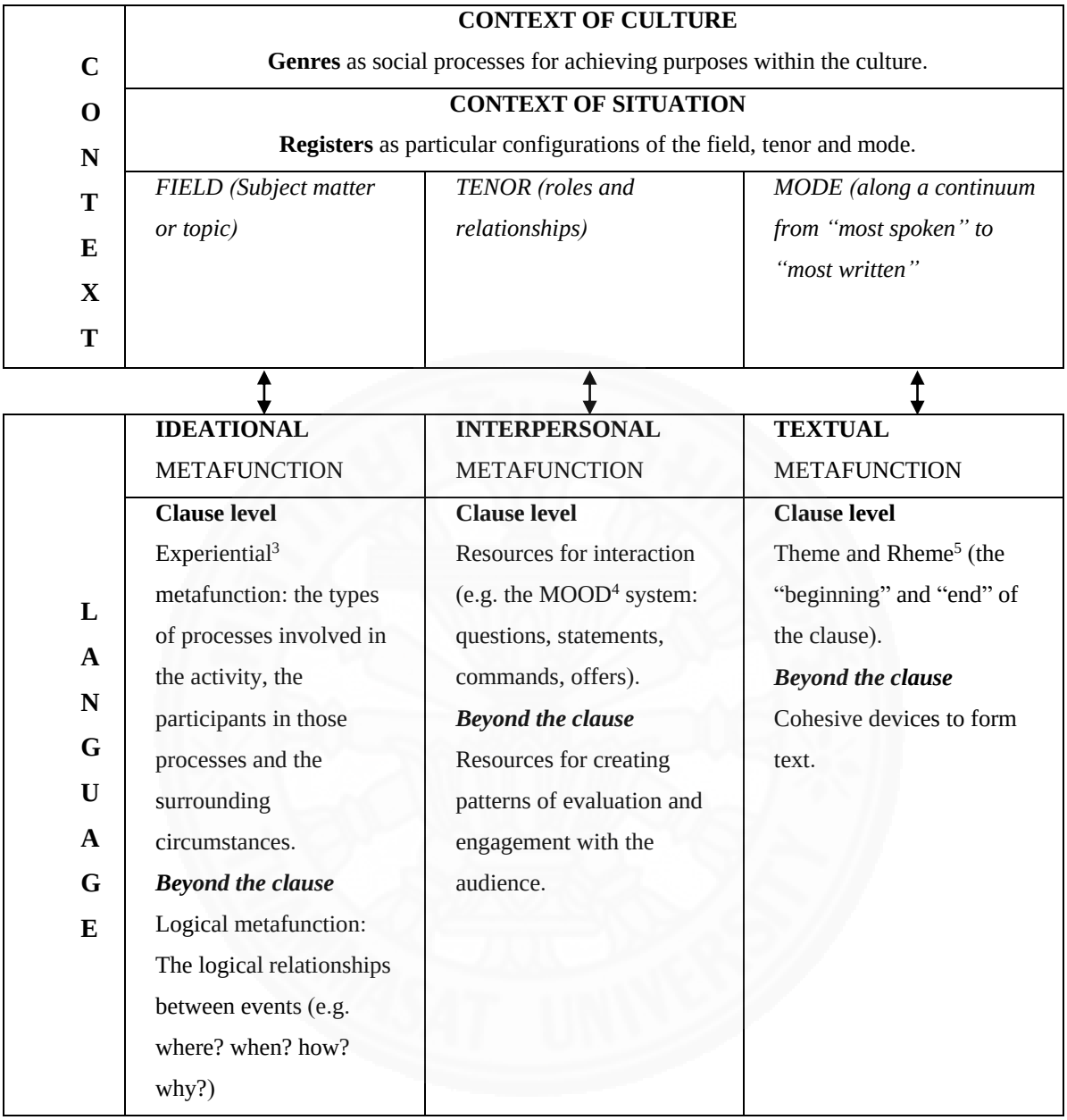
[2] For instance, "I like IKE."

2.3.2 Metafunctions

2.3.2.1 Contexts

To grasp the essence of culture through genres, it is advised that genre analysis be investigated, focusing on both the language and context. Context can be recognized through Halliday's (1979) registers: *field*, *tenor*, and *mode*, while language can be recognized through ideational, interpersonal, and textual metafunctions (see Figure 2.3). Ideational metafunction describes how writers represent their realities through different types of ideational processes constructed upon the participants, processes, and circumstances. An interpersonal metafunction primarily involves the roles and the relationship between the writer and the readers and can be realized through mood systems (e.g., evaluative, suggestive, and persuasive). The textual metafunction elaborates how the text has been constructed upon cohesive devices.

Figure 2.1: A functional model of language (Christie & Derewianka, 2008, p. 7)



[3]Experiential metafunction can be as the meaning-making process where the relationship among participants, processes and circumstances is semantically linked. Processes are subcategorized as a means to understand how the reality is represented towards the readers/interlocutors (see section 2.3.3.3).

[4]Mood refers to tone of the clauses and can be represented, for example, through modalities (e.g. should, have to, must) or adverbs related to degree of confidence (e.g. likely, strongly, seemingly).

[5]Theme of a sentence is deemed the subject or the topic (Subject), whereas Rheme is what being said about the topic (Predicate).

2.3.2.2 Metadiscourse

According to Figure 2.1, metadiscourse covers both interpersonal and textual metafunctions. The metafunction of SFG is a property of all languages and is focused more on the functions and semantics rather than the forms or syntax. Ideational metafunction (further subcategorized into "experiential" and "logical") is concerned with building the experience of the speaker. Interpersonal function is concerned with the linguistic choices that the speaker makes to interact with others. Textual function is concerned with all the grammatical points responsible for the flow of the communication or discourses. Overall, we can say that the texts represent all aspects of the world (physical, social, and mental) that the speaker is faced with (ideational) and empower social relations between the participants through their values, attitudes, and desires (interpersonal), and through weaving texts coherently and cohesively (textual).

Hyland (2005) spelled out that interpersonal and textual metafunctions could be seen as interpersonal metadiscourse (see Table 2.4) as they are used for persuasive purposes. He adopted and combined the interpersonal and textual metafunctions into "interpersonal metadiscourse," where the former can be seen as "interactional" (mood) and the latter as "interactive" (cohesive devices) (p. 49). Hyland (2012) elaborated interactive resources as "ways of organizing discourse to anticipate readers' knowledge and so reflect the writer's assessment of the reader's processing abilities, background resources, and intertextual experiences" and interactional resources as the "the writer's efforts to control the level of personality in a text and establish a suitable relationship to his or her data" (p. 79). By all means, the metadiscourse is contructed upon the belief that writing is a means of social interaction and that it can reveal "how writers, through, their texts, see the values, interests, and assumptions of their communities" (Hyland, 2005, p. 195).

Table 2.4: An interpersonal model of metadiscourse (Hyland, 2005, p. 49)

Interactive	***Help to guide the reader through the text***	***Resources***
Transitions	Express relations between main clauses	*in addition; but; thus; and*
Frame markers	Refer to discourse acts, sequences and stages	*finally; to conclude; my purpose is*
Endophoric markers	Refer information in other parts of the text	*noted above; see figure; in section 2*
Evidentials	Refer to information from other texts	*according to X; Z states;*
Code glosses	Elaborate propositional meaning	*namely; e.g.; such as; in other words*
Interactional	***Involve the reader in the text***	***Resources***
Hedges	Withhold commitment and open dialogue	*might; perhaps; possible; about*
Boosters	Emphasize certainty and close dialogue	*strongly; certainly; must*
Attitude markers	Express writer's attitude to proposition	*unfortunately; I agree; surprisingly*
Self-mentions	Explicit reference to authors	*I; we; my; me; our*
Engagement markers	Explicitly build relationship with reader	*consider; note; you can see that*

At present, metadiscourse is considered a powerful stylistic device to analyze how a writer persuades readers through his/her authorial stance. Prasithrathsint (2015), for instance, investigated the use of linguistic markers and hedging in English academic RAs in humanities written by Anglo-American, Filipino, and Thai scholars regarding linguistic markers in their discussion sections. The results revealed that the native speakers of English used hedging mostly, followed by the Filipino and Thai

writers, and this implied that non-native English writers could express more uncertainty as well as their authorial stance in humanities academic journals.

Metadiscourse is a practical approach with respect to understanding the interpersonal interactions uttered by interlocutors; nevertheless, it spaces out how to cope with inanimate subjects, as categorized in Pho's (2008) linguistic realizations. In a nutshell, a metadiscourse covers both interpersonal and textual metafunctions and it can be used to voice how discourse markers or cohesive devices are particularly used in a discourse community.

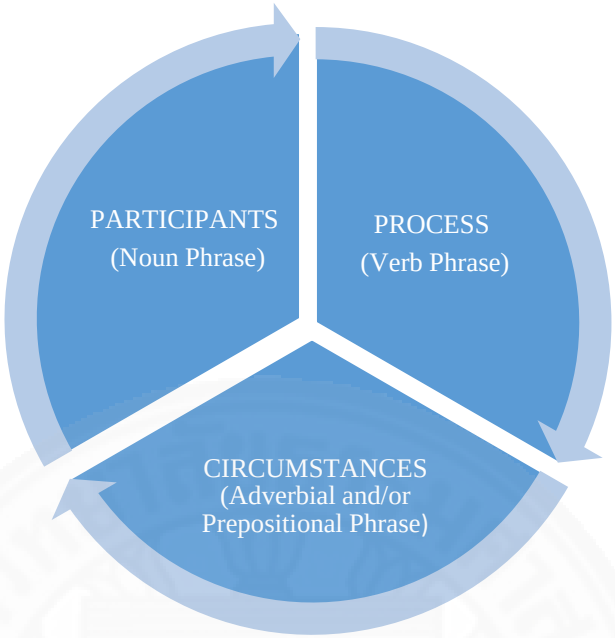
2.3.3 SFL and transitivity

Conceptualized on SFG, the transitivity system was introduced by Halliday (1967) as an essential unit or system of ideational construction in any text. It is one of the three metafunctions realized by semantic concepts. In the English language, the focus of the transitivity system is to elucidate the meaning of the underlying semantic options, categorized as the types or processes expressed in the clause. Halliday (1971) further clarified the relationship between clauses and transitivity as "the set of options whereby the speaker encodes his experience of the processes of the external world, and of the internal world of his own consciousness, together with the participants in these processes and their attendant circumstances" (p. 119). Halliday further applied the concept of transitivity (1971, 1976, 1994) to various types of texts to explore and demonstrate the links between the linguistic functions and textual interpretations.

As a sentence generally consists of three elements: *subject*, *verb,* and *object*, Wales (1989) defined transitivity as the meaning-making procedure, which is "affected" by the elements addressed (p. 466). Analyzing transitivity in situation utterances can display how the synchronized world is represented through the speaker/writer. In addition, Berry (1975) underlined how transitivity is the part of grammar that encodes the narrator's and/or the author's view of reality, according to the "*who does what to whom?"* (Christie & Derewianka, 2008, p. 7*)* grammatical viewpoint.

Simpson (1993) conceptualized that transitivity, as the ideational part of the linguistic system, and the semantic processes expressed by clauses have potentially three constituents, as follows.

Figure 2.2: Simpson's (1993) semantic processes



Transitivity is a stylistic device implemented in literary linguistics and journalism studies, as can be seen in the previous work by Montgomery (1986), Nguyen (2012), and Simpson (1993). At the beginning, it was used with literary texts to help comprehend how individual characters represent their immediate experience and worldview through their utterances. For instance, Halliday (1971) discovered two components employed in *The Inheritors*, where the story was narrated through a great number of abstract nominals (circumstances) and animate subjects (participants). In addition, the high number of mental verbs found in the novel was used to convey the protagonist's gradual "understanding by new things and events" (p. 115) by the story's climax. In terms of media and journalism studies, Montgomery (1986) adopted transitivity analysis in the British press coverage to see how "processes" were used in the broadcast talk of DJs discussing the political alignment during the miners' strike in 1985. Simpson (1993) proposed how to investigate each type of transitivity through aspects of experience: material, mental, relational.

Material processes represent the reality of "doing." Fowler (1986) addressed that the verbs used to describe situations uttered convey a sense of the "physical and objective" (p. 57). The process comprises an *actor* and *goal*, where the former is the primary participant and the latter may act as a second participant. The *actor* is subdivided

into animate and inanimate actors. If the process is acted on by an animate actor, it is categorized as an *action* process. An *event* process, in contrast, is a process which is acted on by an inanimate actor. Besides, an *action* process can be either an *intention* or *supervention*. An *intention* process is a voluntary act whereas a *supervention* process is involuntary.

Table 2.5: Categorization of material process (Simpson, 1993, p. 83)

<table>
<tr><td rowspan="3">Material Process</td><td rowspan="2">Action Process
(animate actor)
John kissed Mary.
The boy fell over.</td><td>Intention Process
John kissed Mary.
I kicked the ball.</td></tr>
<tr><td>Supervention Process
The boy fell over.
I dropped the vase.</td></tr>
<tr><td>Event Process
(inanimate actor)
The lake shimmered.
The car backfired.</td><td></td></tr>
</table>

As opposed to a material process, a mental process is a clause of "sensing," where typical verbs representing an intangible process of individual thought or feeling are involved. A mental process consists of a *senser* and a *phenomenon* as two participants and can be subdivided into two categories, i.e., *internalized* and *externalized* processes. *Internalized* processes can be subcategorized into perception ("seeing," "hearing"), reaction ("liking," "hating"), and cognition ("thinking," "understanding"). Dissimilar to an *internalized* process, a *verbal* process is a process of "saying," comprising two main participant roles, namely the *sayer* and *receiver*. The *sayer* is the addresser/speaker, while the *receiver* is the addressee/listener to whom the process is directed. A verbal process may contain another participant, entitled the *verbiage*, which denotes the content of the utterance addressed to the receiver.

Table 2.6: Categorization of mental process (Simpson, 1993, p. 85)

<table>
<tr><td rowspan="4">Mental Process</td><td rowspan="3">Internalized Process
John saw Mary.
She likes Bach.
She considered the question.</td><td>Perception
John saw Mary.
She listened to it.</td></tr>
<tr><td>Reaction
She likes Bach.
He hates wine.</td></tr>
<tr><td>Cognition
She considered the question.
I thought hard.</td></tr>
<tr><td>Verbal Process
He said that…
I announced the decision</td><td></td></tr>
</table>

A relational process is a clause of "being," with the most typical structure consisting of the verb "be." Other types of relational process consist of linking verbs representing states of being and existing, such as "appear," "look," and "become." The process consists of two participant roles, i.e., *carrier*, the topic of the clause preceding the verb, and *attribute*, a description following the verb or comment about the topic (adjectival or nominal group). Moreover, they can be subdivided into *attributive*, where an element is an attribute of the other, *identifying*, where an element identifies the other, and *existential*, where there is no certain intention.

Table 2.7: Categorization of relational process (Simpson, 1993, p. 85)

Relational process	Attributive *Tom is wise.* *The fair is on a Tuesday.* *Peter has a piano.* *The queen was in the parlour.*
	Identifying *Sarah is the leader.* *Peter owns the piano.* *Tomorrow is the 9th* *The fair takes up the whole day.*
	Existential *There was a storm.* *Has there been a storm.* *It is raining.*

To summarize, a holistic view of the transitivity model (see Table 2.9) has been developed and consequently weaved into a meta-layer. The transitivity system is meaningful to both non-fictional and fictional texts because they visualize how a writer represents reality toward the readers. While the writer recounts situations in actions, specific types of transitivity are employed throughout his/her utterances. Burton (1982) underlined the implication of transitivity to literary studies stating how it scientifically adheres to tangible textual evidence rather than a "subjectivity" (p. 196) of literary interpretations centered on a diversity of qualitative methodological approaches and individual experience.

Table 2.8: Simpson's (1993) transitivity model

<table>
<tr><td rowspan="8">Processes</td><td rowspan="3">Material
(Actor + Goal)</td><td rowspan="2">Action</td><td>Intention</td></tr>
<tr><td>Supervention</td></tr>
<tr><td colspan="2">Event</td></tr>
<tr><td rowspan="4">Mental
(Actor + Goal)</td><td rowspan="3">Internalized
(Senser + Phenomenon)</td><td>Perception</td></tr>
<tr><td>Reaction</td></tr>
<tr><td>Cognition</td></tr>
<tr><td colspan="2">Verbalized
(Sayer + Target)</td></tr>
<tr><td rowspan="3">Relational</td><td colspan="2">Attributive (Carrier + Attribute)</td></tr>
<tr><td colspan="2">Identifying (Identifier + Identified)</td></tr>
<tr><td colspan="2">Existential</td></tr>
</table>

Since Simpson's (1993) model primarily focused on literary linguistics and the "mind style" (Leech & Short, 2007) of fictional characters, several grammarians and scholars have fleshed out the concept of transitivity and addressed how the model could shed some light on pedagogical implications in ELT. For example, based on Halliday's (1994) framework, Christie and Derewianka (2008) vocalized the necessity for an ideational metafunction of the language used for developmental phrases in learning how to write and addressed how the transitivity system could relate to a school discourse where learners could "expand their linguistic resources in order to represent the kinds of experience encountered" (p. 8). As a result, a transitivity system for writing pedagogy has been adapted and realized by adding behavioral process and by differentiating *verbal* and *existential* processes explicitly from mental and relational processes, respectively (see Table 2.10).

Table 2.9: Christie and Derewianka's (2008) types of processes

Process Type	**Aspect of experience**
Material	Doings and happenings in the material world – "outer" experience
Behavioral	Physiological and psychological behavior
Mental	Processes of consciousness – "inner" experience
Relational	Processes of "being" and "having" creating relationships between elements of experience
Verbal	Processes of "saying" and "meaning"
Existential	Existing

2.3.3.1 Transitivity in professional and academic writing

Analysis of the transitivity system has been widely used in literary texts to comprehend the particular personalities of characters in novels (Bonifacio, 2011; Cunanan, 2011; Halliday, 1971; Short 1976). In non-literary discourses, previous studies have focused on the expressivities of transitivity in describing "text features." For example, as with professional writing, Yang (2001) studied the formation of transitivity systems in editorials and found that they were constructed by material processes (55.9%) and relational processes (27.4%). Wu (2004) found that academic English emails in a group of Chinese students comprised a high frequency of mental processes while they were interacting in academic discussions.

There have also been some transitivity analyses of experimental RAs in different fields. Transitivity is widely used in academic writing in order to understand how researchers represent their reality toward the reader. Analyzing other researchers' strategies through the types of transitivity used throughout a piece of writing provides insightful writing instructions for non-native students. For example, Martinez (2001) investigated the impersonality style of writing through the transitivity structure in a corpus of 21 experimental RAs in the fields of physical, biological, and social sciences.

The results revealed that there was a tension between the objectivity of the findings (through a material process) and the level of persuasion (through a mentalized process) established in each discipline. The paper concluded that impersonal constructions were a result of the writers' strategic choices of transitivity, as could be seen from the high percentage of relational processes in the results and discussion sections, where the writers could "keep a maximal distance" from the text (p. 241).

Zheng et al. (2014) performed a corpus-based transitivity analysis based on six process types in English medical RAs collected from five SCI-indexed English medical journals. They found that the transitivity system played a vital role in understanding the writer's narrative viewpoint in the RA sections. Their study highlighted the significance of transitivity analysis, which could guide non-native English-speaking (NNES) medical RA writers to realize the stylistic norms of international journals. Their corpus comprised 25 complete English experimental medical RAs, based on SCI-indexed and published papers from 2004 to 2005. The five selected journals were the *New England Journal of Medicine, Journal of the American Medical Association, Biology of Reproduction, Journal of the American Medical Association, Biology of Reproduction, Journal of Cell Biology,* and *European Journal Pharmacology.* The results showed that they were constructed upon material processes (46.11%), followed by relational processes (31.62%), mental processes (13.00%), verbal processes (6.39%), and existential processes (2.88%). The highest percentage of material processes affirmed the nature of the objectivity and informativeness required in medical science. Moreover, such processes were also frequently used in the methods section in order to explain how the research was conducted as clearly as possible. On the other hand, the lowest percentage of the existential processes pointed out "the apparent intent to retreat from interpersonal intervention" (p. 21), whereby the medical writers could emphasize the accuracy of the results. This study visualized NNES medical writers to realize the differences of communicative purpose embedded in each move through a transitivity system.

In terms of genre analysis, Pang and Chen (2007) investigated the features of transitivity in different sections of RAs by analyzing six RAs in psychology and materials science, and they reported that the percentages of transitivity were different in the four sections of an RA, resulting from the different degrees of objectivity conveyed through each section. Sayfouri (2010) conducted a contrastive genre analysis between

Iranian and English-American writers of medical RAs and established two phases of the study covering the macro- and microstructures. For the macrostructures, the study focused on analyzing the rhetorical organizations of the introduction and the discussion sections in 32 RAs of medical sciences. For the microstructures, SFL was applied only in the three steps of the discussion sections. When compared with English-American RAs, the results revealed that Iranian medical RAs employed a fewer number of some steps: step 1.2 (Reference to main research problems), step 2.2 (Reference to limitations of previous research), and step 3.2 (Reference to main research procedures), and that the types of transitivity were less varied. Iranian RAs also lacked metadiscourse markers, which are necessarily required to scaffold comprehension. Sayfouri's study introduced how the same corpora could offer both macro- and microstructures that could offer more valuable in-depth information for the contrastive genre analysis. This study did not spell out how the types of transitivity were generated in both corpora. Moreover, by analyzing only some sections (the introduction and discussion sections) of RAs, the study lacked a complete contrastive viewpoint, which could have been used to accentuate the cultural difference seen from the whole piece of the medical RAs.

2.3.3.2 Problems of analysis and interpretation

Since transitivity is based on lexicogrammar, where a meaning is contextualized, interpretive contrast could occur due to ideological differences because the interpretations are not "value-free" (Simpson, 1993, p. 115). Besides, transitivity could not be independently interpreted as language realizes three metafunctions concurrently and they do not constrain one another (Halliday & Matthiessen, 2004, p. 30). For example, the lexical choice is closely related to the ideational function, while modalities expressing the degree of confidence are associated with the interpersonal function, and discourse markers are closely related to textual function. A possible interpretation thus overlaps and intervenes in an individual's ideological understanding of utterances. Lexical choices may be closely related to ideational metafunction; however, some words (e.g., *disgusting*, *materialistic*, *controversial*) encompass value-laden points of view regarding interpersonal metafunction posing as a negative viewpoint toward particular matters. Likewise, pronouns could demonstrate concurrently interpersonal and textual metafunctions. They could establish personal relationships among interlocuters and act as a coherent device situating texts as shaped by a narrative event. In fact, several

scholars have pointed out the sensitivity of interpretation derived by transitivity. For instance, Martinez (2001) exemplified a set of verbs, such as “suggest” and “indicate,” which could be classified as either a relational process or mental process; the former when they link two abstract entities, the latter when they “make us think that” (p. 231). Halliday (1994) also pointed out the verb “show” having overlapping verbal and mental processes; the former when it has an explicit *sayer*, the latter when it links two abstract entities. As categorizing process types may lead to interpretive contrasts, the grammatical structures and contexts of a sentence could facilitate transitivity analysis.

2.4 Features of research article abstracts

2.4.1 Definitions and types

It is universally acknowledged that the abstract construes a contraction of the whole research study. Researchers use the abstract to communicate, summarize, and draw readers’ attention toward their study. Rowley (1988) explained that an abstract mirrors “the writing style and format of the original text” (p. 10) and that it provides central concepts through a condensed form of the document. In 1979, the definition of abstract was coined by The American National Standards Institute (ANSI), where its function was stated to show an “accurate representation of the contents of a document, preferably prepared by its author (s) for publication with it” (cf. Bhatia, 1993, p. 78). An abstract could also be the first frontier for gatekeepers or reviewers as to whether a work would be accepted or rejected by academic journals. Bhatia (1993) found that the structure and content in the abstract and introduction parts were not that different, except for the more meticulous details found in the latter, and explicated that the main focus of the content of an abstract was to outline the following:

(1) What the author did
(2) How the author did it
(3) What the author found
(4) What the author concluded.

However, what Bhatia found might not be entirely correct since some recent studies have been published proving that the abstract and introduction parts have their own distinctive features (Liyanage & Birch, 2001; Yakhontova, 2002). The usefulness of abstracts can be extended toward the needs of academic conferences at which researchers can publicly present their papers. The organizing committees of each conference typically

preview and select poster/oral presentations through the quality of the researchers' abstracts to make a decision as to whether such research studies fit in with the concurrent theme of the conference.

As with online databases, abstracts, not the entire paper, are primarily indexed through search engines. The quality of abstracts facilitates readers deciding whether they would desire to purchase a RA. For instance, readers could read beforehand the brief results and conclusions through reading the abstracts, without needed to read the entire content and research methodology in the full paper. If the abstracts draw the readers' attention, the readers will be more likely to be interested in reading the whole content of the RA, and therefore purchasing the RA.

Based on the content and style, scholars and academic authorities categorize abstracts into four types. According to the University of North Carolina at Chapel Hill Libraries (2016), these are conventions in which abstracts are generally written: *critical, descriptive, informative,* and *highlight*. Approximately composed of 500 words, critical abstracts scarcely appear in academic abstracts as they summarize and provide the findings, results, and discussion, alongside the writer's opinionated comments and his/her comparisons to other related works. A descriptive abstract is short in size, approximately 100 words, and it may include the purpose, methods, and limitations of the research. It does, however, omit the results, discussions, and conclusions, and is typically branded as a short outline, not a summary. An informative abstract is the most frequent type seen in academic fields and its function is not to give a critique or an evaluation, but primarily to inform. At around 300 words, this type consists of three compulsory sections and sometimes provides the results, conclusions, and the author's recommendations. The highlight abstract is rarely used in academic writing, but is particularly written to attract readers' attention by providing only incomplete information. Since abstracts are a recollection of past events from the authors or researchers, they are generally written in the past simple tense. However, Weissberg and Buker (1990) advised that a variety of tenses should be used throughout the different moves: Background (present tense), Purpose (past tense/present perfect), Methodology (past tense), Result (past tense), and Discussion (present tense) (p. 186).

2.4.2 Characteristics of abstracts

The characteristics of abstracts in academic fields can be extended from a simple summary, facilitating readers to save time reviewing the full paper, to a successful publication in a leading academic journal (Rowley, 1988). The quantities of abstracts have been increasing annually, leading to more competitiveness among scholars. Abstracts are used by scientists to get concise and accurate data and to "save reading time" (Salager-Meyer: 1990, p. 366) as abstracts allow them to filter whether the full articles would be of interest to them. In terms of undermining the language barrier, abstracts may be written in both English and their parent language, opening up more access for readers to comprehend the research theme. Besides, abstracts provide key words that facilitate the reader to foretell the lexical themes most frequently used in the full article. Swales (1990) emphasized the quality of a well-versed abstract as a key indicator to aid understanding of the full-length text, alongside "the argument of the parent text" (p. 179).

Despite the usefulness of abstracts, still a reader may miss some information due to the abstracts' condensed format, lexical condensation, and content brevity. Silyn-Roberts (2000) pointed out that one of the difficulties was "linking the information into a coherent story" and suggested that a lack of coherence could lead to misconception and an imprecision of the research studies. In addition, writing abstracts can be deemed challenging due to the writer's pensiveness around the lexical density required to properly fit into the format's limited size while aiming to maximize text comprehension (Hartley, 2002, p. 332). As regarding the abstracts' usefulness, the American National Standards Institute (ANSI) (1979) outlined the characteristics of a successful abstract, and several scholars (Lancaster 1991; Rowley, 1988) pointed out the significance of lexical choice, such as unambiguous words and synonyms, as one of the essential elements for "searchability" (Lancaster 1991, p. 97) and "readability" (Rowley, 1988, p. 31) of the abstract through abstracting and indexing (A&I) services. Thus, abstracts should be written in tightly worded sentences, avoiding meaningless expression, since there is limited space to elaborate (Graetz, 1985, p. 125). However, they can comprise evaluative expressions through the appearances of metadiscourse (Hyland, 2005) and authorial stance (Pho, 2008). The use of evaluative expressions, boosters, and metadiscourse can lead to a promotional function (Dahl, 2004; Gillaerts & van de Velde, 2010; Hyland &

Tse, 2004; Yakhontova, 2002) conforming to the competitiveness of research articles in the global market. Based on these studies, the generic structure of RAAs may not reflect that of RAs because these are not merely a summary of the original texts, but they also have distinctive linguistic features specifically tailored for a "selling" quality (Yakhontova, 2002). This can be seen from the typical use of hedges and/or boosters in Move D of RA abstracts to negotiate with readers or the use of the future tense to make a work seem more promising (Gillaerts & van de Velde, 2010).

2.4.3 The RA abstract as a genre

As RA abstracts play a major role as a gateway to original articles, they have been considered as a solitary genre in academic discourse (Ventola, 1994). They are different from other genres in academic writing because they differ in their function, in their rhetoric structures, and in their linguistic realizations (Lorés, 2004, p. 281). It remains an ongoing debate whether RA abstracts function only as a condensed informative summary of the original text or whether it simultaneously promotes abridged writing of the original text (Hyland, 2000, Lorés, 2004, Ventola, 1994, Yokhontova, 2002). As abstracts act as a separate genre, they adhere to a social action that establishes an interaction between individuals within an institutional context.

Thus, effective RA abstracts should be interactively written, coherent, comprehensible, and reader-friendly. Hyland (2005) highlighted that academic texts, including RA abstracts, express an interpersonal quality through interactional metadiscourse. He pointed out that academic texts written by experienced authors are able to persuade the reader to read and scrutinize the whole RA by using proper lexical choices, such as nouns and verb phrases, and special metadiscourse to convey precise communicative purposes (pp. 9–12). This metadiscourse could be achieved through the application of cohesive devices, such as transition words (*to conclude*, *to summarize*), engagement markers (*one might consider*), boosters (*it is obvious*, *definitely*), attitude markers (*disagree, positively*), and self-mentions (*I*, *we*, *our*). By realizing such rhetorical organizations and linguistic features, writers show they are aware of stylistic traditions entrenched in the academic field in question.

Interactional discursive markers are not only of interest, they also correspond to deep-rooted research in the rhetorical structure of Swales's (1990) CARS model. IMRD nomenclature was originally used to define a broad perception of abstracts; however, this

proved to be insufficient when applied to various academic disciplines (Salger-Meyer, 1990) and as variations across disciplines arose (Pho, 2008; Samraj, 2002a). Consequently, the classical IMRD nomenclature was modified through several frameworks, such as proposed by Hyland (2000), Kanoksilapatham (2013), Lorés (2004), and Santos (1996). According to Dahl (2004) and Lorés (2004), abstracts have their own rhetorical structure and RA abstracts are not only a mere summary of the original articles, but a separate genre promoting the quality of original texts by downsizing unnecessary information and directing the reader more toward the results.

2.4.4 Previous genre studies of research article abstracts

2.4.4.1 Recent studies on scientific research article abstracts

As abstracts are the first gateway for a successful submission to household publishers (Rowley, 1988), genre-based approaches have been used to help distinguish the moves and steps for pedagogical implications. For example, Cross and Oppenheim (2006) studied the semantic and thematic structure of 12 protozoology abstracts published by CABI Publishing between 1994 and 2004. Interestingly, Cross and Oppenheim were concerned with both the macrostructure and microstructure systems of abstracts to point out how the organizational structure and linguistic features were interrelated. Kaplan et al. (1994) and van Dijk (1980), respectively, applied move analysis and assessed the thematic structure (cf. Cross & Oppenheim, 2006) to analyze the macro- and microstructures of the abstracts. Regarding the macrostructures, they found that the abstracts comprised five moves: Move 1: Relation to other research; Move 2: Introduction; Move 3: Methodology; Move 4: Results, and Move 5: Conclusion. However, Moves 1 and 5 were not conventional, and also the latter was commonly merged with Move 4. In terms of the microstructure, their studies revealed that authors tended to attempt to present their research as part of the discourse community and to answer the question in terms of addressing real-world problems, as revealed by the high number of “discourse domains” (28) and “real-world domains” (45), respectively.

While Cross and Oppenheim focused on both the macrostructure and microstructure of abstracts, Kanoksilapatham (2009) explored the organizational patterns found in scientific abstracts from four disciplines, namely, biochemistry, microbiology, civil engineering, and software engineering. Similar to Cross and Oppenheim’s (2006) study, she found that abstracts in all the disciplines shared a common set of five rhetorical

moves, namely, BPMRD (background information, purposive statement, methodological description, results announcement and discussion, conclusions, implications), which each justified its communicative function throughout the abstract. Moves R and D were conventional in terms of the cut-off value of their frequency; however, some rhetorical moves were omitted in particular disciplines, such as civil engineering and software engineering, and the sequence of moves were varied in general. This research contributed to the significance of moves acting as a structural skeleton for abstract writing; however, it lacked descriptions of the submoves subsisting in each move. To bridge the gap, Eak-in (2015) reported the rhetorical steps in 350 engineering abstracts from five international engineering journals through a corpus-based methodology, and found that the steps used in the engineering abstracts comprised three steps in Move 1 (Establishing territory), zero steps in Move 2 (Establishing a niche), and four steps in Move 3 (Occupying the niche) (p. 15). Her study was intriguing because she used quantitative analysis to substantiate move analysis for genre-based writing instruction; nevertheless, the study did not elaborate on the lexical perspectives or on the frequency of the linguistic features that the writers recounted through their use of particular moves or steps.

Another seminal work, Samraj (2002a), compared 20 abstracts from wildlife behavior and 20 from conservation biology fields through move analysis and by assessing the linguistic features across disciplines. The results showed that different numbers of moves and interpersonal metadiscourse (e.g., hedges and first-person pronouns) were employed in each discipline. Interestingly, the conservation biology abstracts were prone to include more subjectivity than the abstracts on wildlife behavior. The difference in rhetorical organizations found within the two corpora apparently underlines the significance of performing an exhaustive analysis of each discipline to offer more accuracy for pedagogic strategies.

As for medical science, Nwogu's (1997) seminal work pointed out how medical RAs comprised nine obligatory moves along with one conventional move and one optional move. His pioneering work on Swales's (1990) CARS model applied to whole sections of research articles subsequently shed some light on the medical discourse community; however, the rhetorical structures of medical abstracts has also attracted the attention of move analysts. As soon as the abstracts were recognized and treated as a separate genre, Salager-Meyer (1990) investigated abstracts from both medical

experiment-based text-types and theoretical research-types appearing in 37 medical journals, and found that only half (52%) of the abstracts were structurally written, suggesting that a writing pedagogy was in need for medical sciences. Salager-Meyer (1992) further pointed out that the rhetorical organizations between medical text-types and basic research-types were stylistically different because the former group tended to depend more on modality, hedges, and the selection of tenses. In addition, Zhao and Wu (2013) recently conducted a comparative genre study on the abstract sections between Chinese and English native speakers. Based on 100 abstracts, with 50 each sampled from an international journal (*The Lancet)* and a local journal (*Chinese Medical Journal)*, the results revealed that Chinese writers had a tendency to use more of the passive voice and avoided both elaborating on the background of the research study and using first-person pronouns. These studies underlined the significance of conducting more genre-based research on medical sciences from a holistic point of view, e.g., the macro-level (move analysis) and micro-level (linguistic features) structures. Li and Ge (2009) also reported how medical abstracts from over a 30-year period showed a trace of writing evolution that was affected by technological advancements as well as the attitudinal changes of the medical discourse community. This evolution could be seen both in changes in the organizational structure and in the linguistic features, which showed writers adapting to meet the challenging quest to get their work accepted by international medical journals.

Analyzing Hyland's (2000) 5-move model (see Table 3.3), Saeeaw and Tangkiengsirisin (2014) studied the generic structure of RA abstracts in environmental science to offer pedagogical insights for genre-based writing and reading instruction. They selected 25 RAs each from a number of well-established journals, e.g., *Water Research*, *Journal of Environmental Sciences*, *Waste Management and Research*, and *Bioresource Technology*. They found that environmental science RA abstracts tended to be rather conventional (I-P-M-Pr-C), but an introduction was identified in only 52% of cases and was therefore considered optional, while M, Pr, and C were the most cyclical moves. In addition, they also studied move frequency in the RA abstracts as well as the linguistic features (tense markers, deictic items, noun phrase) appearing in each move. Their findings substantiated the fact that scientific RA abstracts tended to comprise five moves; however, their study did not spell out the significance of the submoves and lacked a clear explanation of the scope of the linguistic features used throughout the analysis.

2.4.4.2 Linguistic features in move analysis

Pho (2008) identified rhetorical moves and subsequently identified the features of linguistic realizations. His methodology for linguistic realization drew upon the significance of the linguistic features used to signify moves. The list of linguistic realizations reported can be seen in Table 2.10 below.

Table 2.10: Linguistic features for analysis of linguistic realizations (Pho, 2008, p. 235)

- Grammatical subjects
- Verb tense and aspect
- Voice
- Modal Auxiliaries and semi-modal verbs (e.g. *may, can, should, have to*)
- Epistemic adjectives, adverbs and nouns (e.g. *likely, possible, probably, generally, possibility, assumption, tendency, need*)
- Attitudinal adjectives, adverbs and nouns (e.g. *important, significant, surprisingly, curiously, importance, significance*)
- Self-reference words (e.g. *I, we, my, our, the author (s), the researcher (s)*)
- Reporting verbs (e.g. *suggest*)
- *That*-complement clauses

As the grammatical subjects in his study were varied in terms of the research article abstracts, the classification of grammatical subjects was elaborated on because greater clarity on the type of grammatical subject could shed some light on the degree of metadiscourse represented through a text (see Table 2.11).

Table 2.11: Pho (2008)'s classification of grammatical subjects (pp. 235 – 236)

- Phenomenal classes: Any nouns related to the main objects of the research study.
  - Class 1: objects and attributes of the research study.
    - ***Examples***: *the participants, variables, these strategies, the informants, ...*
- Epistemic classes: Any nouns related to the researcher's reasoning, philosophy or reasons.
  - Class 2: self-reference related to the author(s)
    - ***Examples***: *I, we, the author, the researcher, ...*
  - Class 3: Other reference
    - 3a: specific names of researchers
      - ***Examples***: *Swales (2004), Tangkiengsirisin (2010), ...*
    - 3b: previous research studies without specific names of researchers
      - ***Examples***: *previous studies, previous work, research in the area, ...*
    - 3c: general topics in the research studies
      - ***Examples***: *move-based analysis, the prominent approach of text world theory, ...*
    - 3d: specific outcomes addressed in previous research studies
      - ***Examples***: *no clear definition from ESP courses, ...*
  - Class 4: Addressee/Audience (or words related to the reader, e.g. the generic "we" or "one")
  - Class 5: Macro-research outcome (general reference of the research study)
    - ***Examples:*** *this study, this paper, this systematic review, ...*
  - Class 6: Micro-research outcome (specific reference of the research study)
    - ***Examples:*** *the results, the findings, the purpose of this study, ...*
  - Class 7: Anticipatory "it" and existential "there"

In terms of linguistic realizations, Pho found that there was a variety of linguistic features across moves. In spite of the refined framework, Pho's framework of linguistic realizations lacked descriptive statistics to enable confirmation of the degree of authorial stance displayed in each discipline. However, the significance of this study

was that he pointed out the value of linguistic features in move analysis. In particular, how analysis of the linguistic realizations could help visualize the authorial stance of the writer as well as point out the significance of the metafunctions of SFL. For instance, it would be promising to analyze textual (cohesive devices or discourse markers) and ideational (transitivity) metafunctions to give more informative results.

2.4.4.3 Thai writing identity in academic abstracts

One of the most recent studies of genre analysis based on the writers' authentic identity was attempted by Pasavoravate (2011), and the findings highlighted the alternative styles of writing between two nations. Pasavoravate investigated 35 English abstracts from linguistics theses and dissertations between Thai and British students, with the authors' Anglo-Saxon or Thai last names scrutinized to ensure their national authenticity. To determine the stylistic similarities and differences, the study was divided into macro-level and micro-level analyses. On the macro level, the analyses were based on both the importance attached to each move (the frequency of moves, the generality and specificity of moves, and move embedding) and the organizational patterns in the abstracts (the sequence of moves and the repetition of moves) (Pasavoravate, 2011, p. 112). At the micro level, the frequency of steps was used to define the strategies used in each rhetorical move. It was particularly interesting that the samples in this study were purposively chosen from theses and dissertations writing, where writers are not restricted either by submission guidelines or by the number of words. When comparing the two corpora, different numbers of steps were noted and it was seen that some were cyclically used, thus it was possible to distinguish between the alternative styles used by Thai and British writers. Pasavoravate's study shed some light on the fact that cultural backgrounds can influence rhetorical organization in the linguistics field; however, her study lacked a contribution to lexicogrammatical analysis, which would be necessary for a micro-level analysis. As regards the pedagogical implications, the study only compared Thai and British abstracts and so did not contribute to discussions around a variety of Englishes (Jenkins, 2014, p. 130) because only one nation was selected for the comparison. Therefore, the present study attempts to address these limitations by establishing pedagogical values at the "international" level. All the samples selected for the present study come from multicutural writers published in refereed international journals.

In conclusion, this chapter described the relevant concepts of discourse and genre analysis and the importance of move analysis for assessing the generic structure of scientific writing. It also introduced the holistic concept of SFG, which plays a vital role in understanding how a writer's worldview is represented through different types of transitivity. The literature review in this chapter subsequently paved the way for building the research methodology used for a comparative genre analysis between Thai and international DRAAs in the following chapter.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Rationale

This chapter explains the research methodology and the selection of the datasets used in this research. The methodology for this research is based on a "genre-specific investigation" (Connor, 2002, p. 498), specifically a comparison of academic writing used in Thai and international dental research article abstracts. The first section discusses the datasets and samples. The second section explains how the data was collected. The third section discusses the data analysis. The fourth section describes the research instruments and the statistical analysis.

3.2 Data Collection

3.2.1 Samples

It is acknowledged that dental journals comprise many subgenres, ranging from systemic reviews, to case reports, review articles, and original contribution; however, this research only focuses on experiment-based research studies classed as "original contributions" or "original articles," founded upon rigid procedures utilizing scientific research methods. Therefore, the sample set used in this research comprised experiment-based abstracts from Thai and international dental journals. Other types of RAs were explicitly excluded from this research study.

There are six dental journals, officially indexed by Thai Citation Index (TCI), organized and distributed by dental faculties in Thailand, although there are nine dental faculties certified by The Dental Council in Thailand. The six Thai dental journals are: *Chulalongkorn University Journal* (*CDJ*), *Mahidol University Journal* (*MDJ*), *Chiang Mai Dental Journal* (*CMJ*), *Kon Khaen Dental Journal* (*KKJ*), *Srinakharinwirot University Dental Journal* (*SWU*), and *Songklanakarin Dental Journal* (*SDJ*). These six journals are also cited by the Thai dental community and recognized as places where students from Thai and non-Thai dental programs could get their work published. Since promoting Thai students' writing in international dental programs is one of our key aims, all the corresponding authors were approached via email to ensure that they used to study at international dental faculties in Thailand and that they were Thai by nationality and

mainly accountable for the writing of their abstract. The publication period for the TDRAAs was from 2012 to 2016.

Regarding the international dental journals, the samples were drawn from the top five leading international dental journals based on their impact factor (2015) via the Scientific Journal Ranking (SJR) website (http://www. Scimagojr.com/journalrank.php). The *Journal of Dental Research* (*JDR*) comprised RAs from all dental specialties, while *Oral Oncology* (*OO*) comprised head and neck pathological disorders, clinical features, and treatment in orofacial diseases, *Dental Materials* (*DM*) included trends of biomaterials used in operative dentistry and oral medicine, *Journal of Clinical Periodontology* (*JCP*) covered both periodontics and oral medicine, and the *Journal of Endodontics* (*JOE*) covered trends in endodontics, periodontics, and oral medicine. Although these journals did not cover all dental specialties, they are considered well-respected refereed journals. Their original articles are experiment-based research studies, and so they represent a good platform to compare the generic structures of the two datasets. The publication period was between 2012 and 2016.

120 TDRAAs and 120 IDRAAs were used for this comparative study and both datasets were based on purposive sampling and, subsequently, selected through simple randomization. However, it was found that a small sample set could be used and could yield satisfactory results, indicating that the number of samples might not be as important as the depth of the analysis and the objectives of the individual studies. For example, the numbers of samples used for the move-based studies of Cross and Openheim (2006), Doró (2013), Lorés (2004), Pho (2008), and Samraj (2002a) were 12, 40, 36, 30, 20, and 12 RAAs, respectively. As for the comparative studies, the numbers of RAAs studied by Kanoksilapatham (2015), Pasavoravate (2011), Saeeaw and Tangkiengsirisin (2014), and Yakhontova (2006) were 120, 70, 50, and 100 RAAs, respectively, for the whole datasets.

The present study, however, increased the number of samples to 240 DRAAs for two reasons. First, the number of samples available in TDRAAs published from 2012 to 2016 and written by Thai students under the conditions given was limited at 120. Second, the number of abstracts used in this research study was higher than in the aforementioned studies, so that the analysis might yield generalizable results through the greater representativeness of the data (Biber, 1993).

3.2.2 Criteria for data selection

3.2.2.1 Thai and international writers

Regarding the IDRAAs, the writers were from various countries around the world; however, due to the restriction of the author guidelines, the English language used in the international dental journals had to have been professionally proofread. This meant that English use in the journals qualified as a selection criterion at the international level. One complication was finding single-authored abstracts in original articles as dental research studies tend to require collaboration with several co-researchers across subdisciplines. Therefore, all the corresponding authors from the IDRAAs were screened to ensure that each original contribution was from an affiliation outside Thailand and that all Thai researchers, based on their last names, were not included in the IDRAA sample set (Yokhontova, 2006, p. 155).

Regarding the TDRAAs, all of the writers were Thai dental students, whose identities could be primarily checked and verified by their last names. Subsequently, emails were sent to all the corresponding authors to confirm that they had not studied in international faculties or had any extensive exposure working in an English environment and that their nationality was indeed Thai. All of the Thai students had enrolled in international programs in Thai universities, where the minimum requirement for English proficiency in these programs was IELTS 6.0 or TOEFL 550. Although these programs were located in Thai dental faculties, all the lectures were conducted in English and all the assignments needed to be submitted in English. As a dental research study was a requirement for both undergraduate and postgraduate dentistry degrees, all abstracts, as well as the other sections, were written in English.

3.2.2.2 The length of the abstracts

According to submission guidelines, the word limit for abstracts tends to range from 150 to 350 words in Thai dental journals and from 200 to 400 words in international dental journals. Since there was a variation in the word limit in both TDRAAs and IDRAAs, the abstracts selected for the present study ranged from 200 to 300 words and any abstracts below or higher than that word limit were excluded.

3.2.2.3 Publication date

The publication date was also considered important for the present study. Technological advancements in dental sciences are evolving rapidly and journals are

simultaneously issued to correspond to the newest trends. For RAAs to be included in the present study, the journal had to be printed between 2012 and 2016 because this represented the modernity of dental technology through contemporary rhetorical organization of both the Thai and international journals.

3.3 Data analysis

As move analysis and transitivity analysis can provide information regarding the generic structure and tonal style of RAAs, identification of the moves was based upon a top-down approach through analyzing the linguistic features present in the RAAs. Then, transitivity analysis was conducted after identification of the moves. This section describes move analysis and transitivity analysis in detail.

3.3.1 Move analysis

A coding protocol for move analysis was adapted from the frameworks of Hyland (2000) and Kanoksilapatham (2013).

Table 3.1: A coding protocol adapted for generic structure of DRAAs (Hyland, 2000; Kanoksilapatham, 2013)

Background	Provision of preliminary information, research gap motivation and rationale of the research
Purpose	Indicating/outlining the intention behind the paper and raising hypothesis
Methodology	Description of research design, data, methodology, approach, statistics, etc.
Result	Announcing and/or reporting results or main findings based on what was accomplished
Discussion	Drawing inferences, research implications, suggestion and recommendation

These models highlighted the existence of five rhetorical moves, albeit different nomenclatures are used, in abstracts, as recognized by most scientific writers through their specific well-defined communicative purposes. To illustrate, Kanoksilapatham's (2013) abstract analysis framework was applied with civil engineering RA abstracts, in which the moves were divided into background (B), purpose (P), methodology (M),

results (R), and discussion (D) based on "the functions of the moves in the abstract texts" (p.4) and these functions were in line with the communicative purposes from Hyland's (2000) framework (see Table 3.2 below).

Table 3.2: Hyland's (2000) framework for abstract analysis

Move 1: Introduction	S1: Arguing for topic prominence S2: Making topic generalizations S3: Defining terms, objects, or processes S4: Identifying a gap in current knowledge
Move 2: Purpose	S1: Stating the purpose directly
Move 3: Method	S1: Describing the participants S2: Describing the instruments or equipment S3: Describing the procedure and conditions
Move 4: Product	S1: Describing the main features or properties of the solution or product
Move 5: Conclusion	S1: Deducing conclusions from results S2: Evaluating value of the research S3: Presenting recommendations

Identifying the moves in light of the two frameworks paved the way for constructing a specific coding protocol for move analysis. However, a revision was needed to enable some definitions to more or less fit into the nature of dental abstracts (see Appendix C for the pilot study). Consequently, a finalized coding protocol was developed as a guideline for move analysis. The abstracts were subsequently dissected at the sentence level and each sentence was identified as a particular move based on its communicative purpose guided by the coding protocol. Move identification was then compiled to construct the generic structures of the TDRAAs and IDRAAs.

As the dental abstracts were written in the context of the dental research community, the moves were thus identified by a top-down approach and the identification was subsequently supported by scrutinizing the linguistic features (Swales, 2004). In the top-down approach, all the abstracts were first read to "get the feel" (Hyland, 2000, p. 6) of the content and to familiarize the researcher with their generic structures. Then, they

were identified through the concept of move analysis, facilitated by the coding protocol. After that, the linguistic features were scrutinized to support move analysis. For the scrutiny of the linguistic features, the present study was based on Hyland's (2005) metadiscourse (see Table 2.4) and Pho's (2008) linguistic realizations (see Table 2.11) as these frameworks encompass the interpersonal and textual metafunctions of SFG. The former contributes to the interpersonal existence, or *mood*, of the rhetorical moves that readers have to conform to, whereas the latter contributes to the textual cohesion, which is seen through the cohesive devices used throughout the abstracts.

Overall, the modified coding protocol was used to facilitate the move identification and to monitor the variation of the coding procedure. Besides, it also acted as a manual to escort and train each expert on how to identify moves as an independent coder. The data gained from the independent coding were also useful for calculating both the agreement rates and inter-coder reliability (see section 3.4 below).

3.3.2 Transitivity analysis

This study focused on analyzing the process types of transitivity realized by verbs as proposed by Halliday (1994) and Thompson (2000) (see Table 3.3). Note that some verbs could be realized by more than one process type depending on the context of the clause (Halliday & Martin, 1993). To illustrate this point, consider the word "show," which could fall into a verbal process if there were an explicit sayer and target (e.g., *previous research studies <u>show</u> that an inclusion of a primer may increase collagen in dentin…*), while it could also fall into a relational process if it was used to identify a relationship between two abstract things (e.g., *The statistics <u>show</u> a 40% increase of collagen in dentinal tubules…*). Therefore, Halliday's (1994) and Thompson's (2000) models on transitivity systems were integrated to classify the process types of transitivity.

As the writing in the two datasets comprised both simple and complex or compound sentences, the transitivity analysis only focused on the most foregrounding feature of each sentence. To deal with complexity regarding the syntactic structures, the identification of transitivity was based on Zheng et al.'s (2014) ranking of clauses, with clauses functioning as constituents of a higher unit (see section 3.3.3.2 below).

Table 3.3: Types of processes proposed by Halliday (1994) and Thompson (2000)

Processes	Verbs
Material	do, test, catch, resign, dissolve, combine, play, go, fetch, fall, break, mend, soak, increase, etc.
Mental	sense, like, evaluate, feel, think, perceive, long for, know, see, believe, hear, fear, understand, etc.
Relational	be, play, act as, serve as, mean, indicate, suggest, imply, show, betoken, mark, reflect, equal, make, comprise, etc.
Behavioral	look, watch, stare, observe, listen, think, worry, dream, chatter, grumble, talk, cry, laugh, smile, frown, sigh, whine, etc.
Verbal	say, tell, ask, describe, repeat, outline, explain, order, promise, speak, imply, indicate, show, demonstrate, recommend, etc.
Existential	be, exist, remain, arise, occur, come about, happen, take place, follow, ensue, sit, stand, lie, hang, rise, stretch, emerge, grow, erupt, flourish, prevail, etc.

3.3.3 Move analysis and transitivity analysis

The results gained from the data analysis were used to compare both the generic structure, made up of a set of moves, and the process types of transitivity between the TDRAAs and IDRAAs.

3.3.3.1 Move analysis

The results from the move identification conducted through the coding protocol comprised the move frequency and move sequence as follows:

(1) Move frequency

The move frequency was vital to indicate whether moves were conventional or optional. According to Kanoksilapatham (2015), the borderline cut-off frequency was 60% out of the entire dataset. In each dataset, if a move occurred more than 60% of the time in the entire dataset but less than 100%, the move was regarded as “conventional.” It was considered “optional” if it appeared less than 60%. If the move appeared 100% throughout the dataset, it was classed as an “obligatory” move.

(2) Move sequence

After the move identification, all the moves were listed and respectively counted to establish a move sequence of each abstract. This procedure demonstrated whether all the abstracts shared similarities and fell into predictable sequential patterns. Moreover, the move sequences complemented the findings of the move frequency, showing how the Thai and international writers wrote with respect to the conventions of the discourse community.

3.3.3.2 Transitivity analysis

The classification of the process types was conducted for each move. Each sentence was classified through the coding protocol and then the results tallied to determine the number of process types employed in each move. This analysis was used to explain how writers employed a set of verbal choices to represent their worldview of situations uttered. At this level, the ranking clauses were used to extract the main clauses from the subordinate clauses. This could be explained through Stockwell (2004)'s cognitive theory, whereby the reader immediately perceives the meaning of the writing style by observing what is foregrounded against the textual background. In this case, when being compared with subordinate clauses, main clauses were foregrounded because they stood alone and had a complete meaning. A subordinate clause, by contrast, was embedded and considered as textual background because its function was to give further details and to elaborate the main clause. Thus, the main clauses in each move were analyzed through a transitivity system based on verbal choices as proposed by Halliday (1994) and Thompson (2000), with all the subordinate clauses, or embedded clauses, excluded from the transitivity analysis, as can be seen in the examples below (Zheng et al., 2014, p. 16).

One single ranking

*(1) ///Our study **demonstrates** the value of intravascular ultrasonography in assessing the effect of therapies on the atherosclerotic disease process.///*

One clause complex = One single ranking + ~~One embedded sentence~~

*(2) ///The target study population **excluded** 648 residents in services [[~~that seldom **use** CPOE: pathology, podiatry, occupational medicine, anesthesia, radiology, radiation oncology, ophthalmology, and dermatology.~~]]///*

3.4 Inter-coder reliability

Identification of the moves was subjective and depended on individual judgment. To reduce subjectivity throughout this research study, it was decided that the identification would be conducted by another coder specializing or having expertise in the corresponding academic field. According to Bhatia (1993), the coder should be a competent expert member of a discourse community, and/or familiar with the language specifically used in the corresponding genre and/or able to clearly explain the communicative goals to other members or a like-minded audience. In the present study, the expert chosen was a lecturer with a Ph.D. degree in dental sciences who was familiar with dental journals and/or get involved in ESP courses in Thailand. The expert could suggest the way that the language had been exploited and represented in both Thai and international dental journals. Additionally, if the expert was familiar with the papers and/or ESP courses related to dental sciences, he/she could further clarify some terminologies specifically used in the dental discipline. For a few hours, the expert was trained in move identification as classified in the coding protocol. The researcher explained how the coding protocol was used in this research and introduced both the basic concepts of move analysis and the contribution of this research to ELT and ESP. The coder was guided through various examples from the datasets in order to establish the boundaries within each move and step. To ensure that the coder could independently identify moves, the coder was asked to analyze three randomly selected DRAAs from the datasets independently. If there was a disagreement on move identification, both the researcher and the coder discussed the issue to come to a final agreement. When the coder became familiar with the coding protocol, they randomly selected 25% of all the abstracts (Kanoksilapatham, 2005) from the datasets (Thai = 30, international = 30) and started coding the abstracts individually within one month. The results gained from each coder were used to establish the agreement rates in due course.

As transitivity analysis was chiefly conducted by the researcher, inter-coder reliability was also used to evaluate the researcher's reliable judgment on categorizing transitivity. The researcher scrutinized all the sentences appearing in both the TDRAAs and IDRAAs and distinguished between the main and subordinate clauses found within each move. All the subordinate clauses were deleted, and the transitivity analysis was then applied to all the main clauses. The analysis was based on the categorization of transitivity proposed by Halliday (1994) and Thompson (2000), and the frequency of the process types of transitivity appearing in each move was manually calculated in due course. Another coder was chosen for categorizing the types of transitivity. This coder was an English expert who had been specializing in genre analysis and SFG concept. Over a few hours, the coder was trained how to categorize the types of transitivity through examples from both datasets to ensure that each type was well defined. Then, the coder independently classified the types of transitivity from three randomly selected DRAAs. When there was a disagreement on the classification of transitivity, both the researcher and the coder reached a consensus via discussion. Likewise, the coder had a one-month period to classify the types of transitivity from 25% of all the abstracts. Finally, the results gained from each coder were used to establish the agreement rates.

Regarding move analysis, the agreement rates could simply have been calculated by checking the degree of percentage that the researcher and the coder agreed on a particular move or a particular set of items. However, it was recognized that such an agreement might occur by chance or by mere guess. Therefore, Cohen's kappa was included so that the agreement rates between two coders could be validated through referential statistics that reflect the psychological reality (Kanoksilapatham, 2005, p. 273) of the data analysis. According to Orwin (1994), Cohen's kappa value could range from a lower limit of 0.00 (0% agreement of both coders) to an upper limit of 1.00 (100% agreement of both coders); a value below 0.40 was considered poor, while a value between 0.40 and 0.59 was considered fair, between 0.60 and 0.74 was considered good, and above 0.75 was considered excellent. *Statistical Package for the Social Sciences* (SPSS) statistics was used to calculate the value of Cohen's kappa, which contributed to the reliability of move identification.

Correspondingly, an inter-coder reliability assessment was also performed with transitivity analysis. As aforementioned, to increase the reliability of the descriptive

statistics, the researcher asked another coder to (re)categorize the process types of transitivity from a randomly selected 25% of the samples from each dataset one month after the initial attempt. In a similar fashion, Cohen's kappa statistics was used for inter-coder reliability analysis of the abstracts (.60–.74 = good, more than .75 = excellent), with SPSS statistics consequently used to calculate the value of Cohen's kappa, which contributed to the reliability of the transitivity analysis.

3.5 Potentiality, limitations and implications: The pilot study

Based on move analysis and transitivity analysis, a pilot study (see Appendix C) was conducted to generate some results that could shed some light on the comparative genre analysis between the Thai and international writers. However, although the pilot study generated some promising results, it needed some amendments regarding the quantity, inter-reliability, theoretical frameworks, and unidirectional guidelines for move analysis and transitivity analysis.

Regarding the quantity, the pilot study comprised only 12 abstracts representing such a dataset. Although the findings consequently yielded interesting descriptive statistics for discussion, this could not be considered sufficient and did not saturate the data. By collecting more abstracts until the data is saturated, the researcher was able to establish a reliable coding protocol, where either conventional or optional moves might be later discovered or possibly repositioned with respect to the move sequence. Recently, previous research studies on move analysis have mentioned other findings, such as "move embedding" (Santos, 1996) and "cyclical move" (Yang & Allison, 2003). Although there was evidence of move embedding in the pilot study in the IDRAAs, neither cyclical move nor move embedding was seen in the dataset of the TDRAAs. Based on these findings, it raises a thought-provoking question of whether IDRAAs are open to a more variable style of academic writing. Nevertheless, the results from the pilot study were only supported by a small dataset, which did not reveal any significant pattern of these phenomena. Therefore, more samples from the two datasets are needed to justify whether any other strategies, such as move embedding or cyclical moves, were employed in particular. In a similar fashion, more samples might generate a different number of process types of transitivity in each move and might change the linguistic interpretation.

The pilot study was solely conducted by one researcher, without another coder, and was purely subjective. To decrease the level of subjectivity, two different coders were

employed. Both coders were trained in the terminology and sequential instructions above-mentioned. The first coder independently identified moves according to the coding protocol, while the second coder independently classified the types of transitivity. Utilizing 25% of the samples randomly selected, the results gained from each coder were compared with that of the researcher using Cohen's kappa statistics, which can specify the inter-coder reliability of findings.

Regarding the theoretical frameworks, the pilot study showed that the modified coding protocol for move analysis yielded satisfactory results corresponding to the nature of the experiment-based DRAAs. Nevertheless, some explanations based on the modified frameworks (Hyland, 2000; Kanoksilapatham, 2013) could be abridged in terms of the key definitions, so the coder could understand each move as a holistic picture, not divisive statements (see Table 3.11 for a refined model). In fact, divisive statements are intended to distinguish submoves in longer texts, so they are not necessarily required for the present study.

Regarding developing a coding protocol for the transitivity analysis, this appears to be problematic in terms of interpretive contrasts within the specific context of dental research. For example, the sample verbs proposed by Halliday (1994) and Thompson (2000) are sometimes elusive and lack lucid descriptions and examples. Therefore, guidelines for the transitivity analysis were produced based on the consensus of the researcher and the second coder, who was an expert in the field of discourse analysis in ESP. The guidelines for transitivity analysis were thus tailor-made and contextualized specifically for the present study.

3.6 Guidelines for move analysis for dental discourse community

The move analysis coder needed to understand the coding protocol, but to ask the researcher if any clarification was needed. There were five possible moves for each abstract. Each abstract had to be read thoroughly to understand the content before the coding procedure. Once finished, the abstract was dissected at the sentence level, as noted by a period. Each sentence was then analyzed and coded based on the definition of each move provided on the right side of the protocol (see Appendix D for a blank sheet designed for move analysis). All the codes were then compiled and written in the form of a move sequence for measuring the agreement rates later.

3.7 Guidelines for transitivity analysis for dental discourse community

Compared to move identification, categorizing transitivity is more subjective as it depends on an interpretation of the verbal choice, which could fall into more than one process type. Since the relationship among participant(s), the process, and circumstance(s) is lexicogrammatical, clause-dependent, and interrelated, like a "chemical solution" (Hasan, 1995, p. 231), to avoid an interpretive contrast between the coders, an ad hoc coding protocol for the transitivity analysis was subsequently modified in the present study. After the first and second rounds of transitivity analysis by two individuals, all discussions, including both agreements and disagreements, were compiled and calibrated to establish a modified coding protocol for the transitivity analysis. The following coding protocol was constructed based upon the two individuals' consensus as specific guidelines for the dental discourse community. Finally, some examples of the verbs frequently seen throughout the pilot are given (Table 3.4) to demonstrate how each process type is represented.

A. A material process is realized by actions and mostly conveyed through the passive voice. The actions are conducted and can be observed from outer experience. These verbs are related with the research procedure, measures, and tangibility. This includes the verbs (e.g., compare, analyze, evaluate, synthesize) from Bloom's cognitive domain that focus on the collective actions entailing the scientific research procedures and empirical evidence.

Examples

(1) *Bovine dentin specimens were **treated** either with ZnF2 or HCl-acidified ZnF2 (ZnF2/HCl) and then **demineralized**.*

(2) *High plaque levels at gingival margins after oral hygiene were **observed** in an unselected sample of young German adults.*

(3) *The authors **assessed** the ability of high-velocity water microsprays to enhance delivery of antimicrobials into 3-d-old S. mutans biofilms.*

(4) *This study **evaluated** detection and monitoring of caries lesions through a clear sealant over 44 mo.*

(5) *The aim of this study was to **determine** the effect of 5 liquids used as die lubricants: microfilm, silicone oil, palm oil, slurry water and water on the compressive strength and surface hardness of a die stone.*

B. A mental process is realized by the cognitive ability of human beings or the researchers. This ability is related to individual sensing and is hard to illustrate in terms of tangibility. Both the epistemic modality (Simpson, 1993) through perceptive verbs (feel, think, suppose, realize) and boulomaic modality involving desire (hope, want, wish) of human beings are included in this process.

Examples

(1) *We **found** that apically directed travel of the irrigant was caused by disruption of the surface tension at the solution-air interface.*

(2) *We **hypothesized** that temporal escalation in stress exacerbates risk for TMD*

(3) *Dentinal proteases are **believed** to play an important role in the degradation of hybrid layers (HL).*

(4) *This study **aimed** to clarify the role of SHP in odontoblast differentiation and matrix mineralization.*

C. A relational process is realized by the use of any verbs representing an association between entities or participants in a clause. The classical verb "to be" structure represents this process type. Other verbs conveying explanation or attributes of or across entities in a clause also fall into this category. These include metaphorical phrases, similes, and idiomatic phrases, which can use various types of processes to link or relate mental images as a means to establish meaning. For instance, the phrase "play a

major role" is constructed upon the material process "play"; however, the meaning is metaphorical since this idiomatic phrase actually means "involve," representing a relational process.

Examples

(1) *The results **showed** a significant difference between the roughness values obtained from the tested profilometers with the AFM exhibiting the most consistent roughness values.*

(2) *In addition, tooth loss was **related** to initial prognosis and it was determined which of the prognostic factors were also risk factors.*

(3) *Statistical analysis **included** chi-squared-test, unpaired-to-sample-t-test, and ANOVA.*

D. A behavioral process is realized through invoking any human behaviors based on a combination of physiological and psychological acts (Halliday, 2004, p. 248), or a mixture of material and mental processes. Since it focuses on a humanistic viewpoint and crosses over material and mental processes, the realization of this process in this study is based upon the following rules.

I. A sentence must be in the active voice and the subject proven to be a human being(s). Any sentence with a passive voice is subsequently categorized as either a material or mental process.

II. A verb must be proven to illustrate both "doing" and "sensing" simultaneously. For example, "cry" can relate to both the physiological act of "sobbing" as well as the psychological act of "being sad" at the same time.

Examples

(1) *After being haunted, she **breathed** a sigh of relief.*

(2) *Michael **stared** out of the window.*

However, it is worth noting that the pilot study had no examples of behavioral process. This can be explained by the eminence of the passive voice and the lack of first-person pronouns throughout the pilot.

E. A verbal process is realized by an act of saying and contributing to the establishment of reported speech and narration. The act of saying could be directive, persuasive, or imperative. Classic examples of verbal process can be found in Move D, where researchers suggest, recommend, or spell out a means of applying the research implications as well as the limitations for further studies.

Examples

(1) *Based on these results, we **conclude** that the serum scaffold can promote efficient repair of large bone defects…*

(2) *Recently, we **reported** that in mandibular molars contracted endodontic cavities (CECs) improved fracture strength compared with traditional endodontic cavities (TECs) but compromised instrumentation efficacy in distal canals*

F. An existential process is realized by an existential-there clause to represent an existence or an occurrence. The clause should not have either a participant or a circumstance. The process serves to indicate the existence of an entity or an event featured in a clause, where "there" functions as the "subject" and the entity or the event functions as the "existent."

Examples

(1) ***There were** no significant differences between EndoVac, EndoActivator, and the passive extrusion groups.*

(2) ***There was** no significant difference between the prevalence of retromolar canal and both gender and side of mandible (p > 0.05).*

Complications may arise if a clause contains a circumstantial element of time or place (Halliday & Matthiessen, 2004, p. 257) where the subject is omitted and this could then be categorized as either a relational or material process.

Examples

(1) *On the blackboard (there)* ***was*** *a beautiful graffiti.*

(2) *On the ground (there)* ***emerges*** *a mysterious figure.*

It is recommended that a coder replaces "there" before any verb in question to ensure that it does not fall into a circumstantial element. If there is evidence of a way of locating the process in terms of deixis (Ibid., p. 258), the process is categorized as existential.

Examples

(1) *Caregivers' health literacy has* ***emerged*** *as an important determinant of young children's health care and outcomes. (Material)*

(2) *On the ground (there)* ***emerges*** *a mysterious figure. (Existential)*

G. It is important to realize that the criteria applied herein for categorizing the process types were specifically related to the dental discourse community and only co-constructed upon the consensus between individuals' performing the task in the present study. If complications arise during the categorizing process, it is recommended that a coder replaces a problematic verb with any congruent verb with the closest meaning to accommodate the coding process. The replacement must retain the same clausal meaning. This facilitates the categorizing process where some verbs overlap two or more process types, for example, as follows:

Original Clause

Both implant systems ***~~contained~~*** *surface contaminants evoking a pro-inflammatory response similar to that induced by LPS.* (JCP: 19)

Replacement Clause

Both implant systems ***had*** *surface contaminants evoking a pro-inflammatory response similar to that induced by LPS.* (JCP: 19 - Relational Process)

H. Since process types are constructed upon three parts: participants, processes, and circumstances, it is better to focus not only on the "verbs" represented in a clause, but also the others. Some process types comprise two participants, while others have only one. Circumstances are also mandatory for some processes, while others dismiss them.

I. As myriads of verbs can emerge throughout the coding procedure, it is better to re-categorize the whole coding process a few days later in order to reduce intra-subjectivity level.

Table 3.4: Examples of verbs representing process types

Processes	**Verbs**
Material	test, dissolve, mix, inspect, soak, analyze, collect, observe, study, investigate, measure, determine, evaluate
Mental	aim, hypothesize, attempt, wish, require, tend, consider, evaluate (that), find (that)
Relational	be, have, serve as, indicate, suggest, imply, show, mark, contain, comprise, lack, metaphorics (play a major role), linking verbs (become, appear)
Behavioral	cry, laugh, smile, stare, sigh, dream, breathe, faint
Verbal	describe (that), recommend (that), conclude (that), suggest (that), demonstrate (that), explain, report, reveal, characterize
Existential	(there) be, exist, emerge, remain, rise, grow, erupt

In conclusion, this chapter presented the methodology employed in the study. It covered the data collection and the analytical frameworks, as well as providing details about the inter-coder reliability assessment. The pilot study (Appendix C) was illustrated throughout in order to shed some light on the viability of the present study to be conducted in a timely manner. In addition, the pilot study ultimately highlighted the significance of move analysis and transitivity and showed they could have pedagogical implications in ELT. This chapter ended with presenting the guidelines used as analytical frameworks to reduce any incongruence caused by interpretive contexts.

CHAPTER 4
RESULTS AND DISCUSSION

This chapter has two main sections that report the results obtained from move analysis and transitivity analysis. The first section displays the results from move analysis based on the nomenclature of a BPMRD coding protocol. The second section shows the results from the transitivity analysis of each move. In each move, some examples from the two datasets are incorporated to describe how the analysis was achieved through foregrounding the linguistic features. Regarding the quantitative views, both sections conclude with the statistical results to complement the findings derived from both move analysis and transitivity analysis.

4.1 Move analysis

4.1.1 Move identification

Rhetorical moves were identified not only to display the generic structures of the IDRAAs and TDRAAs but also to notify the linguistic features frequently found within the two datasets. To display the generic structures, all five rhetorical moves were identified as B (background), P (purpose), M (methodology), R (results), and D (discussion). The BPMRD coding protocol specifically adapted for the present study (Hyland, 2000; Kanoksilapatham, 2013) (see below) was employed to identify each move.

Table 4.1: An adapted coding protocol for abstract analysis
(Hyland, 2000; Kanoksilapatham, 2013)

Moves	Acronym	Identification
Background	Move B	Provision of preliminary information, research gap, motivation and rationale of the research
Purpose	Move P	Indicating/outlining the intention behind the paper and raising hypothesis
Methodology	Move M	Description of research design, data, methodology, approach, statistics, etc.
Result	Move R	Announcing and/or reporting results or main findings based on what was accomplished
Discussion	Move D	Drawing inferences, research implications, suggestion and recommendation

Besides, significant linguistic features were addressed alongside each rhetorical move involving these aspects: verb tense and aspect, voice, modal auxiliaries, epistemic and attitudinal words, self-reference words, reporting verbs, anticipatory "it" and existential "there."

4.1.1.1 Background

Move B is usually located in the first sentence of the abstracts to establish the context, the background knowledge of the research, the significance of the research, and the research gap, as can be seen in Example (1). It was found in 25.8% and 60.9% of the TDRAAs and IDRAAs, respectively.

(1) *Boesenbergia pandurate has been documented to possess the antimutagenicity and cytotoxicity on a variety of cancer cells* ***but little is known*** *about its apoptotic inductive potential.* (MDJ: 31)

It is quite common to see the present simple tenses and present perfect tenses in this move. The use of the former suggests how a study in question relates to contemporary issues in dentistry, while the use of the latter displays recent findings as part of the study's rationale. Using either the present simple or present perfect tenses makes readers perceive how generalizable the information presented is. However, the past simple tenses could be found in a few of both the IDRAAs and TDRAAs when authors are reminiscing on the renowned history or background of dental sciences.

(2) *The human papillomavirus (HPV)* ***is*** *an important cause of some head and neck squamous cell carcinomas (HNSCCs), but its role in cancer of the lateral tongue* ***is*** *debatable.* (OO: 17)

(3) *In general, simplified periodontal therapy* ***might be*** *a pragmatic strategy for public health programmes targeting Indigenous Australian adults.* (JCP: 14)

(4) *At present,* ***there are*** *increasing number of patients receiving oral anticoagulant and/or antiplatelet drugs owing to their systemic diseases who require dental extractions.* (KDJ: 2)

When compared to the TDRAAs, a fewer number of existential-there structures, as can be seen in Example (5), were found in the IDRAAs. In addition, modal auxiliaries, as can be seen in Example (3), were only found in the IDRAAs, with none found in the TDRAAs. The use of modal auxiliaries demonstrates the writers' personal evaluation based on various degrees of confidence, whereas the use of a there-clause signifies the objective utterance in which the existence only occurs through it being the center of attention. The tension between personal evaluation and objectivity addresses how the IDRAAs display the writers' authorial stance, while the TDRAAs preserve a neutral style.

4.1.1.2 Purpose

Move P was found in 99.1% and 94% of the datasets of the TDRAAs and IDRAAs, respectively. Move P is thus considered conventional for both datasets. This move appears to have foregrounding formulaic sequences at the beginning of the clause.

These sequences were frequently found through an explicit type of reporting verb and the deictic marker "the" to highlight the contribution of each research study. Examples (1), (2), and (3) show that common phrases, such as "the objective of," "the purpose of," and "this study," can be frequently seen as eminent markers for Move P.

(1) *This study **assessed** the impacts of CECs on instrumentation efficacy and axial strain responses in maxillary molars* (JOE: 1)

(2) *The objective of this study **was to investigate** the mesio-distal tooth wideth of Bangkok residents from 1972 to 2008.* (MDJ: 10)

(3) *The purpose of this study **was to evaluate** the clinical and radiological findings of elongated styloid processes that appear in panoramic images of the Thai population over 20 years of age.* (CDJ: 1)

It is apparent that dental writers from both datasets were inclined to use "this study," as can be seen in Example (1), as the subject of the sentence. Since "this study" cannot accomplish the action without the researchers, the omission of human entities is employed to highlight the humanification, which reflects the nature of scientific study, where personal involvement is usually avoided.

(4) *The purpose of this study **was to clarify** the amount of fluoride released from four commercial base and liner materials (viz., Vitrebond ®, Vivaglass ®, Lime-Lite ® and Ionosit ®)* (KDJ: 3)

However, the use of first-person pronouns is ostensible throughout the IDRAAs and this represents the researcher entities in the experiments (*we, the authors, researchers*) (see Examples (5) and (6)). The frequent use of first-person pronouns in the IDRAAs, considered as the "hard" discipline, is contrary to Hyland's (2009) previous statement that scientific writing is mostly written with the disappearance of the writer's

identity. Although the use of the exclusive "we" was eminent, there was no evidence of the singular first-person pronoun "I" used in both datasets, albeit it should be noted that should be expected as collaboration among co-researchers was necessary and that dental research studies could not be conducted by a single researcher.

(5) ***We*** *assessed the cost-effectiveness of retaining FI molars via periodontal treatments versus replacing them via implant-supported crowns (ISCs).* (JCP: 11)

(6) ***We*** *sought to investigate whether there is evidence of field cancerization in patients with oral cavity squamous cell carcinoma (OSCC) enrolled in a betel quid chewing area.* (OO: 16)

Regarding embedding strategies, the IDRAAs used a variation of such strategies through the inclusion of prepositional phrases (Example (7)) and infinitival phrases (Examples (8) and (9)), while there was no embedding strategy employed in the TDRAAs. Not only do these strategies highlight a means of providing details within a condensed space of abstracts, but they also suggest more sophisticated syntactic structures nested by the international writers of IDRAAs (Saeeaw & Tankiengsirisin, 2014). As Move P is intended to be simple and goal-oriented, it shows that the Thai dental writers prefer uncomplicated to compounded syntactic structures.

(7) ***To evaluate*** *failure loads of teeth restored by use of alumina-coping, and* ***to assess*** *the effects of different amounts of residual tooth structure and different cements,* ***standardized artificial aluminal copings were fabricated*** *on seventy-two molars.* (DM: 21) (P+M)

(8) *Here,* ***the authors used transcriptomic analyses to examine*** *the additional molecular pathways related to the process of alligator tooth development.* (JDR: 3) (M+P)

(9) ***Because herpesviruses might be etiologically involved in periapical pathosis of endodontic origin****, this study aimed* ***to determine*** *the occurrence of human cytomegalovirus (HCMV), Epstein-Barr virus (EBV), and…* (JOE: 25) (B+P)

Formulaic sequences found in this move were noticeable since the move was considered conventional in both datasets. It was found that Thai dental writers frequently apply formulaic sequences, like "this study was to," "the purpose of this study," "the aim of this," and "the objective of this study." Similarly, formulaic sequences, like "this study was to," "the aim of this," "the purpose of this study," "this study aimed to," and "the objective of this study," were frequently found in the IDRAAs. Compared to the TDRAAs, phrases driven by the use of first-person pronouns, like "we investigated" (5) and "we aimed" (4), were employed more frequently in the IDRAAs.

In addition, analysis of the formulaic sequences revealed the occurrences of semantic patterns, such as deictic terms and reporting verbs (see Table 4.2 below). The use of "this" and "the" could imply the writers' attempt to integrate the focus of the research study to the body of the abstract. This strategy is acknowledged in narratology where determiners are used to decrease the ontological distance between the narrator and narratee for the case of "this," and to increase the narratological distance for "that" (Fowler, 1986; Semino, 1997).

It was apparent that the dental journals had fewer inquiry types when compared to previous studies by Suntara and Usaha (2013), Pho (2008), or Santos (1996). Throughout the purpose move, writers are inclined to narrow down to four lexical choices as follows: "study," "purpose," "aim," and "objective." Regarding reporting verbs, both datasets were inclined to have similar lexical choices, albeit different occurrences, such as "compare," "investigate," "aim," "evaluate" (see Tables 4.2 and 4.3 below). When compared to the TDRAAs, the semantic complexity of the IDRAAs could be reflected through the verb "evaluate," which was deemed to show higher-order thinking in Bloom's cognitive domain (Anderson et al., 2001).

Table 4.2: TDRAAs: Occurrences of frequent semantic patterns

Frequency of semantic patterns		
Deictic Terms	**Inquiry Type**	**Reporting Verbs**
This (66)	study (53)	compare (26)
The (43)	purpose (21)	determine (18)
	aim (13)	investigate (15)
	objective (10)	study (10)
		aim (8)
		evaluate (6)
		examine (5)
		assess (3)
		analyze (2)

Table 4.3: IDRAAs: Occurrences of frequent semantic patterns

Frequency of Semantic Patterns		
Deictic Terms	**Inquiry Type**	**Reporting Verbs**
This (58)	study (62)	evaluate (26)
The (32)	aim (30)	investigate (21)
We (18)	purpose (9)	aim at/to (15)
	objective (6)	assess (10)
		compare (10)
		determine (8)
		test (4)
		examine (3)
		study (3)
		explore (2)

4.1.1.3 Methodology

Move M elaborates the procedures used in the research study and features the experiment-based dental research methodology in dental sciences. This move was considered conventional because of the frequency of occurrences for the TDRAAs (95.84%) and IDRAAs (92.00%). Regarding Move M, there were a few cases in the TDRAAs and IDRAAs that were cyclical together with Move R, and this cyclicity is similar to Santos's (1996) and Pho's (2008) findings. However, they are considered to be rare (less than 1%) compared to in the previous two studies. As some research has multifaceted procedures and report subsequent results within each procedural method, the cyclicity of this move could be implied as the writer's intention to abridge the complexity of the research through reappearing patterns and the sporadic occurrences of moves (Kanoksilapatham, 2013). This is similar to Samraj's (2002b) study, where such cyclicity was infrequently found in the field of environmental science.

(1) *Alleles for each AXIN2 marker were tested for transmission distortion with clefts by means of the Family-based Association Test.* ***(M)*** *// We observed an association with SNP rs7224837 and all clefts in the combined populations (p=0.001), and with SNP rs3923086 and cleft lip and palate in Asian populations (p=0.004).* ***(R)*** *//We confirmed our association findings in an additional 528 cleft families from the United States (p<0.009).* ***(R)****// We tested for gene-gene interaction between AXIN2 and additional cleft susceptibility loci.* ***(M)*** *// We assessed and detected AXIN2 mRNA and protein expression during murine palatogenesis.* ***(R)*** *// In addition, we also observed co-localization of AXIN2 with Irf6 proteins, particularly in the epithelium* ***(R)****.//* (JDR: 24)

As can be seen in Example (1), the complexity of the research methodology is condensed in a "limited space" (Pho, 2008) and is consequently dissected in multiple procedural steps, followed by the subsequent results from each procedural step (M-R-M-R). This occurrence was seen once in the IDRAAs, where the shortening of both the

methodology and results moves were marked in each sentence by the pronoun “we” to indicate the clear borderline of each move.

As with the tense and voice, Move M explicitly consists of the past simple tenses and passive voice. The past simple tenses were employed to recount the procedure of the research methodology implemented in the study. The use of the past simple tenses was also constructed with the passive voice. The active voice may possibly have been used in the IDRAAs to underline the significance of the “actor” in the clause; however, both datasets mostly used the passive voice to display impersonal involvement as well as to highlight the objects that received the treatment, or objectification (Halliday & Martin, 1993). By doing so, readers are inclined to focus on how the objects were implemented, applied, selected, collected, or sectioned. It could be inferred that writers attempt to remain as objective as possible to present the research methodology conducted.

(2) *The labial surfaces of forty bovine incisor crowns **were ground** flat, exposing dentin.* (CDJ: 4)

(3) *Fourteen human canines **were prepared** according to be a standardized, conventional endodontic treatment protocol and filled with the HEC/calcium silicate sealer.* (JOE: 4)

Modalities were hardly used in the methodology move throughout both datasets as the degree of confidence was not highlighted. Regarding the use of self-reference words, there were only eight cases found and only in the IDRAAs. The present study substantiates Pho’s (2008) findings that first-person pronouns are rarely addressed as the subjects of the clauses. Though first-person pronouns could be seen in previous studies (Pho, 2008; Martinez, 2001; Saeeaw and Tankiengsirisin, 2014), the first-person plural pronoun “we” was only employed in the present datasets as a representation of a particular group of dental researchers. Examples (4) and (5) demonstrate how the first-person pronoun was employed in the IDRAAs as follows.

(4) ***We*** *assessed general health, smoking and alcohol drinking habits, use of alcohol-containing mouthwash and periodontal status (community periodontal index of treatment needs).* (OO: 12)

(5) ***We*** *first examined the expression of CXC chemokine receptor 4 (CXCR4) for SDF-1α in the apical papilla and in cultured SCAPs using immunofluorescence, reverse-transcription polymerase chain reaction (RT-PCR), and flow cytometric analyses.* (JOE: 9)

To sum up, Move M could be explained by the intricacy of dental scientific research, whereby plenty of research instruments are concurrently used and, plausibly, meta-layered, impelling researchers to point out only the essence of their findings for the readers.

4.1.1.4 Result

Move R presents the significant findings, statistical results, and verbal reports based on the research methodologies implemented. This move had the highest frequency compared to the others and is considered conventional (97.50%) and obligatory (100%) in the TDRAAs and IDRAAs, respectively. Within this move, the top 5 opening nouns in respective order for the IDRAAs were “result,” “finding,” “study,” “analysis,” and “data,” and for the TDRAAs were “finding,” “analysis,” “study,” result,” and “data.” In respective order, the top 5 collocational verbs commonly used for those opening nouns were “show,” “indicate,” “find,” “reveal,” and “suggest” in the IDRAAs, while “show,” “indicate,” “reveal,” “find,” and “demonstrate” were commonly found in the TDRAAs. The findings suggest that there was only a slight difference in terms of collocational use in both datasets.

Self-reference words or first-person pronouns are rare in Move R. This corresponds to Pho’s (2008) findings, where the use of self-reference words was reported as uncommon in this move due to the fact that it focuses the researchers’ attention on facts and figures that result from the data analysis. Dissimilar to Hyland’s (2009) findings, there was no singular “I” in Move R in both datasets, indicating that the dental writers preferred to use “we” as a group representative. As opposed to the IDRAAs, the

authors in the TDRAAs were inclined to exclude their identities and report the results objectively. The uses of self-reference pronouns "we" in the IDRAAs can be seen as follows:

(1) ***We*** *found that apically directed travel of the irrigant was caused by disruption of the surface tension at the solution-air interface.* (JOE: 16)

(2) ***We*** *observed increased ALK activity in late-stage human OSCC tumors and invasive OSCC cell lines.* (OO: 3)

(3) *In addition,* ***the authors*** *identified the molecular circuitry at different stages of tooth development.* (JDR: 3)

One of the foregrounding features found in Move R is the explicit use of that-complement clauses (Pho, 2008), which demonstrate "promotional aspects" for abstract writing (Dahl, 2004; Hyland & Tse, 2004; Gillaerts & van de Velde, 2010; Yakhontova, 2002). By using a that-complement clause, dental writers stress on what is considered vital and apply their evaluation and judgment in an attempt to convince readers to rely on their findings. It should be noted that the that-complement clause is normally submerged in other moves of the abstracts (Pho, 2008); however, it was predominantly found in Move R in the present study. It could be said that the dental discourse community is unique because the use of the that-complement clause was normally applied with particular reporting verbs ("demonstrate," "show," "revealed") in this move of the two datasets. The following Examples (4), (5), (6) and (7) show that Move R from both datasets was conventionally written with a that-complement clause.

(4) *The results from the present study* ***demonstrate that*** *an osteoporotic condition significantly increases alveolar bone height loss, and that the therapeutic effects via bone-targeting systems…*(JDR: 16)

(5) *The results* ***showed that*** *microleakage between two resin cements was not significant different.* (SWU: 8)

(6) *Majority **indicated that**, among all laboratory procedures, posterior teeth arrangement was the most difficult (82%), most time-consuming (93%), and most needing an aiding device (81%).* (CDJ: 7)

(7) *The result of this study **revealed that** 13.3% of dental patients reported bruxism.* (SWU: 12)

Another syntactic structure found in Move R is the use of the anticipatory "it" as the subject. This is one of markers found in Hyland and Tse's (2004) metadiscourse, where writers diminish their own identity into an abstract entity. The abstract entity, mostly inanimate objects, acts as a human being and conveys the writers' consciousness through the use of the general subject as "it." Since the anticipatory "it" is an unidentified subject, this abstract identity conceals the writers' identity and, as a result, makes the clause objective. In the present study, the Thai writers usually used the dummy "it" to act upon their concealed identities when their evaluation of the results was expressed. However, the use of this syntactic structure was entirely dismissed by the international writers. This is one of the unique linguistic features distinguishing the TDRAAs and IDRAAs. The following Examples (8) and (9) show some instances found in the TDRAAs.

(8) ***It** was found that the flexural modulus increase (sic) with an addition of the glass fibers.* (CMJ: 9)

(9) *For the pattern of resin penetration into enamel during bracket bonding procedure, **it** was found that subgroups without liquid resin represented less penetration of resin than those with liquid resin.* (CDJ: 10)

Another distinctive feature found in the TDRAAs is a discrepancy between the tense of the embedded verb in that-clauses and the reporting verb [CMJ: 9]. Such a discrepancy was found in almost 10% of the TDRAAs.

Regarding the tense aspect in Move R, Santos (1996) and Pho (2008) pointed out that Move R was eminent, with the use of the past tense elaborating previous

studies, in which the results are compared and contrasted. In this study, the past simple tense was conventionally found in both datasets and affirmed that the past simple tense is explicitly used in this move, as can be seen from Examples (10) and (11) below.

(10) *The median PGFA in the ProTaper group **was** 77.5%, whereas the median PGFA **was** 90.5% in the SAF group (P<.05).* (JOE: 24)

(11) *Compared to the control group, there were statistically significant reductions in extent of shallow pockets: PD> 4 mm…*(JCP: 14)

Occasionally, present simple tenses could also be found, as shown in Examples (12) and (13). The effect of the present tense could give readers the impression that the results are generalizable and establishing new knowledge.

(12) *…tumor-derived or immune factors **result** in the accumulation of phenotypically and functionally diverse populations of CD11b+Gr-1+cells in mice with oral squamous cell carcinoma.* (OO: 4)

(13) *The study **provides** tentative evidence that SES may influence levels of resources such as social support and SOC, which mediate stress….* (JDR: 11)

Santos (1996) addressed how past simple tenses are used to signify the narrower claim of the research results, while the present simple tenses are used to establish an indisputable and generalizable argument. In other words, scrutinizing the text, readers perceive that the utterance is factual, naturally-occurring, and habitual and that the findings are contemporary in the world we are living. In the present study, the rarity of the present simple tenses could be seen as another variation, but dental researchers are inclined to use more past simple tenses to report the results straightforwardly.

4.1.1.5 Discussion

According to the percentage of the move frequency, Move D was conventional in both the IDRAAs (96.90%) and TDRAAs (90.00%). Opening nouns

found in this move are “the study” and “the result(s)” at the beginning of this move. However, the former was more frequently seen in the TDRAAs, while the latter was more frequently seen in the IDRAAs. Examples (1) and (2) demonstrate a means of using such discourse markers.

(1) *The **results** indicate that the modulation of autophagy in P-PDLSCs may provide a novel therapeutic strategy to improve periodontal therapy* (JCP: 8)

(2) *The **study** suggested that the amount of heavy metals and arsenic in orthodontic elastomeric chains of clear, yellow and pink color…* (MU: 37)

Though it is common for writers in social sciences to repeat references like “paper” and “article” (Suntara & Usaha, 2013), these words are rarely used in DRAAs, as shown in the present study. As “paper” and “article” represent the portrait of the research article, dental writers opt to avoid using them, and instead specifically focus on the results or findings from the experiments. Lexical preferences through the opening nouns, such as “results,” “findings,” and “conclusion,” in Move D could provide another dissimilarity between soft and hard disciplines (see Examples (3), (4), and (5) below).

(3) *In conclusion, **this study** demonstrated that pterostilbene caused autophagy and apoptosis in human oral cancer cells, suggesting that pterostilbene could serve as a new and promising agent for treating human oral cancer.* (OO: 10)

(4) *These **findings** provide initial support for health literacy as an important determinant of the meaningful use and cost of oral health care* (JDR: 17)

(5) *The **results** showed only vascular endothelial growth factor was significantly related with clinical attachment level and HbA1c.* (SWU: 6)

Another linguistic feature found in Move D was the use of self-reference pronouns, such as “we” or “our,” in the IDRAAs. According to Hyland (2009), the frequent use of self-reference usually happens at the beginning and end of an abstract to achieve the stance of self-promotion. Pho (2008) also found that the use of self-reference in Move D of abstracts was to present the writers’ explicitness. However, there was no self-reference in the TDRAAs, implying a lower level of self-realization in Thai writers when discussing results.

(6) ***We*** *conclude that PAD does not adversely affect the bond strength of the AH Plus sealer to root canal dentin and that it can be used for the final disinfection of root canals.* (JOE: 18)

(7) ***Our*** *data provide new aspects how the HMGB1 tumor-derived danger signal augments function of Treg in patients with HNSCC.* (OO: 25)

Instead, Thai writers prefer to address research implications objectively using anticipatory “it” structure in this move. Similarly, international writers occasionally use this specific structure to evaluate and predict possibility, as can be seen in Examples (8), (9), (10), and (11) below.

(8) ***It might therefore be*** *useful for enhancing the aesthetic appearance of full-contour zirconia restorations made from this material.* (DM: 9)

(9) ***It appears to be*** *an alternative to MTA as an endodontic biomaterial offering several advantages.* (DM: 17)

(10) *… **it was concluded that**, for the population of Mueang Khon Kaen District, the proportions of maxillary lateral incisor to maxillary central incisor on the left and right sides related to 70% RED, and shape of maxillary incisors were similar to square.* (KDJ: 14)

(11) *…, **it** is necessary to be aware of this variation when performing surgery.* (CDJ: 14)

Similar to Move R, that-complement clauses are foregrounding features for Move D. Regarding Examples (12), (13), and (17), the clauses co-occur with persuasive verbs, such as "suggest," "demonstrate," "recommend," "indicate," "conclude," "demonstrate," and "show." Of these, the highest co-occurring word found in both the IDRAAs and TDRAAs was "suggest" (see Examples (14), (15), and (16)).

(12) *Together, these data **illustrate that** ALK inhibitors enhance anti-tumor activity of EGFR inhibitors in susceptible tumors that display increased ALK expression, most likely through abolition of ALT activation.* (OO: 3)

(13) *Based on these results, we **conclude that** the serum scaffold can promote efficient repair of large bone defects, but the combination with BM-MSCs accelerates this process, increasing significantly the amount and quality of bone formed.* (JCP: 6)

(14) *These findings **suggest that** composite resin with a bonding agent over MTA can be restored almost immediately after MTA mixing during a single visit.* (JOE: 19)

(15) *The result **suggests that** these two Thai medicinal plant extracts promote cell proliferation and might be able to use as a potential medicine for wound healing process on periodontal diseases.* (MDJ: 8)

(16) *Results possibly **suggested that** all fluoride varnishes used are efficiently initiate the remineralization in advance artificial enamel caries…* (KDJ: 9)

(17) *It can be **concluded that** both 2 restorative materials and 3 levels of root canal had not an effect on microleakage between fiber post and root canal wall.* (SWU: 10)

There was no major difference in terms of the use of co-occurring persuasive verbs in the IDRAAs and TDRAAs. However, the lexical choices of persuasive verbs in the IDRAAs were more diverse, representing the various stylistic

preferences found in the international journals. In other words, the TDRAAs had fewer patterns of that-complement clauses in the research article abstracts.

From the perspective of the tense used in Move D, the TDRAAs particularly maintained the use of the past simple tense throughout the TDRAAs, while a variation of the tense was found in the IDRAAs. Especially in this move, the use of the past tense in the IDRAAs in the preceding moves often shifted to the present simple tense. As scientific research studies are generally perceived as "applicable" in the real world, the effect of the present simple tense in Move D is to yield a generalizable output or a universal statement to readers.

(18) *In conclusion, base and liner materials **had** markedly different fluoride releasing characterisitics and Vitrebond ® released the most.* (KDJ: 3 – Past simple tense)

(19) *HMGB1 **is** a chemoattractant for Treg and **promotes** their suppressive function.* (OO: 25 – Present simple tense)

(20) *The development of appropriate treatements for oral leukoplakia **is** required, which will be enable successful differentiation between surgical and observation cases.* (OO: 5 – Present simple tense)

Another linguistic feature found in Move D is the use of modal auxiliaries, showing the writers' degree of confidence while uttering statements. These modalities are used to convey the writers' degree of confidence while making a deduction in the situations uttered.

(21) *Additional post-heat-light curing of nano-composites **may** produce higher color change than the hand-light curing protocol. Consequently, the polishing procedures **should** be applied to obtain more resistant composite surface to discoloration*. (DM: 25)

(22) *The clinician **should** be aware that due to a distinct activation Of both initiators, marginal quality **may** be influenced on the long-term.* (DM: 1)

(23) *This method **may** be potentially useful as an adjunct to root canal treatment. (JOE: 10)*

Based on its occurrences, Move D was found to be conventional in both datasets. In addition, the use of opening nouns or nominal references was relatively similar; however, various types of co-occurring verbs were found throughout the IDRAAs. It could be concluded from this that cultural differences between the writers may affect the lexical choices they make. The main tense used in the TDRAAs remained the past simple, whereas the use of the present tense could be seen more frequently in the IDRAAs. The use of the present tense represents a stylistic preference of international writers, who tend to take account of the generalizability of their results to persuade readers of their applicable implications. Modal auxiliaries are explicitly used in Move D as premises to show the writers' degree of confidence while discussing their results or findings. For example, modal verbs, like "may," "might," "could," and "can," could be used for making deductions based on the possibility or certainty of the situations uttered. Additionally, modalities are semiotically linked to research implications because they demonstrate plausible prospects for readers to seek original knowledge and other possibilities.

4.1.2 Move frequency

As a discourse community prompts the desired writing style, the frequency of moves is a significant signal to understand the organizational structure represented in each discourse community. Each move is perceived differently based on the number of its occurrences, and based on this frequency of use, the move can be categorized into optional, conventional, and obligatory. A move is deemed optional when it is found in less than 60% of the dataset, while it is deemed conventional if its frequency is higher than 60%. An obligatory move is identified when it occurs in every abstract of the dataset.

Based on two datasets of the 120 TDRAAs and 120 IDRAAs based on Kanoksilapatham's (2013) BPMRD rhetorical structure, the moves could be divided into

optional, conventional, and obligatory based on the percentages they were found within each dataset.

Table 4.4: Frequency of the occurrences of moves in IDRAAs and TDRAAs

Moves	Move Occurrences: TDRAAs (%)	Move Occurrences: IDRAAs (%)
Background	25.8	60.9
Purpose	99.1	94
Methodology	95.8	92
Results	97.5	100
Discussion	90	96.9

As can be seen from Table 4.4, the frequency of the occurrences of moves in the IDRAAs and TDRAAs was not entirely similar. While Moves P, M, and D in both datasets are considered conventional, differences based on the status of the move could be found with Moves B and R. Move B in the TDRAAs is considered optional, while in the IDRAAs, it is considered conventional. Move R in the TDRAAs is considered conventional, while tin the IDRAAs, it is considered obligatory. Since Move R is obligatory, international dental writers are required to report results when writing research article abstracts. On the other hand, Move B is trivially recognized by Thai writers compared to the international writers in the IDRAAs. As Move B is conventional in the IDRAAs and primarily focuses on giving background information, explaining the terminology, pointing out significant studies, or indicating research gaps, the Thai writers should better realize the importance of this move because the research background is required at the international level.

4.1.2.1 The dearth of Background move

Move B in the TDRAAs could reveal significant information regarding the Thai writing style. Due to the limitation of space provided in an abstract, writers instinctively delete insignificant parts and keep only those parts that should matter to readers. As Move B recounts the significance of previous literature, Thai dental students seemingly choose to exclude this move as they think it is not as significant as the other moves. Moreover, Move B is usually the space for pinpointing the research gap and

paving the way for researchers to spell out the significance of their present study. The lack of Move B through the lower number of BPMRD move sequences shows that Thai dental writers decline to do so.

Regarding a reader-responsible writing style, Thai dental writers are inclined to avoid providing sufficient information when given an opportunity. Instead, they prefer positioning the research purpose to providing the research background or research gap. By doing so, readers need to seek more background knowledge relevant to the research in question by themselves. On the contrary, international writers pay more attention to the rationale of the research and the research gap as highlighted in Move B and fall into a writer-responsible writing style. The inherent belief and philosophy of Thai people are different from NES writers as the latter are more explicit and direct. For instance, teachers in the U.S. emphasize students the need to include clear and unambiguous information to correspond to their reader-responsible or high-context culture (Hinds, 1987). Thailand, on the other hand, is one of many Asian countries that are considered as living in a low-context culture, where the burden of deciphering meaning from implicit text is left to the readers. In other words, readers expect ambiguous and implicit messages so that they can appreciate and extract the meaning from those messages. On the other hand, NES readers in high-context cultures expect straightforward and explicit messages. The explanation for the dearth of a background move can substantiate Hinds' typology across cultures that there is an existence of a reader-responsible writing style within Thai dental students writing. When compared to international writers, the writing style more corresponds to a writer-responsible culture. It is apparent that international readers typically expect relevant information to appear somewhere in the first or second sentences to enable them to comprehend the explicit purpose and direction of the abstract. Starting from Move B, international writers aim to provide a clearer picture of the content representing the original text.

As Move B is used for indicating a gap or establishing a niche (Swales, 2004), face-saving strategies may be a vivid reflection of the Thai close-knit society. As opposed to western cultures, Thai society is unaccustomed to the practice of criticism, but rather accustomed to the system of reciprocity and seniority. Buddhism and a customary belief of social relationships as a family member (Kanoksilapatham, 2007, pp. 199–200) discourage any disrespectful acts against senior fellows. Thus, it is considered

inappropriate to identify names and to expose their research gaps or any "shortcomings" in previous research (Taylor & Chen, 1991). The following Examples (1) to (7) demonstrate that international writers directly criticize previous literature through words such as "controversial," "inadequate," or "fails." On the other hand, Examples (8) to (16) highlight some of the means Thai writers use to avoid face-threatening acts while addressing research gaps.

(1) *However, EGFR targeted therapies **yielded little to no efficacy** in clinical trials.* (OO:2)

(2) *Identification and isolation of CSCs **needs to be improved** further.*(OO:21)

*(3) …, there are **conflicting reports** regarding the accuracy of CT.* (DM: 9)

(4) *Replacing glazing with polishing is still **controversial** in terms of the surface roughness of dental porcelains.* (DM: 12)

(5) *Scientific evidence on the effects of chronic periodontitis on end-stage renal disease (ESRD) remains **inadequate** and **inconclusive**.* (JCP: 9)

(6) *The influence of smoking on factors that support B-cell function in periodontitis **remains unclear.*** (JCP: 15)

(7) *However, a single measurement **fails** to characterize the dynamic nature of stress over time.* (JDR: 16)

(8) *However, **there is no study** for both extracts on oral cells.* (MDJ: 8)

(9) *Failure in IANB **may be caused** due to several factor, a factor may be the patient position.* (MDJ: 3)

(10) *Nowadays **there are** many kinds of cements and metal conditioners with different chemical compositions used to cement crowns or bridges* (MDJ: 26)

(11) *However, the standard canine index in Thai population **is not well established**.* (MDJ: 30)

(12) *…and cytotoxicity on a variety of cancer cells but **little is known** about its apoptotic inductive potential.* (MDJ: 31)

(13) *However, previous studies **did not consider** creating the ferrule effect together with resin composite built up.* (SWU: 13)

(14) *Premalignant lesions can also appear benign and often **be overlooked** by some examiners.* (SWU: 14)

(15) *Only **a limited number of reports existed** about fluid flow through dentin in primary teeth, none of them were studied in carious dentin in vivo.* (CDJ: 21)

(16) *Several studies reported increased PCNA expression in oral lichen planus (OLP), but ADAM-9 expression in OLP **has not yet been studied.*** (CDJ: 20)

Besides, Thai writers are goal-oriented and likely to focus on Move P by aiming for the research goal directly. The readers' attention is then immediately shifted into the research purpose, which is clearly shown by the highest frequency of PMRD move sequences in the TDRAAs. Based on the occurrences, it can be seen that Thai dental writers abide by the significance of Move P more than Move B. In particular, when the number of words is limited, as in abstract writing, Thai dental writers prefer exclusion to the inclusion of Move B as a part of the abstract.

At the international level, the degree of competitiveness is regulated by commercial publishers. It is acknowledged that these publishers are open to worldwide scholars and that the research quality must be exceptional to be accepted. The pressure among the international dental community is inevitably larger than that in the Thai dental community because of the "size and professional maturity of target discourse communities" (Bonn & Swales, 2007), which drives global competitiveness. To be accepted, international dental writers should not only realize a significant literature, but also use references to previously published work by their anticipatory publishers. The recognition of previous work thus seems to be valuable at the international level, yet Thai dental writers are inclined to dismiss it. It is possible, however, to raise the awareness of Thai dental writers regarding the significance of previous work despite the condensed space of an abstract. When comparing native and non-native academic writing, the avoidance of Move B was evident and this has been found in various studies (Bonn &

Swales 2007; Fredrickson & Swales 1994; Melander et al., 1997; and Taylor & Chen 1991), thus affirming the substantiality of previous significant work.

This could be linked to the difference in learning style across cultures between independent and spoon-feeding learning (Smith, 2008; Samah et al., 2009). Another explanation for this is the educational foundation of international research scholars, whose supervision tends to be based on a building block of information. As they develop new research studies, international research scholars seek thorough information based on an in-depth and self-learning discipline and instinctively recognize the value of each report in the literature. On the contrary, the Thai learning style is grounded upon oral traditions, considered as a passive learning style. Thai, not just specifically dentistry, students learn passively, avoiding interacting or discussing in the classroom. It is thus assumed that the knowledge is ready-made and fostered by the instructors' guidance, not constructed upon individual learning. By doing so, students seem to be unaware of the value of previous studies which are used to propel their research study.

As Move B pertains to elaboration through the details and introductory background, it could be said that Thai dental writing is based on a reader-responsible style. When this move is considered optional, it is difficult for a general audience to understand the content without the appropriate context. Abstracts are thus written specifically for the limited number of the readers who are only interested and specialized in that particular field. As a publication is only used as a requirement for graduation, it is also possible that Thai writers may not see the significance of their own work at the international level. Straightforwardly aiming for Move P without situating their work reflects the way they rarely think about the rationale and contextual information of their study in question. Besides, their reader-responsible style of writing could relate to the fact that they assume their supervisors, editors, and peer dentists are only anticipatory readers and they have no need to explicate or simplify information for general readers. The findings from the present study can be valuable for students in terms of founding an "audience design" (Bonn & Swales, 2007) to attract more international readers or a wider readership as background information is essential to form contexts.

Dissimilar to the TDRAAs, Move B is more significant for international writers as it is used to address how a study in question situates itself worldwide. Recognizing the authorship of substantial literature is imperative in this case.

It is also desirable to refer to any previous works issued by the same publishing house where marketable profits are a part of decision making. Therefore, Move B is used to display how the researchers situate themselves through literature recognized by an editor-in-chief. The high number of occurrences of Move B found in the IDRAAs clearly demonstrates how international writers include relevant literature or preliminary information to pave the way for their present study. As dental faculties in Thailand are places where practice is the essence of study, conducting a research study is also another tool for students to achieve the principles of a research methodology. In light of practicum for dental students, the significance of the research study may not be of the first priority. The focus, however, is to familiarize students with the means of conducting research for the sake of educational purposes. As their research might be governed and scaffolded by their supervisors, students soon realize that they are in a comfort zone. Therefore, elaboration and cherishing their work against competitiveness with other research studies may not be of the first priority.

When compared to international journals with high-impact factors, the degree of competitiveness is driven by the quality of the research paper. All papers published are considered innovative and are frequently cited by worldwide dental researchers. Move B is not only used to pay tribute to and elaborate on the significant literature, it is also an opportunity to highlight a research gap and how to bridge that gap innovatively. While bridging the research gap is used to highlight a paper's original contribution toward anticipatory readers, the relevant literature could serve to suffice as wider information for general readers, if by chance they are interested in dental sciences. This is a trend for dental journals to attract a larger group of readers since dental innovations or implementations used in dental sciences may affect people's health.

4.1.2.2 Linguistic features

As move analysis in this present study was based on a top-down approach, the linguistic features were incorporated with contextual clues to identify the moves based on the communicative purpose. These linguistic features have been proven to be significant as they identified that an RA abstract has its own specific make-up, and is not just a pale reflection of the RA (Gillaerts & van de Velde, 2010). They also found that the interactional metadiscourse in abstracts had changed over the last three decades, whereby the use of hedges, boosters, and attitude markers are decreasing. These changes

are occurring due to multiple factors, such as the genre-specific discourse community, research trends, and rhetorical pedagogies.

(1) First-person pronouns

The main linguistic features found within this study could be highlighted through the use of the first-person pronoun "we" throughout the IDRAAs, while the use of self-mentioning pronouns in the TDRAAs was relatively restrained. It has been established that scientific abstracts are inclined to appear impersonal and objective, but the presence of authorial stance (Pho, 2008) through the use of "we" underlines the author's involvement from move to move. Since authorial stance in the present study was more frequently found within each of the rhetorical moves in the IDRAAs in the form of the self-mention pronouns "we," "us," and "our," it is suggested that the international writers' authoritativeness is more apparent.

It is vital to address the issue of the first-person pronouns appearing in the present study as they have multiple semantic and syntactic functions. At the outset, the trend of using "we" as a first-person pronoun in IDRAAs could be explained, according to Li and Ge (2009), as there has been a dramatic increase in the number of research studies published in medical journals since the new millennium and hence any previous manuscripts published by a single researcher will gradually "disappear." In addition, guidelines for medical journal writing often recommend authors to alternate between the passive voice and active voice when appropriate (Day, 1998). The higher frequency of first-person pronouns, such as "we," can also increase the tonal style of reliability as they convey accuracy, quality, and the meaning of the results (Beaver, 2001). Moreover, the inclusive "we" can be used as a social actor to emphasize the writers' engagement in the research and to decrease the distance between writers and readers to identify with engaged readers (van Leeuwen, 2008).

When compared to medical journals, present-day international writers are inclined to use more of the active voice; however, the majority of samples throughout the two datasets in the present study were written in the passive voice. Therefore, authorial stance should be more promoted (Pho, 2008) and vocalized for potential dental researchers so that they could produce publishable abstracts, not just in the impersonal style used throughout, for instance, all the moves in TDRAAs. At present, the lack of first-person pronouns in the two datasets highlights the uniqueness of the

dental discourse community, which is different from the case of medical journals. Since the active voice is more frequently seen in IDRAAs, it is still recommended that Thai writers should employ the active voice more to express their commitment to their research.

(2) Tense

As regards the use of verb tenses, it has been revealed that there is a close relationship between the communicative purpose and verb tenses and that the verb tenses express the attitudinal changes of writers (Salger-Meyer, 1992). There were three tenses found within the present study: present simple, past simple, and present perfect. It was common to see the past simple tense in Moves P, M, and R throughout both datasets. The past simple tense is usually preferably used to elaborate specific actions or procedures conducted during experimental studies. Moreover, the past simple tense related to the stylistic convention employed in scientific English writing (Weissberg & Buker, 1990). It can be concluded that Moves P, M, and R in the dental abstracts mostly recounted specific actions of past events.

The present simple and the present perfect tenses were mostly found through Moves B and D in the dental abstracts. Since both tenses suggest a writers' attempt to attain trustworthiness and generalizability, they are not well-perceived by dental writers as these would go against the basic philosophy of scientific knowledge, where evidence is primarily collected to prove the research hypothesis. On the one hand, the level of certainty expressed through dental abstracts may not be a necessity as dental writers focus more on empirical evidence, not attempting to convince readers. On the other hand, it is likely that readers in the dental community might be amply critical and that there is no need for such discursive strategies. Additionally, trustworthiness could be gained through applying rigid procedures and simply providing the main findings of the research study.

The present simple tense was mostly found in Moves B and D in the dental abstracts. It adheres to the generalizability of specific findings and is conventionally used for establishing information for scientific communities (Salager-Meyer, 1992). As Moves B and D provide space for interpreting the results and implications, it has been found that medical writers more often use the present simple

tense to signal to readers that their findings suggest a universal applicability by implying a convincing tonal style of writing.

As for the present perfect tense, its function is relatively similar to the present simple tense in that it aims to express the relevance of the research study grounded on the most recent literature. Salager-Meyer (1992) found that medical writers had a tendency to prefer the present simple tense to the present perfect tense while discussing their results in Move D. This is true and in accord with the results found within the present study. In addition, it can be concluded that the present simple tense is preferable for dental writers to generalize their utterances and to suggest that their findings or implications are timeless or authoritative (Day, 1995).

It is intriguing that there was some use of the future tense found within the IDRAAs. The use of the future tense can contribute to a special function of abstracts as a "promise" (Yakhontova, 2002) not a "report." However, the rarity of the future tense in Move D shows that it is not preferable for dental writers to use it.

(1) *This study **shows** that SRP plus either air polishing or prophylaxis paste are both effective for initial periodontal therapy.* (KDJ: 12 – Present tense)

(2) *The development of appropriate treatements for oral leukoplakia […] **will** enable successful differentiation between surgical and observation cases.* (OO: 5 – Future tense)

(3) Modal auxiliaries

Modal auxiliaries are specifically employed in Moves B and D to transmit various degrees of possibility or a certainty of deduction; however, they are entirely dismissed in Move M. This could substantiate the fact that modal auxiliaries are only required in particular moves in which attempting to show obligation, judgment, or an evaluation in their statements is appropriate.

(1) *This result **may** offer insight into ways to modulate the genetic controls…* (JDR: 3 - possibility)

(2) *…however, tissue engineering procedures **must** be optimized further to improve the success rate.* (JDR: 7 - certainty)

(3) *SCAPs **can** be chemoattracted via the SDF-1α/CXCR4 axis, suggesting that SDF-1α…*(JOE: 9 – certainty)

(4) *Cancer **may** be derived from cancer stem-like cells (CSCs), which are tumor-initiating cells...* (OO: 21 – possibility)

(4) Anticipatory "it"

The anticipatory "it" is another linguistic feature worth mentioning for the present study. The anticipatory "it" was frequently found in Move D in both datasets with the aim to make utterances less subjective. However, it was unexpectedly also found in Move R in the TDRAAs but not in the IDRAAs. As IDRAAs are considered as an appropriate platform for dental researchers, the use of the anticipatory "it" should be prioritized and recommended in terms of pragmatic aspects, or appropriateness, for Thai dental students.

(1) ***It might therefore be** useful for enhancing the aesthetic appearance of full-contour zirconia restorations made from this material.* (DM: 9)

(2) ***It appears to be** an alternative to MTA as an endodontic biomaterial offering several advantages.* (DM: 17)

(3) ***It** is necessary to be aware of this variation when performing surgery.* (CDJ: 14)

4.1.3 Move sequence

Figure 4.1: Move sequences: IDRAAs

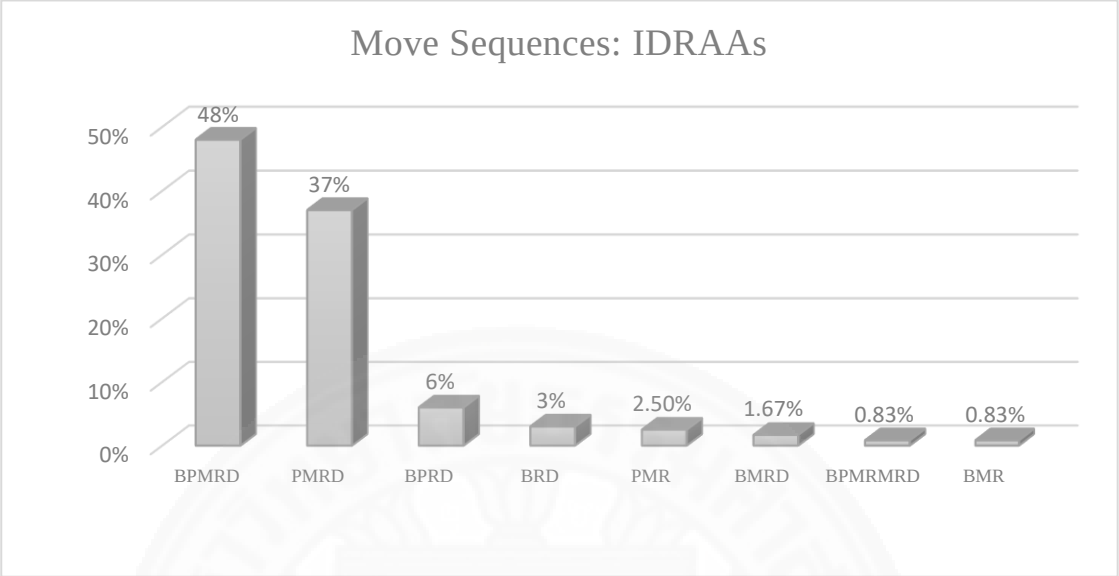


Table 4.5: Percentages of move sequences: IDRAAs

Move Sequences: IDRAAs	
1. BPMRD	48%
2. PMRD	37%
3. BPRD	6%
4. BRD	3%
6. PMR	2.5%
7. BMRD	1.67%
8. BPMRMRD	0.83%
9. BMR	0.83%

Figure 4.2: Move sequences TDRAAs

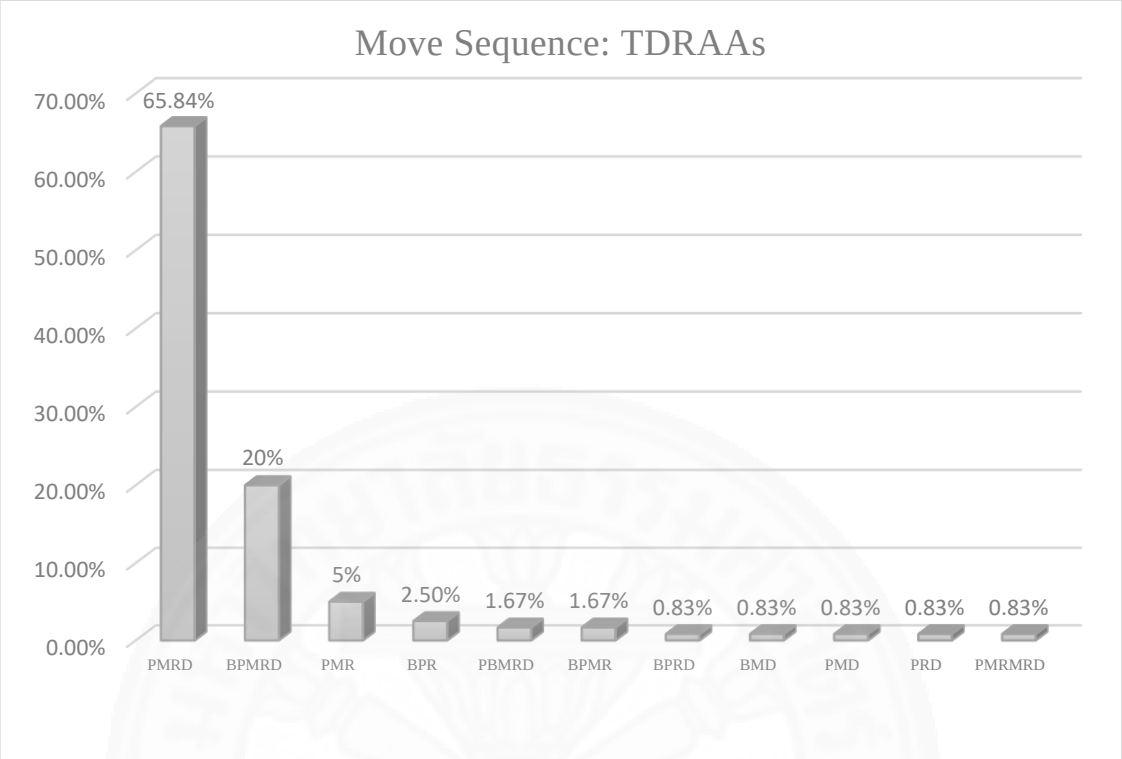


Table 4.6: Percentages of move sequences: TDRAAs

Move Sequences: TDRAAs	
1. PMRD	65.84%
2. BPMRD	20%
3. PMR	5%
4. BPR	2.5%
5. PBMRD	1.67%
6. BPMR	1.67%
7. BPRD	0.83%
8. BMD	0.83%
9. PMD	0.83%
10. PRD	0.83%
11. PMRMRD	0.83%

According to Table 4.5, the move sequences most frequently found in the IDRAAs were BPMRD (48%), PMRD (37%), BPRD (6%), and BRD (3%), respectively. According to Table 4.6, the highest occurrences of move sequences found in the TDRAAs were PMRD (65.84%), BPMRD (20%), PMR (5%), and BPR (2.5%), respectively. Though there were variations in the move sequences occurring across the IDRAAs and TDRAAs, it was apparent that BPMRD and PMRD were the most employed sequences across the two datasets. BPMRD (48%) was the move sequence most used in the IDRAAs, suggesting this as a favored means for highlighting the background to the research studies at the international level. These results substantiate Hyland's (2004) statement that Move B is an increasing trend for academic writers to express their motives and to familiarize readers with the contexts provided. Moreover, the findings are also in accord with Suntara and Usaha's (2013) findings that the addition of Move B is commonly used to complement the "absence of well-defined sets of problems" (p. 86) because Move B is used in dental journals to situate problems in their contexts as well.

However, Move B is not used and emphasized in the TDRAAs as the sequence BPMRD was only seen in 19.17% of abstracts. PMRD, on the other hand, was the most frequently used (65.84%), thus the disappearance of Move B was apparent. From Figure 4.2, it is clear that the percentage of PMRD sequence is at its highest level. When compared to PMRD, the percentage of BPMRD dramatically drops to 20%.

Dissimilar to Pho's (2008) and Santos's (1996) findings that most abstract writings comprise three moves (PMR), DRAAs in the present study mostly comprised at least four moves (PMRD), and this showed the difference in terms of discipline variations between soft and hard sciences. Despite the different occurrences between the IDRAAs and TDRAAs, one key highlight of the present study is that the inclusion of Moves B and D are of significance for academic writing within dental communities. This is in line with Hyland (2004)'s findings, where the implementation of Move D, elaborating applications and implications, was applied in broader types of abstracts (Kanoksilapatham, 2013; Suntara & Usaha, 2013; Saeeaw & Tangkiengsirisin, 2014).

As embedded, cyclical, and reversal moves were found as evidence for the writers' attempts to produce a more cohesive textual construction in the condensed space of the abstracts, it was affirmed through the present study that dental researchers avoid

writing abstracts in the style of a checklist (Santos, 1996, p. 497) despite the writing being in a scientific discipline. Since embedded moves were more frequently found with international writers, they represent the writers' grammatical dexterity, which is mandatory to integrate two moves within the same sentence. On the other hand, the reverse moves (PBMRD) were barely found throughout the two datasets and then only with Thai writers. This may be considered as a minor pedagogical concern for Thai writers, when compared with the dataset of the IDRAAs.

4.1.4 Statistical results

4.1.4.1 Chi square and effect size

An association between move frequency and the journal types (TDRAAs and IDRAAs) could yield statistical results regarding stylistic differences. Thus, Chi square and effect size were used to check if there would be a significant difference between each dataset and move frequency. As for effect size, it was used to validate a generalizable power based on the number of samples chosen for the present study.

(1) Move frequency

This section attempts to apply statistical calculation to see if there is an association between move frequency and the journal types.

Table 4.7: Chi-squared move frequency

M/T	Inter (N=530)	Thai (N=490)	Total (N=1020)	Chi.Sq. (Sig.)	φ_c
B	72	31	103	15.422* (0.05)	0.12
P	112	119	231		
M	110	115	225		
R	120	117	237		
D	116	108	224		

According to Table 4.7, this relationship is unlikely to be due to chance; as even when the significance threshold is set at .05, the results reject the null hypothesis, showing that there is an association between the moves and journal types.

According to Cramer's V, the magnitude of the size effect can be considered as a small one, and the maximum possible variation between journal types and the move frequency is 12%.

(2) Move sequence

This section attempts to apply statistical calculation to see if there is an association between move sequence and journal types.

Table 4.8: Chi-squared move sequence

Move Sequence	Inter	Thai	Chi.Sq. (Sig.)	φ_c
BPMRD	58	24	29.779* (0.05)	0.35
PMRD	44	79		
PMR	3	6		
BPRD	7	1		
Others	8	10		
Total	120	120		

According to Table 4.8, this relationship is unlikely to be due to chance; as even when the significance threshold is set at .05, the results reject the null hypothesis, showing that there is an association between the move sequence and journal types. According to Cramer's V, the magnitude of the size effect can be considered as a medium one, and the maximum possible variation between journal types and move sequence is 35%.

4.1.4.2 Inter-coder reliability: Cohen's kappa

Move identification demarcated by only one researcher could raise a question about the reliability and validity of this study. Therefore, to boost the strength of the analysis, another coder, an expert in dentistry, was invited to individually analyze the generic structures found in both datasets. Table 4.9 shows that the agreement rate for move identification by the two raters was high (97.62%). In addition, Cohen's kappa analysis (0.938) showed that the inter-coder reliability was excellent because the value was higher than 0.75.

Table 4.9: Inter-coder agreement rates and Cohen's kappa analysis

Moves	Coded Units	Agreement	Disagreement	Percentage
Background	15	14	1	93.34%
Purpose	27	27	0	100%
Methodology	29	29	0	100%
Result	30	29	1	96.67%
Conclusion	25	24	1	96%
Total	126	123	3	97.62%

Symmetric Measures

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Kappa	.938	.062	7.276	.000
N of Valid Cases	60			

1. Not assuming the null hypothesis.
2. Using the asymptotic standard error assuming the null hypothesis.

4.2 Transitivity analysis

This section describes the results from the transitivity analysis. The coding protocol used for categorizing the process types (see Table 4.10) reiterates the key semantics to serve as guidelines for the analysis.

Table 4.10: A coding protocol for categorizing process types of transitivity

Processes	**Key Semantics**	**Verbs**
Material	"doing"	test, dissolve, mix, inspect, soak, analyze, collect, observe, study, investigate, measure, evaluate
Mental	"sensing"	aim, hypothesize, attempt, wish, require, tend, consider, evaluate (that), find (that)
Relational	"being"	be, have, serve as, indicate, suggest, imply, show, mark, contain, comprise, lack, metaphorics (e.g. play a major role), linking verbs (become, appear)
Behavioral	"behaving"	cry, laugh, smile, stare, sigh, dream, breathe, faint
Verbal	"saying"	describe (that), recommend (that), conclude (that), suggest (that), demonstrate (that), explain, report, reveal, characterize
Existential	"existing"	(there) be, exist, emerge, remain, rise, grow, erupt

Based on the IDRAAs, material processes showed the highest frequency throughout the dataset (46.86%), followed by relational processes (30.48%), mental processes (12.04%), verbal processes (6.88%), and existential processes (3.73%). As for the TDRAAs, material processes showed the highest frequency (53.38%), followed by relational processes (31.05%), mental processes (8.01%), existential processes (5.39%), and verbal processes (2.17%). The rarity of behavioral processes in scientific writing (Halliday & Martin, 1993; Zheng et al., 2014) was also evidenced in the present study, as there was no existence of behavioral processes in either of the datasets.

Table 4.11: Percentages of process types in TDRAAs

Type	Background	Purpose	Methodology	Result	Discussion	Mean
Material	28.74	60	87.42	25.76	32.38	46.86
Mental	13.79	31.11	3.79	1.84	9.66	12.04
Relational	41.39	6.67	8.16	56.32	47.73	30.48
Existential	14.94	0	0.23	8.96	2.27	6.88
Verbal	1.44	2.22	0.28	7.12	7.96	3.73
Behavioral	0	0	0	0	0	0

Table 4.12: Percentages of process types in IDRAAs

Type	Background	Purpose	Methodology	Result	Discussion	Mean
Material	32.6	72.8	86.09	43.46	31.93	53.38
Mental	6.67	22.06	5.04	2.02	4.23	8.01
Relational	51.85	2.94	8.87	44.67	46.94	31.05
Existential	4.44	0	0	5.03	1.4	2.17
Verbal	4.44	2.2	0	4.82	15.5	5.39
Behavioral	0	0	0	0	0	0

According to Tables 4.11 and 4.12, both datasets mostly consisted of material processes, which carry the sense of "doing" in the clauses. This reflects the nature of the experiment-based research in dental journals because of the involvement of advancing technology and as a lucid illustration of actions is required. The absence of behavioral process reflects the omission of human actions in experiment-based studies. These findings correspond to Zheng et al.'s (2014) and Martínez's (2001) studies, where the academic research articles they studied mostly consisted of material processes and lacked behavioral processes. Another interesting finding in the present study was that the percentages of verbal processes, especially Move D, were higher in the IDRAAs, while those of existential processes, especially Move B, were higher in the TDRAAs. These differences are significant for further discussion (see below) as they contribute to the functional stylistic perspective.

4.2.1 Material process

Material process clauses represent the rigidity and objectivity of scientific writing (Halliday & Martin, 1993). As material processes underline the significance of the act between the "subject" and "goals," the "process" is categorized based on the notion that the subject(s) "do/does" something. The main verbs mostly found throughout the datasets, such as "collected," "prepared," "sectioned," or "placed," are examples of material processes demonstrating physical and visible acts (see below).

Table 4.13: Material process

Actor	Pr : Material	Goal	Circumstance
The authors	*collected*	*juvenile alligator dental laminae*	*at different developmental stages.*

The present study revealed that material processes had the highest percentage in both datasets, where they were used to describe research procedures, statistical analysis, and research implications. The results substantiate previous studies focusing on genre-specific writing where material processes also had the highest percentage (Martínez, 2001; Yang, 2004). In addition, some scholars found that material processes predominate

over the other process types because their nature is mostly materialistic and full of activities (Simpson, 1993; Zheng et al., 2014).

It should be noted that Move M in both datasets had the highest percentage of material processes. This can be explained by the writers' intention to display concrete actions without interposing their personal reflections.

> /// (1) /*Fifteen extracted human mandibular premolar teeth with single and straight roots were* ***used****. /// (2) After the clinical crowns were* ***removed*** *from the cementoenamel junction, // (3) root canals were* ***prepared*** *with the ProTaper (Dentsply Maillefer, Ballaigues, Switzerland) rotary system to the size of the F3 file.///* (JOE: 18)

As regards ranking clauses, the above-mentioned show that there were three ranking clauses identified in the methodology move, where the author elaborates on the steps followed in the experiment, such as describing tooth selection and canal preparation. All the ranking clauses were material processes comprising the "goal" and "actor." While the goal is explicit by addressing the objects, the actor, or the researcher, vanishes. The presence of material processes through material verbs, such as "used," "removed," and "prepared," together with the absence of the researchers, characterizes an impersonal style of writing, where the focus is shifted to the goal of the research, not the actor (Zheng et al., 2014). In fact, the passive voice was used in 92.5% of cases throughout the datasets, while the first-person pronoun ("we") was infrequently used in the IDRAAs, and even entirely absent in the TDRAAs.

4.2.2 Mental process

As discussed above, mental process clauses consist of a "senser" and "phenomenon." It is unusual to see mental processes in scientific writing (Halliday & Martin, 1993). Since writers tend to decline the involvement of individual thoughts, the percentages of mental processes in the IDRAAs and TDRAAs in the present study were only 12.04% and 8.01%, respectively, showing that mental processes were hardly used in the present study. IDRAAs frequently use "we" or "the authors" as the senser to represent their mental involvement. However, when a clause is told from a participating narrator as unreflective and lacking modalities (Simpson, 1993; Beaver, 2001), the

narrator's reliability can be perceived, resulting in a greater efficiency and intensiveness of the results as follows.

(1) *We **hypothesized** that temporal escalation in stress exacerbates risk for TMD, and the effect is amplified by allelic variants in a gene, catechol-O-methyltransferase (COMT), regulating catechol neurotransmitter catabolism.* (JDR: 12)

(2) *The supplementation of other bone-augmenting agents is **considered** helpful in preventing such side effects by reducing the amount of BMP-2.* (JDR: 9)

As can be seen from Example (1), the word "hypothesized" suggests a mental activity of the researchers, with "we" entailing their thoughts "that temporal escalation in stress exacerbates risk for TMD, …." As a result, the senser "we" conveys a realistic representation from human agency and, in addition, readers perceive the narrators' reliability through a collectivistic viewpoint. As for persuasiveness, mental processes have been used in various types of academic journals (Wu, 2004; Zheng et al. 2014). Likewise, it is apparent that the Thai and the international dental writers particularly used mental processes in the present datasets, with the highest percentage (31.11% and 22.06%) in Move P, where the researchers merge reliability and determination into their utterances.

4.2.3 Verbal process

Verbal process clauses consist of a sayer, receiver, and verbiage and refer to the process of "saying." In the present study, verbal processes were frequently found in Moves R and D especially, when the writers present their research implications. When compared to the other types, verbal processes were not very common in the TDRAAs (3.73%) and IDRAAs (5.39%).

(1) *…the bone grafting is strongly **recommended** in immediate implant placement case, especially in aging patient, in order to create the esthetic and primary stability.* (CMU: 10)

(2) *Recent studies have **shown** that native phosphorylated full-length porcine amelogenin (P173) and its predominant cleavage product (P148) can inhibit spontaneous calcium phosphate formation in vitro by stabilizing an amorphous calcium phosphate (ACP) precursor phase.* (JDR: 4)

As with Example (1), the sayer and receiver are identified in the clause. However, the sayer "the bone grafting" is not actually represented through human agency, but as a signal (Simpson, 1993; Halliday, 1994) indicating the researchers' recommendation. In other words, the researchers' mindset is conveyed to the clause where the act of recommendation occurs through a passive voice. The receiver in this situation is the reader, who is "recommended in immediate implant placement case." In Example (2), the clause represents a case of verbiage, where a nominal group functions as a participant in the process (Halliday, 1994), because the verb "have shown" is the source of the projection addressing the "native phosphorylated full-length porcine amelogenin (P173) … calcium phosphate (ACP) precursor phase" as verbiage.

Implications constructed upon verbal processes could be linked to the writers' authoritativeness, which is significant in strengthening their argument under discussion as follows.

(3) *A limited number of in vivo studies have **discussed** the prevalence of middle canals in root canal systems of mandibular molars.* (JOE: 11)

(4) *We previously **reported** a systemic hyperinflammatory response to bacterial lipopolysaccharide (LPS) in children with localized aggressive periodontitis (LAP).* (JDR: 6)

"A limited number of in vivo studies" in Example (3) was found as Move B to point out the research gap as the sayer. The verbiage "the prevalence of middle canals in root canal systems of mandibular molars" precludes the new discovery of dental treatment, which strengthens the purpose of the study. According to Yang (2004), verbal processes are mostly found in political speeches while responding to news reporters as they transmit both the source authenticity and the speakers' trustworthiness. At this

juncture, the effect of verbal processes make the utterances authentic and persuasive to readers. This can be seen from Example D, where the sayer "we" represents a renowned group of researchers, and the verbiage "a systemic hyperinflammatory response to bacterial lipopolysaccharide (LPS)…" is used to reassure readers the significance of their preceding study.

4.2.4 Existential process

Existential process clauses characterize the existence of an entity with only one participant. The participant, or existent, is realized by its subject "there." While the other types of processes involve a relationship between participants and circumstances, existential processes diminish human agency and dislodge the relationship between entities. The present study shows that the mean percentage of existential processes was the lowest in total.

(1) ***There was*** *no statistically significant difference in retention status for subjects having resin-based fissure sealant with adhesive and glass ionomer sealant in both periods of evaluation.* (MDJ: 12)

(2) ***There were*** *no significant differences between EndoVac, EndoActivator, and the passive extrusion groups.* (JOE: 8)

In Examples (1) and (2), the existents "no statistically significant difference" and "no significant differences …" are respectively considered as solitary participants without circumstances. Since there is no human agency to manipulate actions or processes, the clause becomes objective at the discourse level. In fact, Simpson (1993), Halliday (1994), and Thompson (2000) reiterated this point sowing that the degree of objectivity is highlighted while using existential processes. In spite of this, the lowest percentage in the present study reveals that the use of existential process is only occasional in the IDRAAs. When compared to the IDRAAs, the three-fold increase of existential processes (14.94%) found in Move B in the TDRAAs fosters a cautious optimism with respect to the pedagogy in ESP.

4.2.5 Relational process

The present study revealed that the second highest percentage of process types was relational process clauses. The definition of relational processes has to do with "being," which denotes the relationship between two entities and is mainly informative in scientific writing (Halliday & Martin, 1993). Relational processes can be subdivided into attributive and identifying relational processes, with the present study including both subtypes of relational process clauses. The difference between attributive and identifying relational processes can be seen from the potential for reversibility (Simpson, 1993; Halliday, 1994; Martínez, 2001; Flowerdew, 2013) as illustrated below (see Tables 4.13 and 4.14).

Table 4.14: Attributive relational process

Carrier	Pr : Relational	Attribute
The distance between the implant shoulder to 1st BIC	***was***	*2.51+0.7mm (lingual sites) compared to 3.64+0.8 mm for buccal sites (p < 0.0001). (JCP :3)*

Table 4.15: Identifying relational process

Type	Pr : Relational	Token
Symptom relief	***was***	*the primary expectation or an equally important expectation amongst the remaining 117 patients (OO:1)*

Regularly, the attributive relational process is used to elaborate scientific knowledge in dentistry, dental procedures, and the existence of significant findings. There are instances where the carriers are accompanied by the attributes as follows.

(1) *For ACC and CPS, the MIC value for S. Mutans **was** identical, and the MBC **was** similar with only a 1-step dilution difference (1:2).* (JDR: 1)

(2) *Over 20% of patients **had** multiple complex coronary lesions.* (JCP: 23)

(3) *Patient position **had** no effect on the efficacy of anesthesia of the IANB by direct technique.* (MDJ: 3)

The relational process clauses in Example (1) are attributive as the two carriers "the MIC value for S. Mutans" and "the MBC" are described as "identical" and "similar," respectively. These attributives signify new information for readers and are considered as irreversible when the position of the carrier and attribute cannot be relocated.

Defining terminology through identifying relational processes in dentistry may be required to give readers sufficient background within the condensed space of abstracts. Identifying relational processes mostly appeared when the clarification of key terms was needed in a complicated scientific experiment. The definitions of the terminology or descriptions provided relevant information to help readers understand the important issues under discussion as follows.

(4) *Decreased ADAM-0 expression in OLP epithelium **suggests** reduction of epithelial differentiation, whereas enhanced PCNA expression in OLP epithelium **suggests** induced epithelial proliferation.* (CDJ: 20)

(5) *Without dilution, F68 sealer **showed** the significantly highest cell viability (at 79%) among the experimental sealers.* (MDJ: 2)

(6) *The specimen treated with distilled water **demonstrated** the most far liquid penetration into the center of the specimen, followed by the slurry water and microfilm, respectively.* (MDJ: 4)

Example (5), for instance, represents identifying a relational process because the identifier "F68 sealer" is described as "the significantly highest cell viability (at 79%) among the experimental sealers." The description provides specific information to help readers understand the prestige of the F68 sealer when compared to other types of root

canal sealers. Example (6) shows that the identifier “the specimen treated with distilled water” was identified as “the most far liquid penetration into the center of the specimen.” It is apparent that the identifier and the identified drawn from the examples given could be reversible and similar in meaning. Identifying a relative process is a means of providing information for topics under discussion and for enriching the argumentation in the making.

According to Halliday and Martin (1993), relational processes relegate actions into nominalizations and diminish the use of human agency, with the proposition that one entity affects the other in a clause. In other words, writers decline the involvement of human agency and focus more on the relationship between two entities, presenting information in terms of factual contribution. Throughout the datasets, relational processes serve as supplementary descriptions to material processes, characterizing texts as more informative and less mechanical.

4.2.6 Moves and comparison of process types

Abstracts are considered a viable gateway for researchers to present their original contribution to the world of scientific knowledge. Transitivity analysis entails assessing the generic pattern (BPMRD) of the abstracts with ideational transmission characterized by rhetorical moves. Also, it is broadly acknowledged that scientific writing can be materialistic, objective, neutral, and passive (Nwogu, 1997). The findings from the transitivity analysis in the present study suggested that the dental research article abstracts consisted of various types of processes, and provided empirical evidence that scientific writing is not simply objective.

In other words, the importance of categorizing transitivity focuses attention on the realization of the stylistic features whether the text is represented as objective (material, existential), subjective (mental), informative (relational process), persuasive, or argumentative (verbal). Throughout the datasets, material processes were the most prominent, which reflects the worldview of dental researchers as outcome-based and objective. Relational processes are used to clarify significant information for readers and establish the relationship between two entities. More than 75% of the datasets comprised material and relational processes, with the latter complementing the prominent use of material processes, leaving the impression that objective and informative styles were mostly used. On the contrary, mental and verbal processes were occasionally used to

present a persuasive and argumentative tone. Though existential processes are deemed objective with respect to the there-construction and solitary participant, their lowest percentage could suggest the stylistic preference of dental researchers to use more material processes to describe what has been done rather than what exists.

While genre analysis can reveal rhetorical moves based on communicative purpose, transitivity is associated with the researchers' mental representation construed by the process clauses used. Based on the different types of processes, the clauses could convey different tones; for example, Move B includes apposite information for readers to understand the background and rationale of the research study. This study revealed that relational processes, followed by material processes, were mostly used in Move B of both datasets, suggesting an informative and objective writing style. The move resonates with Swales's (2004) notion of the introduction calling readers' attention and characterizing the specificity of the research. Arrington and Rose (1987) also pointed out that the introduction consists of a mixture of an authoritative and sincere stance. In TDRAAs, however, existential processes are frequently used more than mental processes in the third order. It is possible that TDRAAs recount the research study objectively while IDRAAs remain subjective. The rarity of verbal processes in Move B indicates that authoritativeness is not well-versed by Thai writers while discussing or criticizing relevant issues through a review of the literature and previous studies.

For Move P, both datasets comprised mostly material and mental processes as they encompass the action and determination of the research studies. While relational and verbal processes were rarely used, there was no existential process in Move P of both datasets. This similarity suggests that the stylistic features in both datasets are comparable whenever Move P is written.

For Move M, the percentage of material processes was highest because dental researchers illustrate a means of performing the research procedures and a description of the research tools and advanced technology. Most material processes are constructed with the passive voice and an agentless structure, focusing on how research is conducted, how the samples are collected and selected, and how the data are statistically analyzed. This move has a low frequency of mental and existential processes. However, the main difference found in the TDRAAs and IDRAAs was the incidence of relational processes found in the former and that of verbal processes found in the latter. These imply that

TDRAAs maintain an informative style, while IDRAAs prefer to articulate what is completed while describing the research procedures.

Move R usually reports the results and relates to the statistical analysis alongside the writers' judgment, interpretation, comments, and opinions (Brett, 1994). Apparently, verbal processes are more frequently used to express the researchers' personal voice when compared to the previous moves. However, both datasets showed that relational processes had the highest percentage, followed by material processes and existential processes. This concludes that DRAAs still report findings with an avoidance of subjective evaluation and aim instead at clarification of the results. Specifically, while IDRAAs informatively explain the results through the major use of relational processes, TDRAAs account for more material processes to simplify the results.

In Move D, most scientific writers usually interpret data in relation to other studies to establish innovative knowledge, original contribution, or the research implications (Basturkmen, 2012). Relational processes are primary premises of the writers' withdrawal from their idiosyncrasy, while material processes are evidently shown as the researchers' objective preoccupation. By contrast, both datasets in the present study had low percentages of mental processes where the provision of persuasiveness and argumentativeness was established. The occurrences of mental processes, nonetheless, may not be perceptible compared to the number of verbal processes extensively manifested in the IDRAAs. However, the occurrences of mental processes were higher than verbal processes in the TDRAAs. When compared to the other moves, the higher percentages of verbal processes in Moves R and D indicated that the IDRAAs vocalized their contribution to readers and suggested implications for further studies. Also, it should be noted that the percentages of existential processes in Moves R and D of the TDRAAs were double those of the IDRAAs. This final remark indicates that TDRAAs prefer to use the there-structure with the absence of human agency to report and discuss results.

4.2.6.1 Ideational transmission in Background move

One of the communicative purposes in Move B is to establish a niche or to address any existing problems of the research presented. It is found that this move mainly comprises relational processes, followed by material processes. Since relational processes carry the tonal style of informativeness, the relatively high frequency of

relational processes may stem from an attempt to be accurate and elaborative regarding the relevant literature. Of the most intriguing aspects is the use of existential and mental processes in the TDRAAs. When comparing, IDRAAs rather avoid using existential processes, while TDRAAs have a greater number of existential processes. The relatively high frequency of existential processes may stem from the writers' endeavoring to be unbiased while elaborating this move. IDRAAs, on the other hand, have a greater number of verbal processes, which are used to account facts interactively. The difference in process types found between the two datasets may be caused by the modesty of Thai society and by the lack of pedagogical guidance, where appropriateness at the semantic level is also required to achieve the communicative purpose.

(1) *Nonetheless, the implant retained prosthesis* ***requires*** *additional hygiene procedures to keep the prosthesis, retentive elements free of debris…* (MDJ: 14 - Mental)

(2) *These methods* ***require*** *experienced oral medicine specialists/pathologists, especially when the clinical appearance is equivocal.* (SWU: 14 – Mental)

(3) ***There are*** *always periodontal lesions remaining after scaling and root planning in the phase I periodontal treatment that may indicate for re-root planning…*(SWU: 2 – Existential)

(4) ***There are*** *several factors that contribute to the success of restoration for endodontically treated tooth.* (SWU: 13 – Existential)

(5) *Recently, we* ***reported*** *that in mandibular molars contracted endodontic cavities (CECs) improved fracture strength compared with traditional endodontic cavities (TECs)…*(JOE: 1 – Verbal)

(6) *A limited number of in vivo studies have* ***discussed*** *the prevalence of middle mesial canals in root canal systems of mandibular molars.* (JOE: 11 – Verbal)

4.2.6.2 Material process and Result move

Although Move R is commonly perceived as a means to report findings through report verbs, process types of transitivity demonstrate that there are various means to report results. Relational processes have the highest frequency in the two datasets, followed by material and existential processes. Surprisingly, verbal processes that represent a sense of "saying" are of limited use. One of the most intriguing findings with Move R was the twofold higher frequency of material processes in the IDRAAs when compared to the TDRAAs. This implies a particular style used by international writers, who focus more on causative actions to research byproducts than the byproducts themselves.

(1) *Interestingly, the 30º impact in the distal position* ***delivered*** *approximately 16 times more microbeads…* (JDR: 2 – Material)

(2) *The GH carrier containing OP3-4 with BMP-2* ***enlarged*** *the radio-opague area…*(JDR: 9 – Material)

(3) *No changes were* ***observed*** *with time prolonged, except the durability* (DM: 5– Material)

(4) *CD44+SSEA-4+ cells* ***exhibited*** *cancer stem-like properties, including extensive self-renewal into the bulk of cancer cells.* (OO: 21 – Material)

(5) *At the 4-mm level, groups A and B* ***produced*** *significantly higher PGFA than all other groups…*(JOE: 20 – Material)

(6) *The dual sputtering deposition technique* ***created*** *a HA/ TiO_2 hybrid structure.* (DM: 24 - Material)

(7) *Anti-TNF-α and antiseptic therapies* ***prevented*** *the development and exacerbation of infectious-PD.* (JCP: 20 – Material)

4.2.6.3 Verbal process and Discussion move

Although Move D in each dataset was not statistically different, there are some points worth discussing regarding the cultural contexts. Move D is considered a viable channel for the writers' discussion for pointing out implications, recommendations, and research suggestions. In addition, verbal processes are used to interpret, evaluate, and persuade readers of the research presented to aid them to recognize its contribution to the world of dentistry. When compared to other moves, it is ostensible that the number of verbal processes was relatively increased in this move in both datasets, but the IDRAAs had the higher number of occurrences. International writers thus seem to focus more on knowledge construction and implications (Hunston, 1994; Zheng et al., 2014). Since the international dental discourse community is more competitive and larger than that of the Thai dental discourse community, greater persuasiveness is thus required for international writers to highlight original knowledge and to prove their study's contribution to dental technology or even to suggest a connection or development between the findings and the research gap they uttered in Move B. As Thai dental writers belong to a smaller sized dental discourse community, persuasiveness may not be required as much as it is for international writers. To enhance this point, the following examples demonstrate some typical verbal processes frequently found in IDRAAs.

(1) *This study **suggests** that occlusal surfaces without frank cavitation (ICDAS 0-4) that are sealed with a clear sealant can be monitored with ICDAS, QLF, or DIAGNOdent, which may aid in predicting the need for sealant repair.* (JDR: 15)

(2) *We **concluded** that faster changes in QLF variables can indicate lesion progression toward cavitation and be more clinically relevant than actual QLF values.* (JDR: 19)

(3) *These results **suggest** that SHP may mediate BMP2 signaling to promote mineralization of the dentin matrix.* (JDR: 20)

On the other hand, the relatively higher frequency of mental processes in Move D characterizes the humbleness of Thai society and underlines its trend toward "reader responsibility" (Hinds, 1987). When compared to IDRAAs, Thai writers are not directive, but rather are concerned with the involvement of human consciousness or individual feelings while discussing results. Besides, Thai writers are inclined to use hedges with mental processes. Regarding politeness theory (Brown and Levinson, 1987), the use of hedges ("could" and "should") is used to save the readers' negative face as it demonstrates that the writers do not impede their individual space.

(1) *…this method could be **considered** as an alternative technique to luted fiber post within root canal.* (CDJ: 22)

(2) The addition of osteoinduction agent should be **considered** to increase new bone formation to achieve the optimal level in clinical use. (SDJ: 9)

4.2.7 Statistical results

4.2.7.1 Chi square and effect size

Since the difference in frequency is based on descriptive statistics, this section shows how inferential statistics could be used to strengthen the discussion. Chi square statistics were used to compare the frequencies of process types at the dataset and move levels. It should be noted that the behavioral process scarcely appears throughout the datasets, and it is was decided to exclude this process from the statistical analysis as its low frequency could have affected the reliability of the results.

(1) Chi square (datasets)

This section attempts to use statistical calculation to evaluate the association between process types and moves in each dataset.

Table 4.16: Chi-squared transitivity: TDRAAs

Process Types	Moves					Chi.Sq. (Sig.)	φ_c
	B (N=87)	P (N=90)	M (N=641)	R (N=435)	D (N=176)		
Material	28.8	60.0	87.3	25.7	32.4	722.159* (0.05)	0.36
Mental	13.8	31.1	3.6	1.8	9.7		
Relational	41.4	6.7	8.0	56.3	47.7		
Existential	14.9	0	0.8	9.1	2.3		
Verbal	1.1	2.2	2.3	7.1	7.9		

According to Table 4.16, this relationship was unlikely due to chance, since when the significance threshold was set at .05, the results showed that there was an association between the moves in the TDRAAs and the process types. According to Cramer's V, the magnitude of the size effect was medium and the maximum possible variation between the moves and the frequency of the process types was 36%.

Table 4.17: Chi-squared transitivity: IDRAAs

Process Types	Moves					Chi. Sq. (Sig.)	φ_c
	B (N=135)	P (N=136)	M (N=496)	R (N=497)	D (N=213)		
Material	32.6	72.8	86.1	43.5	32.0	496.117* (0.05)	0.28
Mental	6.7	22.1	5.1	2.0	4.2		
Relational	51.9	2.9	8.8	44.6	46.9		
Existential	4.4	0	0	5.1	1.4		
Verbal	4.4	2.2	0	4.8	15.5		

According to Table 4.17, this relationship was unlikely due to chance, since when the significance threshold was set at .05, the results showed that there was an association between the moves in the IDRAAs and the process types. According to Cramer's V, the magnitude of the size effect was small to medium and the maximum possible variation between the moves and the frequency of the process types was 28%.

As with Tables 4.16 and 4.17, the communicative chi-squared analysis revealed that the moves were associated with process types in both datasets. In other words, regardless whether the sources are collected from Thai or international dental journal abstracts, the process types are alternatively used based on the communicative purpose identified in each move. For example, Move B mostly comprises relational processes, while material processes are eminently used in Moves P and M. Since the association between moves and process types was statistically significant in the TDRAAs (722.159) and IDRAAs (496.117) at p = 0.05, this affirmed that the moves were constructed upon different ideational transmission.

(2) Chi square (moves)

Though the statistics at the dataset level revealed that overall the moves were associated with the process types, it could not foresee whether the process types appearing in each move were associated with journal types. Chi-squared analysis was thus used to justify if there was an association with the process types (material, mental, relational, verbal, and existential) appearing in each move and journal type (TDRAAs and IDRAAs). Note that effect size cannot be calculated (N/A) if the Chi-squared analysis is not statistically different.

Table 4.18: Chi-squared Background (B(T)= Thai, B(I)= International)

Process Types	Journal Types		Chi.Sq (Sig.)	φ_c
	B(T) (N=87)	B(I) (N=135)		
Material	28.7	32.6	12.934* (.05)	0.24
Mental	13.8	6.6		
Relational	41.5	51.9		
Verbal	14.9	4.4		
Existential	1.1	4.4		

Table 4.19: Chi-squared Purpose (P(T)= Thai, P(I)= International)

Process Types	Journal Types		Chi.Sq (Sig.)	φ_c
	P(T) (N=90)	P(I) (N=136)		
Material	60	72.9	4.737 (.05)	N/A
Mental	31	22		
Relational	6	2.9		
Verbal	0	0		
Existential	2	2.2		

Table 4.20: Chi-squared Methodology (M(T)=Thai, M(I)= International)

Process Types	Journal Types		Chi.Sq (Sig.)	φ_c
	M(T) (N=641)	M (I) (N=496)		
Material	87.4	86.1	7.145 (.05)	N/A
Mental	3.6	5.0		
Relational	7.9	8.9		
Verbal	0.8	0		
Existential	0.3	0		

Table 4.21: Chi-squared Result (R(T)=Thai, R(I)=International)

Process Types	Journal Types		Chi.Sq. (Sig.)	φ_c
	R(T) (N=435)	R(I) (N=497)		
Material	25.8	43.5	34.311* (.05)	0.19
Mental	1.8	2.0		
Relational	56.3	44.7		
Verbal	9.0	5.0		
Existential	7.1	4.8		

Table 4.22: Chi-squared Discussion (D(T)=Thai, D(I)=International)

Process Types	Journal Types		Chi.Sq. (Sig.)	φ_c
	D(T) (N=176)	D(I) (N=213)		
Material	32.4	31.9	9.208 (.05)	N/A
Mental	9.7	4.2		
Relational	47.7	46.9		
Verbal	2.3	1.5		
Existential	7.9	15.5		

When comparing the process types constructed upon each move and journal type, the chi-squared test revealed that only Moves B (Table 4.18) and R (Table 4.21) were statistically significant at p = 0.05 and rejected the null hypothesis. Therefore, Moves B and R were thus associated with the journal type upon which the process types were proportionally constructed. According to Cramer's V (see Appendix E for further explanation), the magnitude of the size effect was considered as small and the maximum possible variations between the journal type and frequency of process types of moves B and R were 24% and 19%, respectively. On the other hand, Moves P, M, and D were not statistically significant at p = 0.05 and thus accepted the null hypothesis, so these moves were not associated with journal types. Based on the statistical results, the focus was on the manipulation of the process types in Moves B and R. These findings raise an appealing point whether it is worth exploring Thai and international dental writers use of alternative types of processes for Moves B and R. Besides, regarding Table 4.20, the fact that the relational and verbal processes were inversely used in Move M in the TDRAAs and IDRAAs shows a noticeable difference in the tonal style used by the writers. As with Table 4.21, the material process is frequently used in Move R in the TDRAAs, dissimilarly to that in the IDRAAs, where the relational process is eminent. These findings from the two datasets underline how transitivity analysis can be used to determine the alternative style of ideational transmission and is worth exploring to offer insights for dental students, alongside traditional genre analysis.

4.2.7.2 Inter-coder reliability: Cohen's kappa

Categorizing process types is considered subjective as it also depends on the interpretation of the relationship among processes, participants and circumstances. However, in the present study, good agreement rates between the two coders were demonstrated (see Table 4.23). Overall, according to Table 4.23, the reliability value was nearly 90%, meaning that there was a close agreement. The result of Cohen's kappa (k) analysis (0.852) also pointed out the excellent inter-coder reliability. However, some of the agreement rates were lower than 90% and this might imply how the classification of process types of Moves R and D was of the most problematic. Move M, however, represents the hightest percentage of the agreement rates and demonstrates the least problematic analysis of process types. At this juncture, it could be said that verb choices in Move M are more clear-cut whereas those in Moves R and D could be more difficult to differentiate the process types.

Table 4.23: Inter-coder agreement rates and Cohen's kappa analysis

Moves	Coded Units	Agreement	Disagreement	Percentage
Background	55	50	5	90.9%
Purpose	56	50	6	90%
Methodology	284	274	10	96.67%
Result	233	208	25	89%
Discussion	97	84	13	86.67%
Total	725	666	59	91.86%

Symmetric Measures

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Kappa	.852	.050	.8.985	.000
N of Valid Cases	725			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

To conclude, this chapter reported the significant findings from move analysis and transitivity analysis of the two datasets. Regarding the move analysis, the results mainly covered the move frequency and move sequence in the two datasets. Similarly, the results of the transitivity analysis were described through the distribution of the process types appearing in each move of the two datasets. For comparing the IDRAAs and TDRAAs, statistical analysis was used to determine whether the differences were statistically significant. In addition, calculation of the size effect offered a fresh perspective related to the generalizability, which was beneficial for easing any tensions between the qualitative and quantitative aspects of the present study.

CHAPTER 5
Conclusion and Implications

This chapter summarizes the results of the move analysis and transitivity analysis and discusses the pedagogical implications based on the findings. Since the two datasets were constructed with data from the dental discourse community, similarities and differences regarding the textual analysis suggest a means of gaining a mutual understanding and development of ELT for dental students focus on helping them to write effective research article abstracts, which are key to success in journal publications. The first part of this chapter provides an overview of the similarities and differences in the generic structure in TDRAAs and IDRAAs, where obligatory, conventional, and optional moves are characterized by the move frequencies. The second part of this chapter addresses the similarities and differences between the groups based on transitivity analysis. As the behavioral process was found to be barely used in the DRAAs, only five process types are covered in the present discussion. The third part signifies the implication of the study regarding ESP pedagogy, where move analysis is highlighted as a crucial tool for academic writing in dental research studies. The fourth part concludes with the limitations of the present study and recommendations for future work. The first and second parts also correspond to the two following research questions as aforementioned in the first chapter. Move analysis can contribute to answering research question (1) and its subquestions, while transitivity analysis can contribute to answering research question (2) and its subquestions.

(1) What are the similarities and differences of generic structure as determined by move analysis in TDRAAs and IDRAAs?

  (1.1) What are the move frequencies used in the two datasets?

  (1.2) What are the move sequences used in the two datasets?

(2) What are the similarities and differences in the process types of transitivity used in TDRAAs and IDRAAs?

  (2.1) What are the types of transitivity used in each move in the two datasets?

  (2.2) In what way are the stylistic patterns, based on transitivity analysis, displayed in the two datasets?

5.1 Move analysis

This section aims to answer the first research question: “What are the similarities and differences in the generic structure determined by move analysis in TDRAAs and IDRAAs?” Comparisons are made through move analysis, the linguistic features, and the move sequences.

5.1.1 Move frequency

This section aims to answer the subquestion: “What are the conventional/optional moves used in the two datasets?” The following tables demonstrate that there were four conventional moves and one optional move in the TDRAAs, whereas there were four conventional moves and one obligatory move in the IDRAAs.

Figure 5.1: Comparison of move frequency

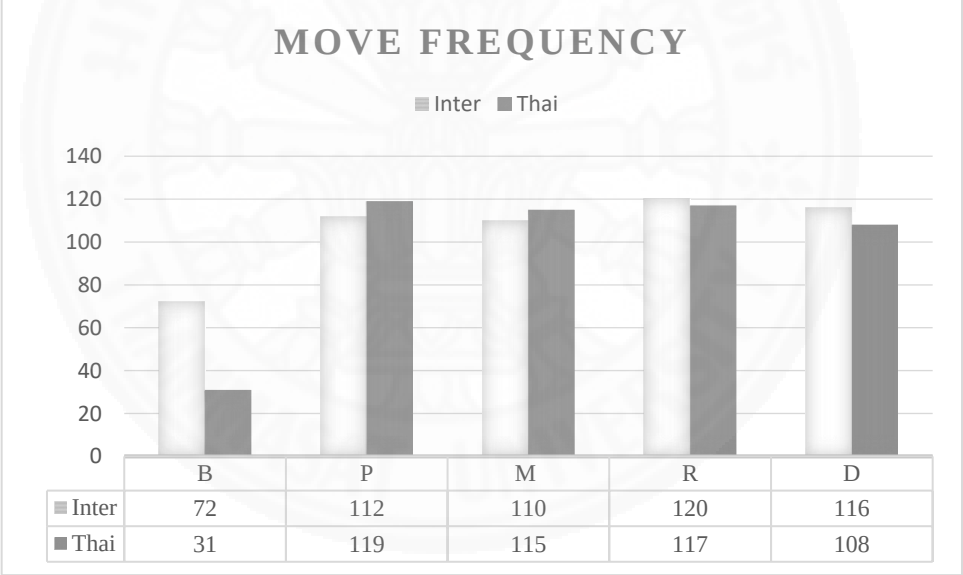


Table 5.1: Generic patterns of TDRAAs and IDRAAs

Moves	TDRAAs	IDRAAs
Background	Optional	Conventional
Purpose	Conventional	Conventional
Methodology	Conventional	Conventional
Result	Conventional	Obligatory
Discussion	Conventional	Conventional

According to Figure 5.1 and Table 5.1, the generic structure of the dental abstracts written by Thai and international writers could be reflected through the move frequency identified by the linguistic features found in both datasets. Both datasets were constructed with a similar structure as can be seen from the conventional and obligatory moves, except for the background move, which was only considered optional in the TDRAAs. The results suggest that IDRAAs, in which the frequency of this move reached approximately a borderline 60%, provide greater context to ensure that readers receive adequate information before proceeding to the subsequent moves.

5.1.2 Move analysis and linguistic features

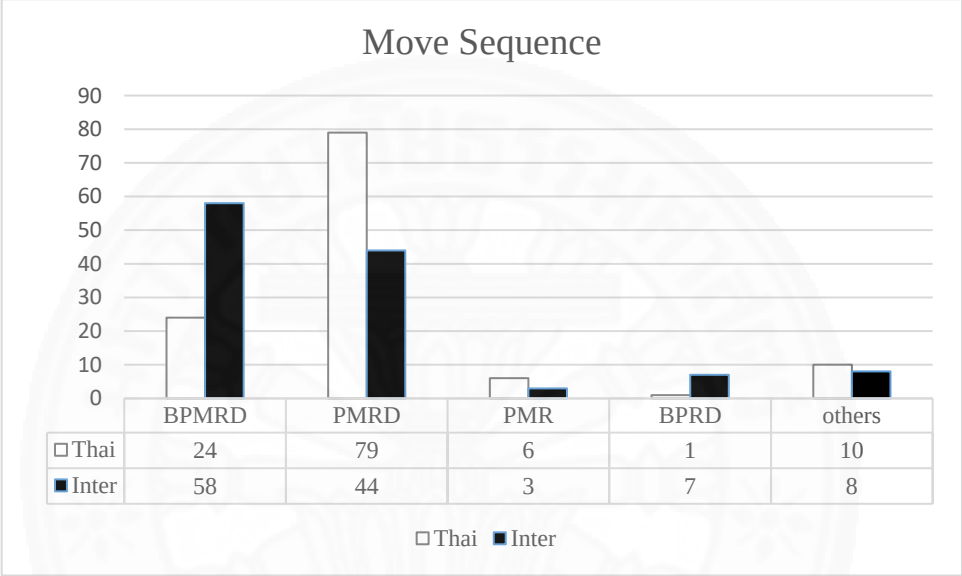
As with the pedagogical value, this study distinguished IDRAAs and TDRAAs with respect to the genre and linguistic features, with the aim that the results could be incorporated into ESP course design for dental researchers and students. The discovery through the linguistic features reiterated the ELT classical quote “one size doesn’t fit all” because it pinpointed similarities and dissimilarities and set out cautious optimism toward the rhetoric used by Thai and international writers. In a genre-based writing course, for example, dental students’ writing should be reinforced though an appropriate means of applying the right linguistic features in research dental abstracts. Though universal instructions for writing academic research abstracts have already been suggested in commercial handbooks or guidelines, each discipline has its own distinctive organizational pattern fitting in with the stylistic preference particularly used in their own discourse community. As can be seen from this present study, the genre analysis from our datasets provides empirical evidence for novice dental writers. Being mindful of these linguistic features emerging in each move, they can pave the way for success in writing RA dental abstracts at the international level. Moreover, learning from these differences can lead dental students to understanding which linguistic features are expected at the international level. Also, dental students can learn from the grammatical errors found from analyzing the linguistic features in TDRAAs. For instance, the discrepancy of tense appearing in it-complement clauses in TDRAAs could result from the unexcused inexperience of the editorial process. On the other hand, the it-complement clause also has a pedagogical value because it is a key indicator for English teachers to focus more on certain grammatical aspects that may not be highlighted in ESP courses

for Thai dental students. As the generic structure and linguistic features are inseparable, it is recommended for ESP instructors show how these two reciprocate each other.

5.1.3 Move sequence

This section aims to answer the subquestion: "What sequences of moves are used in the two datasets?" The answer is provided through Figure 5.2 below.

Figure 5.2: Comparison of move sequence



PMRD was the move sequence mostly found in the TDRAAs, while BPMRD had the highest frequency in the IDRAAs. Now, it is possible that the sequence may be driven by the writers' preference for using Move B or Move P to commence the abstracts. The consequential direction of PMRD is conventional for Thai dental students and proves that they comply with the universal sequences recognized by international writers. However, the highest frequency of BPMRD in the IDRAAs and that of PMRD in the TDRAAs display major differences. Also, the reverse move, such as PBMRD, is rare and was only found in TDRAAs (1.67%).

Another difference was detected through the use of embedded moves. It should be noted that using embedded (P+M) moves, which are more frequently found in IDRAAs, could predict the level of higher-order thinking fostered by grammatical dexterities of the international writers, whose intention is to abridge their experiments within the condensed space of the abstracts (Weissberg & Buker, 1990). Although

experiment-based dental research seems to be rigid by nature, the academic writing is less dull and has a propensity to be open to more writing styles.

There were a few cases of cyclical moves found within the present study. The cyclical moves (M+R) employed in both datasets could be explained as the writers' attempts to separate results into multiple sessions, where each procedure in the research methodology yields a subsequent output. In addition, move cyclicity was considered rare for both datasets and was only used for one study, where the complexity of the research methodology yielded subsequent outputs. The rarity of move cyclicity concludes that dental writers prefer to recount only what matters most throughout their research studies. As abstracts have a condensed space, only selected information is presented and displayed for the intended readers.

Overall, the findings from the move sequence, embedded moves, cyclical moves, and reversal moves raise a question of whether ESP instructors for Thai dental students are aware of these differences, especially the inclusion of Move B as illustrated in IDRAAs. For advanced ESP courses, it is more challenging for the instructors to encourage students to realize the possibility of using embedded moves to correspond with the condensed space of abstracts.

5.2 Transitivity analysis

This section aims to answer the second research question: "What are the similarities and differences in the process types of transitivity used in TDRAAs and IDRAAs?" Comparisons were made through analysis of the frequency of the process types and stylistic patterns found within each move in the two datasets.

5.2.1 Frequency of process types

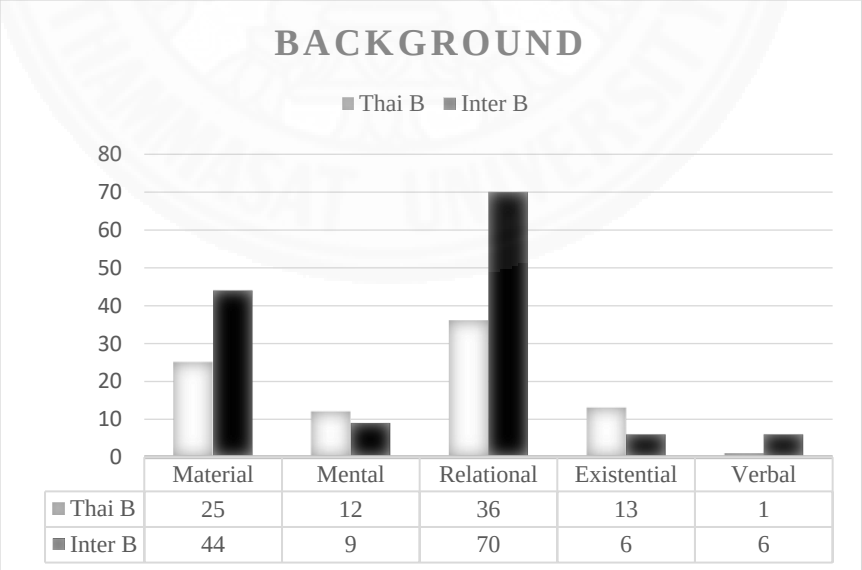
This section aims to answer the subquestion: "What are the types of transitivity used in each move in the two datasets?" The answer is provided through Figures 5.3, 5.4, 5.5, 5.6, and 5.7, with each demonstrating the number of process types appearing in each move in the two datasets.

At the outset, transitivity analysis was performed to understand the writers' ideational transmission based on a comparison of the process types in the rhetorical moves. In light of the genre analysis, each rhetorical move has its own communicative purpose, which can serve to help understand the ways of communicating in a discourse community. As can be seen from the findings, various types of processes were used to

communicate with readers. Comparison of the transitivity analysis results between the IDRAAs and TDRAAs offered some pedagogical implications for Thai dental researchers because the stylistic differences between the two datasets triggered cautious optimism, where appropriateness is required to achieve a successful abstract writing. Though BPMRD is a broad perception of the generic structure used in research article abstracts, the transitivity analysis indicated how the texts were formed stylistically. Therefore, it is important to raise the awareness of ESP teachers on how to choose and identify the types of processes according to the "voice" preferred and recognized by international publishers. To successfully achieve international publication, the provision of transitivity types and concrete examples could be emphasized so that Thai dental students and/or researchers would better understand how a syntactic structure matters to the corresponding readers, if not specifically at the discourse level.

Of greater interest was the different percentages of process types found in each move in the IDRAAs and TDRAAs since each move is associated with a unique communicative goal and characterized through various degrees of subjectivity, objectivity, persuasiveness, informativeness.

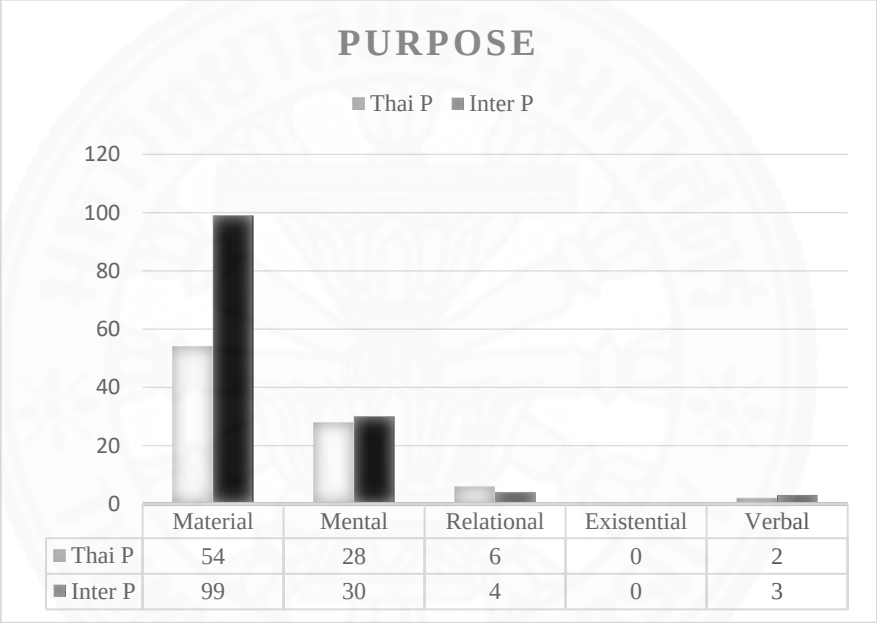
Figure 5.3: Comparison of process types: Move B



	Material	Mental	Relational	Existential	Verbal
Thai B	25	12	36	13	1
Inter B	44	9	70	6	6

Move B primarily offers readers relevant background information through the introductory content or specifies the research gap for the specific questions to be investigated in an informative and elaborative style (Arrington & Rose, 1987). Since a relational process is the clause of "being" by establishing an association between two entities, being either attributive or identifying, its relatively high frequency was not surprising as it was used to represent the tonal style of informativeness throughout this move in both datasets.

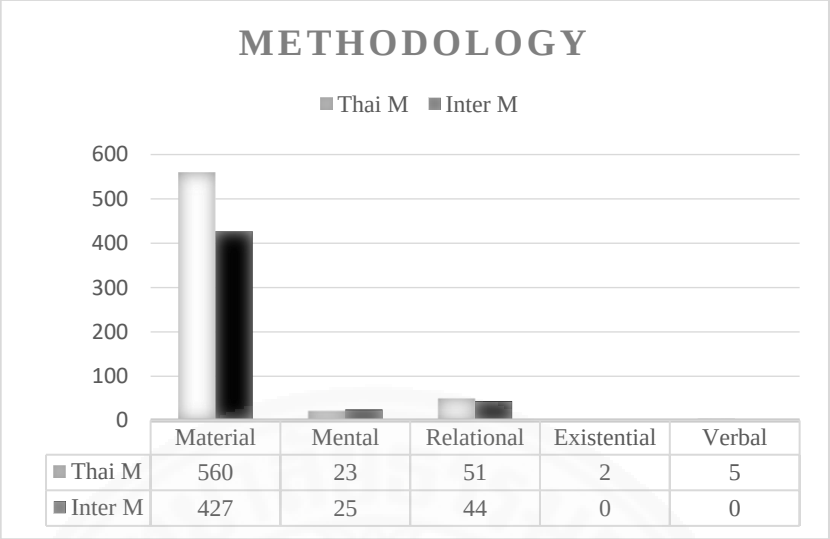
Figure 5.4: Comparison of process types: Move P



	Material	Mental	Relational	Existential	Verbal
Thai P	54	28	6	0	2
Inter P	99	30	4	0	3

Move P mostly comprises material, mental, and relational processes, respectively. It is apparent that this move appears to be written in a similar style in both datasets. Material processes are used to describe purposive actions through the action verbs ("study," "investigate," etc.) of experiments, while mental processes are also frequently used to express the intention and expectation of researchers through mental verbs ("attempt"). There was no existential process used in either dataset.

Figure 5.5: Comparison of process types: Move M



	Material	Mental	Relational	Existential	Verbal
Thai M	560	23	51	2	5
Inter M	427	25	44	0	0

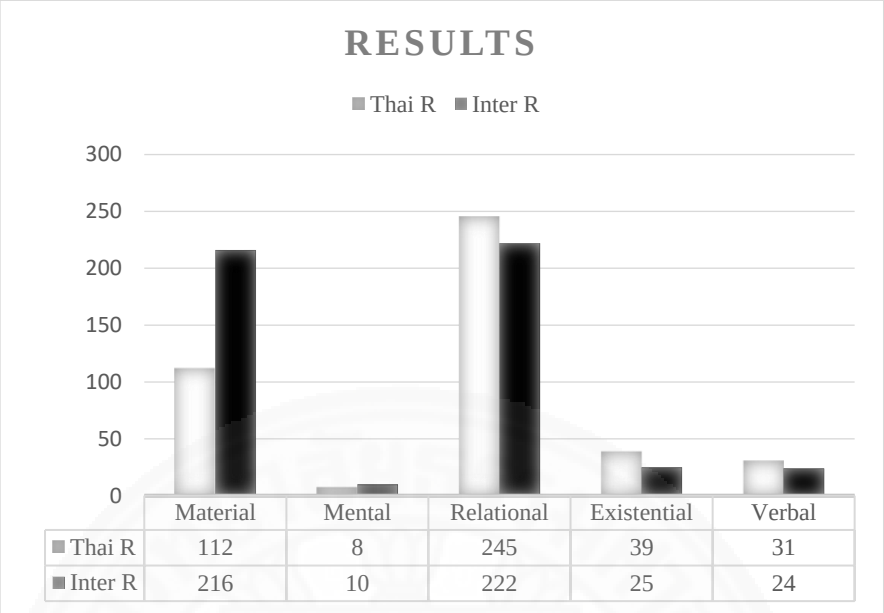
Move M mostly consists of material processes, involving clauses of "doing," with actions reported through agentless clauses (passive voice). It is acknowledged that this move is expected to be written in terms of a detailed description of the research methodology, research instrumentation, implementation, sampling methods, and statistical devices used to support the generalizable findings. By doing so, this move represents object-oriented processes and lacks interpersonal clauses, like mental and verbal processes, which have lower frequencies. Relational processes were used in both datasets to strengthen their utterances. Note that only the TDRAAs used existential processes to represent the writers' detachment toward their utterances. Nevertheless, the eminence of material processes throughout this move contributes to the writers' avoidance of subjective clauses as can be seen from the characteristics of interpersonal utterances built upon the use of mental and verbal processes.

(1) *Two-hundred and forty-two Thai dentists were **asked** to decide which smile in each set is more preferable.* (CUJ: 3 - Verbal)

(2) *Patients with implant retained facial prosthesis are **instructed** to follow hygiene protocol advocated in Maxillofacial Prosthetic Service, Mahidol Unviersity.* (MUJ: 14 - Verbal)

(3) ***There were** two sets of the materials: one for parents and the other for their child.* (MUJ: 33 - Existential)

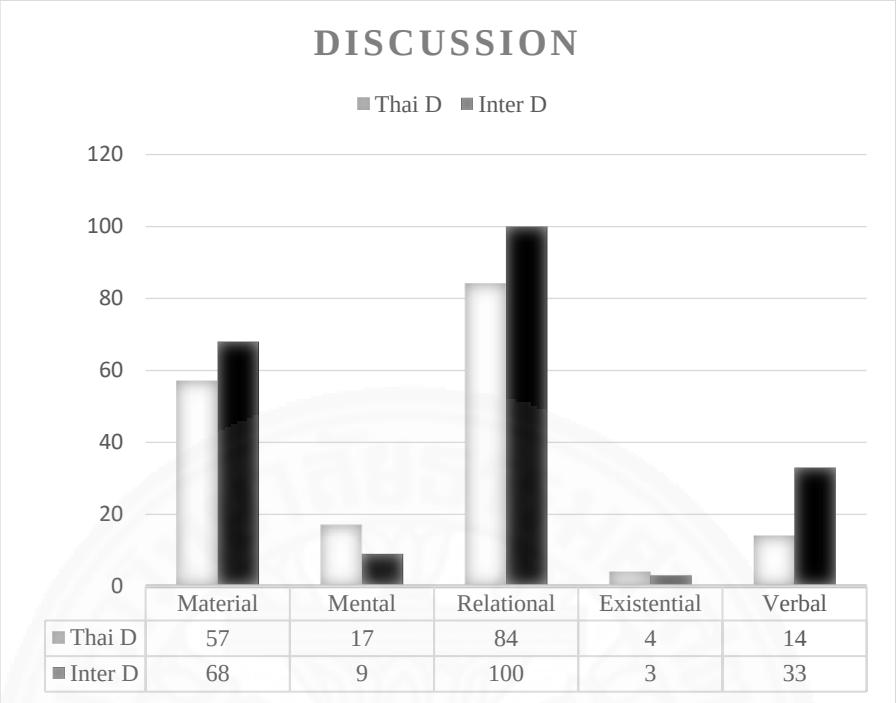
Figure 5.6: Comparison of process types: Move R



	Material	Mental	Relational	Existential	Verbal
Thai R	112	8	245	39	31
Inter R	216	10	222	25	24

Move R is significant for displaying the results and new findings, where they are observed, evaluated, and interpreted by researchers through the use of descriptive or inferential statistics (Brett, 1994). The highest occurrences in the present study were relational processes, respectively, followed by material processes. It could be concluded that the writers depend on relational processes to underline the accuracy of information as well as to explain how the findings are associated with research questions, while also retreating from interpersonal utterances. The low frequencies of mental and verbal processes support the tonal style of objectivity throughout the move. It was noted that both datasets included material processes, but the TDRAAs showed less than 50% usage. It is thus recommended that Thai dental writers should apply more material processes to portray this move.

Figure 5.7: Comparison of process types: Move D



Move D is specifically used for the writers' conclusive evaluations, assessment, suggestions, implications, and recommendations based on the research findings. It is also used to establish original knowledge or the contribution to dental communities as pointed out by Hunston (1994), who stated how Move D supports the construction of knowledge based on the relevance of the findings. In fact, relational processes are apparently foregrounded as writers attempt to retreat from a personal viewpoint and, instead, express their thoughts objectively. Though verbal and mental processes are relatively higher compared to the other moves, interpersonal utterances are still avoided by scientific researchers, whose stances must be as objective as possible. However, verbal processes are likely to be found in IDRAAs and this could be linked to the use of the self-mentioning "we" as international writers attempt to involve themselves in their research. Consequently, international writers frequently use particular verbs, such as "suggest" and "recommend," as a means to support the continuation of the research in question as well as a means to suggest practical applications.

5.2.2 Stylistic patterns

This section also aims to answer the subquestion: “In what way do stylistic patterns, based on transitivity analysis, display in the two datasets?” Throughout the transitivity analysis, it reveals that the Thai and the international writers incline to have similar stylistic patterns; however, the differences are found at the level of process types, specifically in Moves B, R and D. Although Move B is informative through the high frequency of relational processes, the recurrent use of existential process may stem either from the modesty of Thai society or from the Thai writers’ lack of guidance for abstract writing. The stylistic pattern in Move R mostly comprises relational processes; however, the higher frequency of material processes in IDRAAs demonstrates that the international writers focus more on the causative actions of research procedures than the byproducts. Finally, the stylistic pattern in Move D is, to some extent, constructed upon the use of verbal processes that the international writers use as a strategy to persuade worldwide readers. In addition to genre analysis, the findings through transitivity analysis can be explained through the context of Thai society and used to facilitate stylistic guidelines for Thai dental students in due course.

5.3 Genre, transitivity and Thai society

At the sentence level, the Thai and English language are different in terms of grammatical structures. Moving into an intuitive level, Thai and English have different cognitive systems affected by their cultural schema and contexts. Although TDRAAs are written in the English language, the writers’ English is considered as an interlanguage, an idiolect of NNES writers, which affects their academic writing. The present study underlines that stylistic differences exist between Thai and international writers. Though English learning is more widespread throughout Thailand through the greater digital literacy of the 21st century, English is still considered as a foreign language (EFL) and the role of L1 transfer in L2 acquisition is still important. Since L1 transfer in L2 acquisition is relevant to stylistic differences, understanding the cultural background of Thai learners is significant. The following issues are worth discussing to explain how Thai culture affects the writing of Thai dental students, if not specifically, their the academic texts.

English has never been fully acquiesced as Thailand's official second language. Thai people are patriotic and proud of their native language since the country was never colonized during the colonialism period. Therefore, Thailand is considered a monolingual country, although Thais realize the significance of English as a lingual franca (ELF), whereby English is used to serve as a medium for supporting globalization, economic growth, and multiculturalism. Since Thais have been living in a monolingual country for a long time, it is quite difficult for Thais, in general, to admit English as their own language. Second language writing is thus challenging for Thais because Thai grammar is different from that of English. English, for example, is an inflected language, where the subjects and predicates change their forms according to tense, aspect, singularity, and plurality. In contrast to English, Thai is an uninflected language, where the subjects and predicates remain the same no matter what the tenses are. In addition, there are some mismatches regarding English contrastive discourse markers, which cannot be replaced by those of Thai language (Permpikul, 1999). At the beginning, these inflections and mismatches confuse and dismay Thai learners. In fact, it is common for beginners to make grammatical mistakes as soon as they abide by the rules of subject-verb agreement, regular/irregular verbs, modalities, and the tenses in English language. On top of that, although the Thai government has policies and plans in place for developing English proficiency for Thai people; however, the policies are, for the most part, ineffective and changeable. This makes English education static and more distant toward Thais. It is not surprising that Thai people, in general, normally see English as a "foreign" language.

Regarding humbleness in Thai society, this trait derives from three key factors: Buddhism, Confucianism, and family ties. Most Thai people are Buddhists, and Buddhism widely encompasses Thai society in terms of philosophy, belief, and teaching. Only the minority of Thais are Islamic, Christian, or Hindi. Since Buddhism encompasses the Thai kingdom, the doctrines of Buddhism affect the way Thais live. One of the Buddhist ideals is to strive for harmony by avoiding conflict. Thus, entrenched in Buddhist teachings, Thais become humble and less competitive in order to achieve peace and reconciliation. Buddhist teachings are rooted in Thailand, which is recognized as the "Land of Smiles" because Thais are famous for their generosity compared to other cultures. Buddhists believe in "good deeds" by making merit or by donating to charities

based on the idiomatic expression “to put yourself in someone else’s shoes.” They also believe in karma and the consequences of individual actions toward others. In addition to Buddhism, Thais are predisposed by Confucianism, which is overwhelmingly common throughout many Asian countries. Because Confucianists conform to seniority, dignity, and hierarchy (Connor, 1996; Loi and Evans, 2010), as also illustrated by the SOTUS system, it is considered a cultural tradition, whereby Thais respect their seniors and it is considered taboo to disregard or argue with their elders.

As with family ties, it is common to see Thais pay respect to their elders, parents, and senior family members. Moreover, Thais also use kinship terms, not only with their real family members but also with their neighbors, colleagues, or classmates, to build intimacy with them (Kanoksilapatham, 2007). Since family ties are hierarchical by age, it is authoritative that children need to listen to their parents and follow their advice. For instance, children are disallowed to express contrastive opinions as it is deemed rebellious and inappropriate and a subsequent penalty could possibly befall following such behavior. The authoritativeness represented through family ties extends to the traditional orthodoxy of authorities in Thailand, especially in teacher–student relationships. Teachers are authoritative and revered in class. Students need to be obedient and to believe in any information given passively. The authoritativeness of the educational system is instilled from generation to generation and has resulted in passive, or spoon-fed, learning in Thai education.

Overall, Thai society is unique as Buddhism, Confucianism, and family ties play vital roles. These philosophical values elicit a means of Thais’ attempt to maintain balance and harmony in Thai society. All of these reflect the respectful attitude of Thai writers, whose linguistic behavior is idiosyncratic. They avoid pointing out research gaps in previous literature because they consider each piece of work as a production of authority, paving the way for other research fellows, to whom they should be respectful and obedient. However, if a research gap is ostensible, they prefer to use writing strategies, such as hedges or mental or existential processes, to avoid any face-threatening acts in Move B. The humbleness of Thai society could be envisioned in Move D, as Thais being considerate by using hedges with mental processes. When compared to IDRAAs, the findings from TDRAAs could contribute to the concept of world Englishes (Jenkins, 2014), as a place to appreciate Thais’ idiolect of English (Chanawangsa, 1986; Indrasuta,

1987; Pavinee, 1989; Burusphat, 1991). Additionally, for many Thais, native-likedness may represent a positive image (Sa-nguanwonk, 1981), while it is not always "complimentary" for some (Nyuyen, 2011).

> "It has become 'localised' or 'nativised' by adopting some language features of its own, such as sounds, intonation patterns, sentence structures, words and expressions."
>
> (Jenkins, 2014, p. 26)

5.4 Pedagogical implications

This section describes three aspects of the pedagogical implications derived from the present study. The first aspect describes how genre and transitivity can be integrated to establish guidelines for abstract writing at the international level. The second aspect points out the influence of global Englishes and the status of NNES writers in the 21st century, where they might challenge existing academic conventions. The third aspect demonstrates some pedagogic practices that can be adopted to ESP course design.

5.4.1 Guidelines for dental abstracts

Genre analysis is recognized as useful analysis for academic writing as can be seen from its various disciplines. The literature provides evidence that each discipline can share similar organizational structures but differ in terms of the move occurrences and sequences. Similarly, this study affirms that Thai and international abstracts share similar generic patterns, but they are different in the numbers of move occurrences and sequences. The findings from this study could also contribute to improving academic writing in dentistry, which has been barely investigated with respect to genre analysis and from a stylistic perspective. In addition, transitivity analysis could be integrated with genre analysis to unveil some lexicogrammatical perspectives that could contribute to the writers' worldviews characterized by different types of processes. The results from the present study thus affirm that genre analysis is important to understand the communicative purposes represented through rhetorical variations. Without exception, the present study demonstrates that two datasets from different sources of dental discourse communities might share similar generic patterns, while at the same time having minor dissimilarities in terms of the move frequencies and move sequences. It

may be worth exploring other dental communities in other nations to point out rhetorical variations where cultural dimensions could affect the writing style. Within the same move, transitivity raises an appealing point of discussion where lexical choices could lead to a writer's alternative point of view. Transitivity analysis in the present study revealed how the communicative purpose can be realized by different process types. The use of transitivity triggers an awareness of the lexicogrammar, where the meaning is shaped by the situational context as well as by the choices in language (Flowerdew, 2013, p. 13).

One of the reasons that linguistic features should be scrutinized is that a communicative purpose could be associated with genre performance. According to Devitt (2015), communicative purposes and tasks could be perceived as similar in general, but with variations at the microstructure level due to the writers' level of English proficiency, or genre performance, and immediate responses toward situations uttered (p. 47). Linguistic variations found through such a comparison can serve as parameters for Thai dental writers to recognize the significance of genre performance as well as to improve their English proficiency.

In the framework of the BPMRD nomenclature, it was demonstrated that both datasets in the present study mostly shared both conventional moves and process types of transitivity. The use of some moves, for instance, Move M, demonstrated that particular subcategories are closer in generic and transitivity structures than others are. These similarities and differences mirror the uniqueness of the discourse community and the cultural influences of Thai and international dental journals. Tables 5.2, 5.3, 5.4, 5.5, and 5.6 (see below) illustrate the international writers' preferences, encompassing move frequency, move sequence, linguistic features, process types of transitivity, narrative tone, formulaic sequence, and general remarks derived from the present study's multimodal analysis. In light of these guidelines, writing a successful dental abstract should be feasible for any potential dental writer.

Although the numbers of samples and the move and transitivity raters were modest, according to size effect calculations, the present study presents an authentic reflection of abstracts at the international level, which ESP instructors should thus take into account when teaching English to Thai dental students. Regarding experiment-based research, the samples used in the present study still include diverse subdisciplines ranging

from clinical research to oral medicine, where the former is rather more tangible than the latter. It is recommended that future studies of genre analysis should be conducted to explore the similarities and differences in the subdisciplines of dentistry. Further, analyzing individual journals would offer insights to comprehend the communicative effects on disciplinary variations.

Table 5.2: International guideline of Move B

<table>
<tr><th colspan="3">Background</th></tr>
<tr><td>Definition</td><td>Move Analysis</td><td>Transitivity Analysis</td></tr>
<tr><td rowspan="3">Provision of preliminary information, research gap motivation and rationale of the research</td><td>Move Frequency: Conventional</td><td>Process Types: Relational, Material</td></tr>
<tr><td>Move Sequence: 1st order</td><td>Narrative Tone: Neutral, Predictive</td></tr>
<tr><td>Linguistic Features:
1. Present simple tense, Present perfect tense
2. Passive voice (Active voice possible)
3. Modal auxiliaries (“may,” “might,” “can,” “should”)
4. Attitudinal adjectives (“important,” “unknown,” “in)
5. Self-reference words: plural (“we,” “the authors)</td><td>Relational: The authors incline to use relational process “be” to elucidate and strengthen argument.

Material: The authors explain previous literature research actions through the material “doing” processes.</td></tr>
<tr><td colspan="2">Formulaic Sequence:
“(play) an important role,” “is (be) known to,” “the influence of,” “a limited number of”</td></tr>
<tr><td>Remarks:</td><td colspan="2">☒ Grammatical subjects ☒ That-complement clauses
Thai students intend to use “there-structure” much more than international writers.</td></tr>
</table>

Table 5.3: International guideline of Move P

<table>
<tr><th colspan="3">Purpose</th></tr>
<tr><td>Definition</td><td>Move Analysis</td><td>Transitivity Analysis</td></tr>
<tr><td rowspan="3">Indicating/outlining the intention behind the paper and raising hypothesis</td><td>Move Frequency: Conventional</td><td>Process Types: Material, Mental</td></tr>
<tr><td>Move Sequence: 2nd order</td><td>Narrative Tone: Objective, Intentional</td></tr>
<tr><td>Linguistic Features
1. Grammatical subjects (“this study of,” “the aim of,” “the purpose of,” “the objective of,” “the present study)
2. Past tense
3. Passive voice (active voice is possible)
4. Self-reference words (“we,” “the authors”)
5. Reporting verbs (“evaluate,” “investigate,” “assess,” “compare”)</td><td>Material: The authors use action verbs to highlight their research commitments.

Mental: The authors intensify the act by using mental verbs to express their intention.</td></tr>
<tr><td colspan="2">Formulaic Sequences:
“This study was to,” “the aim of the study,” “The purpose of this study,” “The objective of this study”</td></tr>
<tr><td>Remarks</td><td colspan="2">☒ Existential process ☒ That-complement clauses ☒ Anticipatory “it” structures</td></tr>
</table>

Table 5.4: International guideline of Move M

<table>
<tr><th colspan="3">Methodology</th></tr>
<tr><td>Definition</td><td>Move Analysis</td><td>Transitivity Analysis</td></tr>
<tr><td rowspan="4">Description of research design, data, methodology, approach, statistics, etc.</td><td>Move Frequency: Conventional</td><td>Process Types: Material, Relational</td></tr>
<tr><td>Move Sequence 3rd order/ Embedded (P+M), (M+R)</td><td>Narrative Tone: Objective</td></tr>
<tr><td>Linguistic Features
1. Past simple tense
2. Passive voice (Active voice is possible)
3. Self-reference words (“we,” “the authors”)</td><td>Material: The authors focus on actions related to experiments
Relational: The authors describe samples or methodology through “be” verbs.</td></tr>
<tr><td colspan="2">Formulaic Sequence:
“were divided into,” “were subjected to,” “was determined by,” “was measured with,” “were analyzed by,” “were compared with,” “was evaluated by,” “was measured with,” “was performed with,” “were assessed by” “were divided into groups,” “were included in,” “were removed from,” “were used to identify”</td></tr>
<tr><td>Remarks</td><td colspan="2">☒ Modalities and semi-modal verbs ☒ Epistemic adjectives, adverbs and nouns
☒ Attitudinal adjectives ☒ That-complement clause ☒ Existential process ☒ Verbal process</td></tr>
</table>

Table 5.5: International guideline of Move R

<table>
<tr><th colspan="3">Result</th></tr>
<tr><td>Definition</td><td>Move Analysis</td><td>Transitivity Analysis</td></tr>
<tr><td rowspan="3">Announcing and/or reporting results or main findings based on what was accomplished</td><td>Move Frequency: Obligatory</td><td>Process Types: Relational, Material</td></tr>
<tr><td>Move Sequence: 4th order</td><td>Narrative Tone: Informative, Objective</td></tr>
<tr><td>Linguistic Features
1. Grammatical subjects (“result(s),” “finding(s),” “study,” “analysis,” “data”)
2. Past simple tense (Present simple tense is possible)
3. Passive voice (Active voice is possible)
4. Self-reference words (“we,” “the authors”)
5. Reporting verbs (“show,” “indicate,” “reveal,” “find,” “demonstrate”)
6. That-complement clauses (“showed that,” “demonstrate that,” “indicated that,” “revealed that,” “show that”)</td><td>Relational: The authors establish relationship between cause and effect of the intervention in their experiments.

Material: The authors describe how their actions affect results.</td></tr>
<tr><td colspan="2">Formulaic Sequence
“no significant difference,” “was significantly higher,” “significant difference between,” “was associated with,” “was found in,” “was not significantly different,” “was significantly decreased,” “were no significant differences,” “did not affect”</td></tr>
<tr><td>Remarks</td><td colspan="2">☒Modal auxiliaries and semi-modal verbs ☒Epistemic adjectives, adverbs and nouns
☒Attitudinal adjectives, adverbs and nouns ☒Anticipatory “it”(“it was found that”)</td></tr>
</table>

Table 5.6: International guideline of Move D

<table>
<tr><th colspan="3">Discussion</th></tr>
<tr><td>Definition</td><td>Move Analysis</td><td>Transitivity Analysis</td></tr>
<tr><td rowspan="4">Drawing inferences, research implications, suggestion and recommendation</td><td>Move Frequency: Conventional</td><td>Process Types: Relational, Material, Verbal</td></tr>
<tr><td>Move Sequence: 5th order</td><td>Narrative Tone: Informative, Objective, Expressive</td></tr>
<tr><td>Linguistic Features
1. Grammatical subjects (“the (present) study,” “conditions of this study,” “findings,” “results”)
2. Past simple tense (Present simple tense is possible)
3. Passive voice (Active voice is possible)
4. Modal auxiliaries and semi-modal verbs (“may,” “should”)
5. Epistemic adjectives, adverbs and nouns (“possibility,” “promising”)
6. Attitudinal adjectives, adverbs and nouns (“necessary,” “important,” “significant,” “useful”)
7. Self-reference words (“we,” “the authors,” “our”)
8. Reporting verbs (“suggest,” “conclude,” “illustrate”)
9. That-complement clauses (“it can be concluded that,” “it was found that”)</td><td>Relational: The authors describe attributes and identifications of the results (attributive and identifying relational processes).

Material: The authors discuss the results through action verbs.

Verbal (optional): The authors show implications and applicability of the research through report verbs.</td></tr>
<tr><td colspan="2">Formulaic Sequence
“(these) results indicate that,” “(these) results suggest that,” “findings suggest that,” “for the first time,” “we conclude that,” “an effective means of,” “important role in,” “as an adjunct to”</td></tr>
<tr><td>Remarks</td><td colspan="2">Thai writers frequently mention “(within) the limitations of” or “the limitations of this” in Move D, which conveys negative connotation.</td></tr>
</table>

5.4.2 Global Englishes and NNES writers

The present study compares academic writing as an abstract genre in Thai and international dental abstracts to see the similarities and differences in the two datasets. It contributes to the study of global Englishes in a sense that the international dental community is a representation of the "universal" academic discourse. In other words, a comparison of the similarities and differences regarding the generic structure and transitivity can envision an appropriate means of contributing to the global academic discourse in dental sciences. The attempt is not to pinpoint flaws among Thai writers, but to demonstrate that some differences are premises of cultural idiosyncrasies. This point fosters cautious optimism, where accepting the differences across cultures is of the highest value. For example, Thai writers belong to close-knit cultures, where the generic patterns of TDRAAs primarily conform to those taught by their senior professors and supervisors. Since Thainess is instilled in Thai writers, there are differences reflected in the relationship between the Thai identity and the second language writing. However, Thai writers could be enlightened in the course of academic writing because they would be able to see how international writers, whose identities are mixed from inner, outer, and expanding circles, set the parameters to follow. In addition, the international dataset needs to be extended beyond the fossilized perception of either American or British English as the ideals for Thai students to abide by.

5.4.2.1 Global Englishes

As non-native speakers outnumber native speakers in English communication, it is absurd to reboot linguistic imperialism in the 21st century. In other words, there is a rising trend in the acceptance of global Englishes in English learning and teaching, where the concept of mutual intelligibility is echoed by learners and teachers. As long as the language is functional, communicable, and understandable, the accuracy of the English usage may not be so important. Thus, students should learn to be more adaptive to variations of Englishes around the world and not merely to replicate the writing of native speakers of English. They, eventually, will be able to practice and originate their own style of English writing to achieve communicative purposes, which should be recognized and accepted by an international circle of dentistry readers. It is imperative that linguistic skills should not be underestimated as they could cause an obstacle to publication (Ferguson, 2007). Nonetheless, there is a tension between the

theoretical and practical perspectives of English varieties in academic English, whereupon linguistic flexibility may not be well received. It is apparent that linguistic imperialism is still overwhelming in ESP and ELT (Salager-Meyer, 2007). This phenomenon reflects Krachu's theory of concentric circles: inner, outer, and expanding (see Jenkins, 2014, p.14). As long as people are involved in the labeling business and as evidence of discrimination is thus far inconclusive (Ferguson, 2007), it is crucial for Thai students to be aware of the conventions of English academic writing demanded in international journals as the chances for work to be accepted by those publishers will be higher.

Theoretically, the concept of global Englishes is becoming more widespread and people are more willing to accept English varieties. However, there is a controversial issue regarding the hegemony of English that excludes NNES writers from global recognition (Hyland, 2009; Salager-Meyer, 2007). Some academic journals explicitly state in their submission guidelines "American or British usage is accepted, but not a mixture of these." Although this may be viewed as politically biased and discriminatory, Thai writers must follow the instructions, as it is their only way to get their original contribution published in those journals. Now, adopting "expected" English from international journals sounds more reasonable for Thai writers. As unfairness exists at the international level, the following insights are beneficial for Thai writers, together with the need for a high quality English performance and outstanding research.

For example, it is imperative that the standard of written English by NNES writers does not "fall below the expectations of a scientific publication" (Scully and Jenkins, 2006). Consequently, it is arguable whether the NES/NNES status would be more important than the degree of expertise in academic publication as well as the genre performance of academic discourse. Even NNES writers could be privileged if they have lived in an English-speaking country or belonged to a prestigious research group or been academicians in their home country. On the other hand, there are NNES writers who have no opportunity to expose themselves to either veteran or household NNES scholars or NES expatriates. It is certain that such privileged NNES writers will have less difficulty in performing scientific or academic writing, while those who have less exposure to such a privileged experience would have less confidence with regard to both their research expertise and linguistic competence.

> "…publishers and universities have begun to offer mentoring and tutoring services to writers while referees and editors often provide a great deal of unsolicited language assistance."
>
> (Hyland, 2009, p. 181)

To conclude, this section has raised awareness of the rise in global Englishes in the 21st century; however, it is only considered as a spectrum of openness. Academic writing is considered, for example, more rigid regarding the formality and passivity of language, while speaking skills and creative writing might be more welcome for any foregrounding features. It is better for any novice writers to understand and prepare to play by the rules in place at the target journals when it comes to formal writing.

5.4.2.2 NNES writers and inequity

This section describes how a writer's status as a NNES writer may be an extraneous factor for their success in having work accepted for journal publication. In fact, the status as NNES writers for Thai dental researchers might not be as problematic as other non-linguistic factors, such as discrimination and inequity (Canagarajah, 2006; Swales, 2004). Since non-linguistic factors frequently come with low English proficiency and inefficient linguistic competence, a badly written paper will subsequently be correlated with a high rejection rate by publishers. Moreover, there have been reports (Braine, 2005; Flowerdew, 2000) of bias favoring contributors from the U.S. and English-speaking countries in medical and scientific journals. Regarding ELT and applied linguistics, there are reports of discrimination against NNES writers in mass communication journals (Flowerdew, 2000, p. 135). This vicious cycle required new contributors, not specifically NNES writers, to become aware of linguistic competence in English academic writing, although their research quality itself may be exceptional.

Salager-Meyer (2007) also pointed out some major obstacles for underdeveloped and developing countries, or periphery countries. First, these countries lack concrete policies in L1 and L2 scientific writing training. Second, they lack incentives for qualified editorial staff. Third, they have insufficient numbers of professional writing services, professional ghostwriters, or translators to edit their research articles. On top of these factors, individual training for English academic writing

is time-consuming and exhaustive. It is not guaranteed that the use of well-qualified English would guarantee publication success as English skills are only one basic requirement for international publication. There are many more factors, such as personal connections, affiliations, and an excellent quality of research, involved in reviewers' decisions beside the contributors' linguistic competence.

Although Thais have full access to the internet and academic information, Thailand still raises a question regarding its status as a developing country as well as its problematic policy for English education. These poor images may result in a negative impression and they ought to be taken into account when renowned publishers reject any potential papers submitted in a non-native style of English.

To sum up, it is hopeful that one day in the future global Englishes will be more accepted at the international level and that there will be no boundary or discrimination between NNS and NNES writers. However, as publication in international journals entails positive values in dental professions, Thai dental students thus are required to abide by the "imperceptible" current rules and must be able to anticipate what editors or reviewers expect from the submission guidelines.

5.4.3 English for Specific Purposes

As English is vital for academic writing, the present study can contribute to curricula design for ESP courses. The results from this present study can be used to propose instructions for Thai dental students to understand the academic discourse in dental sciences. As abstract writing is frequently used as a platform for academic writing practice, it is essential for ESP teachers to pinpoint the similarities and differences regarding the generic patterns, and linguistic features as well as the transitivity system related to different cultures, points of view, and contexts. Move analysis is crucial to understand how each move (B, P, M, R, and D) can be linked to the communicative purpose; Thai students can learn how to write appropriately to fit each move. Although the generic structure for abstract writing is rigid and stable, students could learn that each dental discourse community has a unique generic pattern. In addition, by learning from these similarities and differences, Thai students can adopt the findings to make their writing appropriate within the context of the target dental discourse community, either at the local or at the international level. In other words, the two datasets represent the trend of writing recognized by the top 5 international journals, where the students can realize

the applicable means of performing academic writing and can compare it to the needs of local journals. They can learn to appreciate the linguistic differences across discourse communities and discuss some relevant issues relating to the cultural context.

In conducting a practical ESP course for dental students, they must learn to understand that English consists of two components: *form* and *function*. For example, a sentence can have a different communicative purpose based on its linguistic features and context. Hyon (1996) and Bhatia (1993) agreed that form and function could provide valuable pedagogical advice for ESP students and that ESP instructors could demonstrate how linguistic conventions and communicative or rhetorical effects are interrelated. To illustrate, it has been established that ESP and systemic functional studies can provide insightful information about particular linguistic features subsisting in various genres. On the other hand, new rhetoric scholars particularly focus on genres as social action and aim to study genres as "social functions" in their institutional settings. As can be seen from the ethnographic descriptions of genres in medical and scientific communities (Bazerman, 1988; Schryer, 1994), new rhetoric scholars aim to explain how genres, or text types, are stylized, valued, and functioned based on the social needs of a particular community. Ostensibly, ESP, SFL, and new rhetoric schools never leave the functional aspect of language despite the fact that they are philosophically divergent.

Although ESP has different philosophical thoughts, it is undeniable that their contributions have pedagogical value in classroom practice. These ESP scholars transform the theoretical perspective of linguistic theories into a practical perspective for students. With respect to genre analysis and its contribution to language instruction (Flowerdew, 1993; Swales & Feak, 1994; Weissberg & Buker; 1990), classroom activities should be organized by ESP instructors to help students understand the concepts of communicative purpose, discourse community, and a means of practicing their writing effectively through realization of the linguistic features that occur most frequently in disciplinary variations. For instance, Johns (1995) and Swales and Feaks (2004) demonstrated rhetorical patterns for NNES graduate students through authentic tasks and language analysis assignments as a platform to succeed in academic writing. In due course, students can establish the relationship between form and function and realize the means of performing academic writing to convey communicative purposes in their own

professions. Therefore, it is important for ESP instructors to establish practical guidance for their students through the foundation of theoretical findings.

Likewise, the findings from the present study are not only theoretical, but also suggest pedagogical implications regarding the realization of rhetorical structure in academic writing, which would vary from discipline to discipline. ESP instructors can use the findings as a starting point for curriculum development, to enable students to learn and recognize organizational patterns in academic writing. Since it is conventional for ESP courses to have students from a range of subdisciplines of dentistry, the instructors could give examples of BPMRD as a nomenclature of scientific abstracts. They could point out how dentistry journals favor generic patterns and how particular verbs frequently appear in each rhetorical move (see Tables 5.2, 5.3, 5.4, 5.5, 5.6 for international guidelines). For instance, while learning the generic patterns of dental abstracts, the instructors could theorize the concept of move analysis (Swales, 2004) by giving various genres of dental abstracts to demonstrate that they all share a similar rhetorical structure. Students could be asked to analyze individual abstracts to establish generic patterns for each subdiscipline and to discuss these in terms of their similarities and differences. By doing so, these pedagogic activities could act as scaffolds to build up the students' incidental learning through the process of individual investigation. On top of this, such learning could substantiate the fact that abstract writing would not be too challenging for NNES students if learners can learn how to distinguish or recognize rhetorical moves based on the concept of genre analysis.

The next step is to introduce ESP learners to the notions of the tonal style used within each rhetorical move. The ESP instructors could suggest that the verbal choice could lead to different tonal styles or shades of meaning. Students could learn the basic knowledge of the process types subsisting in transitivity and could then start to analyze the verbal choices used across subdisciplines. Discussions of the similarities and differences could also lead to incidental learning as well as the sharing of knowledge among classmates. Since transitivity is rather subjective in terms of interpretation, ESP instructors could share their own interpretations with students as they may have more background in terms of direct experience with their academic disciplines. As one word can be interpreted alternatively from individual to individual, the collaboration between language instructors and specialized professionals would benefit future ESP courses.

Students could start learning from the examples provided in the analysis in the present study to see the frequency of verbs used in TDRAAs and IDRAAs and discuss why particular moves have distinctive verbal choices. Then, the ESP instructors could explain how verbal choices can link to the ideational metafunction of SFG through the process types of transitivity. Ultimately, this will be able to understand that each verb carries a different tonal style shaped by a writer, such that ESP learners may then be more cautious when they choose a particular verb to convey an intended meaning to readers.

However, good English writing does not always ensure success in journal publication. Other factors should be taken into account, such as research trends, research quality, and the scope of each journal, when any dental students or researchers set a goal for journal publication. In fact, even when the language use is flawless, it does not guarantee that editors-in-chief or external reviewers will appreciate and accept the paper. According to Lorés (2004), abstract writing is proven to be difficult for amateur writers; however, it is still possible to see the light at the end of the tunnel. As English is the inevitable key to representing a holistic view of research, adopting proper means of abstract writing is always essential in global dental communities.

5.5 Recommendation and Further Studies

This section describes some recommendations for future research based on the findings and limitations of the present study.

5.5.1 The present study compared generic patterns in the abstracts of dental journals written by Thai and international dental researchers. It is recommended that a similar genre analysis be applied to other sections of research articles written by Thai and international dental researchers. Such an analysis covering all the RA sections could allow drawing a more complete picture of academic writing as guidance for international publication for dental students. As each section has a different communicative purpose molded by the dental discourse community, it is important to study rhetorical organization in terms of the moves and submoves, where applicable, to see the similarities and differences between the two discourse communities. In addition, the application of a transitivity system may shed some light upon the worldview of how each discourse community prefers to display each section.

5.5.2 It would be intriguing to perform a comparative study of students' transferability between research article abstracts and full research reports. Since a full report is less strict regarding the number of words and directive submission guidelines, the writing style can be considered free-verse writing. This writing flexibility can affect the way students write, not just specifically the abstracts. It would be useful to investigate how the students transfer content regarding both the lexical and syntactical structures to fit in the space provided by publishers. If possible, a corpus-based comparison across cultures would be useful to explain how each group particularly extracts information from the macro level to the micro level to display the selected content.

5.5.3 Move analysis and transitivity analysis are subjective. The present study used one expert for each type of analysis to test the reliability of the coding, and it is recommended that the next research study should seek additional experts to establish their agreement rates. The experts could be extended to relevant groups of dental sciences; for example, dental graduate students, language specialists, ESP instructors, linguists, journal editors, or even the authors of RAAs themselves. These various groups could present their alternative points of view when they read research journals, which could be reflected in their individual coding. By doing so, the results from the move analysis and transitivity analysis would become more generalizable as the degree of subjectivity decreases.

5.5.4 As the scope of the present study was focused on "original contribution" research article abstracts, it is recommended that other genres of dental research article abstracts, e.g., clinical techniques, case reports, or systematic reviews, should be investigated and the results compared across genres to see rhetorical similarities and differences. Besides, the abstracts chosen for the present dental sciences comprised various subdisciplines, and as such, it is possible to determine how the differences in generic patterns, linguistic features, or stylistic variations exist across subdisciplines. The number of case reports or systematic reviews of dental sciences is also increasing in international dental journals and genre analysis for these types of academic writing may differ and yield intriguing results, which could be used to construct a holistic ESP handbook for dental research abstract writing in the future. The findings could contribute specific information regarding generic patterns for dental researchers working in each field. The present study only reported findings through experiment-based dental research

known as original contributions. As Liyanage and Birch (2001) highlighted, ESP instructors could point out rhetorical variations among subdisciplines for students so they could learn that each discipline has its own distinctive rhetorical structure despite the fact that they all share commonalities.

5.5.5 The present study compared datasets merely based on a textual analysis. If possible, it is suggested that local in-depth interviews should be conducted to gain insightful information for Thai students. The interviewees could be selected from a group of students studying in Thai dental faculties, their supervisors, and some editors from Thai dental journals. Information given by the interviewees could provide more in-depth findings that could contribute to the production of each abstract. As the final product and the students' authentic writing is usually not the same piece due to learning contexts or cultural influences, it would be interesting to explore how their authenticity is progressively refurbished throughout the publication process.

5.6 Conclusion and final thought

Since abstracts in academic dental journals are important and evolving due to the increasing influence of global Englishes, this dissertation concludes with two contributions for NNES dental writers. First, it highlights the pedagogical value of genre analysis and transitivity analysis for NNES dental writers, who could use international guidelines to facilitate the process of abstract writing. Second, it highlights the significance of abstracts, whereby NNES writers should understand that they are not simply a summary of their original texts, but are also promotional texts.

5.6.1 The value of generic structure and tonal style

It is universally acknowledged that the publication of research articles has dramatically increased, as can be seen through the increasing numbers of national and international academic journals in recent years. At present, the growth in demand for publication is leading to a deluxe of information (Lancaster, 1991) in scientific writing and readers are increasingly struggling to filter all the literature being published in their discipline in the modern digital era (Salager-Meyer, 1990). Therefore, a representation of condensed information is compulsory for contributors, just as it is a gateway for indexing and abstracting in library management system. Abstracts, however, are problematic to write, especially for NNES writers, as they struggle to produce ones adequately mirroring the original research articles or with effective keywords to grasp

the intended readers' attention (Tibbo, 1993, p. 7). As well-structured abstracts impress readers only when they adhere to precision and a recognition of their original research contributions, it is considered difficult for writers to produce effective writing within a condensed space. Abstracts are thus considered as a specific genre (Gillaerts & van de Velde, 2010) because writers have to reconstruct the original texts in a way that not only covers only the significant components but also captures both the intended and additional readers attention within a commercial agenda (Yokhontova, 2002). As abstracts must be coherent regarding both their syntactic and semantic structures, the present study encompassed both linguistic perspectives and attempts to highlight genre analysis and transitivity analysis as a combined approach that could be linked to ELT guidance. Currently, there is no other study in the literature focused on dental abstracts in terms of either rhetorical organization or ideational metafunction. Since genre analysis is acclaimed as a useful device to characterize communicative purposes identified by members of the academic community of dental sciences, this study argues that transitivity analysis can draw a fine distinction between each move in terms of ideational transmission. Recognizing these differences provides pedagogical aspects where lexical choices or semantic specifications representing the writers' worldview come into play in abstract writing. To illustrate, while generic patterns of scientific abstracts are distinctively recognized as BPMRD, transitivity analysis has affirmed that each move essentially comprises various shades of a narrative point of view, transmitted and driven by the process types. To complement the focus of the present study, transitivity could offer NNES dental writers an appropriate means to realize the significance of applying a narrative point of view in dental sciences.

5.6.2 Abstracts as evolving and promotional texts

At this juncture, it is hopeful that the findings revealed in the present study will be useful for ESP courses in higher education and encourage Thai dental researchers to become well versed at the international level. Thus, it is recommended that NNES dental students should be aware of stylistic appropriateness because this may be one of the milestones that could increase the chances of a research paper being accepted for publication, beside the research quality itself. However, it is crucial that there is evidence of stylistic evolution regarding move frequency and linguistic features, such as tense, voice, and pronouns, in particular moves. Li and Ge (2009) highlighted the change as

resulting from advancing medical technology and from an attitudinal change of the discourse community. Their study raises dental researchers' awareness about realizing the salient linguistic features appearing in contemporary international dental journals. Furthermore, the modification of genres found within the scientific journals substantiates the significance of this comparative study between Thai and international dental journals since language depends on socio-cognitive contexts that are gradually changing due to current globalization situations.

Additionally, RA abstracts are not only a summary, but also a promotional writing of their original texts (Dahl, 2004; Hyland & Tse, 2004; Gillaerts & van de Velde, 2010; Yakhontova, 2002). The promotional facet of RA abstracts originates from both the competitive nature of the academic world and the toughness of the selection process led by journal editors. Moreover, it has been found that the competitive nature of RAs leads to the use of boosters in RA abstracts to express outstanding information to readers and the use of hedges in Move D to foster negotiation between writers and readers (Hyland, 2000; Prasithrathsint, 2015). However, differences in organizational structure between RA abstracts and original texts have become "smaller" (Gillaerts & van de Velde, 2010) and now even the future tense could be used in RA abstracts to reinforce its "selling" quality (Yakhontova, 2002), as well as to establish its status as a promise not just a mere report. Beside the research quality itself, achieving success for international publication is plausible if Thai dental students could realize how RA abstracts are "promising" to the world of dentistry.

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APPENDICES

APPENDIX A
THAI DENTAL RESEARCH ARTICLE ABSTRACTS

Chulalongkorn University Dental Journal

1. Makarukpinyo, R., & Ratisoontorn, C. (2016). Micro-computed tomographic assessment on marginal adaptation to dentin of biodentine and MTA in blood contaminated furcation repair. *Chulalongkorn University Dental Journal, 39*(1), 33-42.
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4. Siripanthana, S., & Changsiripun, C. (2015). Taste perception in patients wearing upper removable orthodontic appliances with posterior bite planes. *Chulalongkorn University Dental Journal, 38*, 29-36.
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6. Tanasamanchoke, C., & Wiwatwarrapan. (2015). Increased wetting time of methyl formate-methyl acetate did not increase tensile bond strength of relined denture base resin. *Chulalongkorn University Dental Journal, 38*, 75-82.
7. Maetevorakul, S., & Viteporn, S. (2015). Soft tissue profile changes following treatment of class II division 1 malocclusion with different orthodontic modalities. *Chulalongkorn University Dental Journal, 38*, 53-66.
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10. Dongpaiboon, P., & Techalertpaisarn, P. (2015). The effect of liquid resin on initial shear bond strength of orthodontic adhesives. *Chulalongkorn University Dental Journal, 38,* 11-20.

11. Thaitammayanon, P., Sirichompun, C., & Wiwatwarrapan, C. (2015). Comparison of residual monomer in the MMA-based orthodontic base-plate materials before and after water immersion. *Chulalongkorn University Dental Journal, 38,* 67-74.

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22. Saisopa, K., & Srisawasdi, S. (2014). Effect of desensitizing toothpaste on microtensile bond strength between resin composite and dentin. *Chulalongkorn University Dental Journal,* 37, 225-240.

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Songklanakarin Dental Journal

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4. Phermsang-ngarm, P., & Charoemratrote (2015). Load-deflection characteristics of superelastic nickel titanium wire. *Songklanakarin Dental Journal, 3*(1), 15-19.

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Chiang Mai Dental Journal

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APPENDIX B
INTERNATIONAL DENTAL RESEARCH ARTICLE ABSTRACTS

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APPENDIX C
PILOT STUDY

The pilot study was primarily conducted to evaluate the viability of this research study and to implement the modified frameworks. In addition, it was likely to see whether there would yield satisfactory results based on a small group of samples.

A: Samples

10% out of each dataset (12 samples) was used in the pilot study and they were randomly selected from Thai and international dental journals. 12 samples from TDRAAs was selected from the list as follows: 2 of *Chulalongkorn University Dental Journal, 2 of Mahidol University University Dental Journal, 2 of Songklanakarin Dental Journal, 2 of Chiang Mai Dental Journal, 2 of Khon Kaen University Dental Journal and 2 of Srinakharinwirot University Dental Journal*. These samples were geographically related as they represented a local variety of English-written abstracts collected from Thai discourse community. For international dental journals, all of the 12 samples were randomly selected from the list as follows: 2 of *Journal of Dental Research, 2 of Oral Oncology, 2 of Dental Materials, 2 of Clinical Periodontology, 2 of Journal of Endodontics.* These leading international journals represent global discourse community of dental sciences. In addition, the nationalities of corresponding authors were filtered to make sure that any Thai names are excluded.

B: Move analysis

This section explicates the present study's procedure of move identification. Move analysis is used to identify moves based on their communicative functions in both Thai and international dental journals to construct a coding protocol (Table 3.6) for both the researcher and the coder. There are 5 moves found within both datasets: Background (B), Purpose (P), Methodology (M), Result (R) and Discussion (D). These moves appear to be inevitable parts while writing for DRAAs.

Table 1: A proposed coding protocol for genre analysis of DRAAs: Pilot study

Background	(1) Making topic generalizations (2) Stating the importance of the field/topic (3) Defining research gap (4) Identifying rationale of the research
Purpose	(1) Indicating/outlining the intention or main features behind the paper (2) Raising hypothesis
Methodology	(1) Describing samples, materials, statistical information
Result	(1) Announcing and/or evaluating results
Discussion	(1) Deducing conclusions from results (2) Demonstrating recommendation and/or suggestion

Examples of move identification

(1) *Calcium phosphate cement (CPC)* ***is promising*** *for dental and craniofactial applications due to its ability to be injected or filled into complex-shaped bone defects and molded for esthetics, and its resorbability and replacement by new bone. (B) – stating the importance of the field/topic* (IDRAA: 1)

(2) *When leveling severe crowded teeth with nickel titanium (NiTi) wire,* ***the more severity of displacement, the higher force the wire exerts*** *(B) – making topic generalizations* (TDRAA: 3)

(3) *Cervical vertebras* ***are skeletal parts that support the patent of pharyngeal airway*** *(B) – defining Terminology* (TDRAA: 4)

(4) *Enamel resin infiltrants are biomaterials able to treat enamel caries at early stages.* ***Nevertheless, they cannot prevent further demineralization*** *of mineral-depleted enamel (B) – defining gap/problem* (IDRAA: 2)

(5) *This study **was to identify** single nucleotide polymorphisms (SNPs) that associated with different occlusal relationship in a group of Thai population. (P) – indicating purpose* (TDRAA: 1)

(6) *This multicenter, prospective, nonsignificant risk clinical study **evaluated** healing rates for molars 12 months after endodontic therapy using the GentleWave System. (P) – indicating main features* (IDRAA: 3)

(7) ***A total of selected 120 cone beam computed tomographs** which produced by DentiiScan® machine **were used** in this study (M) – describing materials* (TDRAA: 8)

(8) *Statistical analysis **was performed by using the Fisher exact test, Pearson correlation, and multivariate logistic regression analyses** of the preoperative prognostic factors at P=.05 (M) – describing statistical information* (IDRAA: 3)

(9) *The results **showed** that the average of the labial alveolar bone thickness at (A), (B), (C) were 0.92+0.43, 0.84+0.38 and 1.49+0.61(R) – reporting results* (TDRAA: 6)

(10) *This study showed that **knot security depends on suture material, tying technique, and number of throws, but is independent of suture size** (D) – deducing conclusions from results* (IDRAA: 12)

(11) *Incorporation of more crystalline HAp nanorods into enamel resin infiltrants **may be a feasible method to improve** the overall performance in the demineralization. (D) – recommendation or suggestion* (IDRAA: 10)

(1) Move frequency

The pilot study revealed that there were 2 move patterns in DRAAs from both datasets: BPMRD (T=2, I=8) and PMRD (T=8, I=4). Regarding move sequence (see section 3.6.2.2 for further details), the pilot study revealed that all moves have sequential order, as proposed by Hyland (2000). Neither cyclical move nor reversal move was found throughout the pilot study.

Table 2: Move frequency in TDRAAs and IDRAAs

Move 1 TDRAAs =2 IDRAAs = 6	Move 2 TDRAAs = 12 IDRAAs = 12	Move 3 TDRAAs = 12 IDRAAs = 12	Move 4 TDRAAs = 12 IDRAAs = 12	Move 5 TDRAAs = 12 IDRAAs = 12
Move Sequence		Cyclical = 0/0 Embeded = 0/1 PMRD → TDRAAs = 10 IDRAAs = 6 BPMRD → TDRAAs = 2 IDRAAs = 6		
Background	- defining gap/problem (4/0) - stating the importance of the field/topic (2/0) - making topic generalization (0/1) - defining terminology (0/1)			
Purpose	- indicating purpose or main features (11/12) - raising hypothesis (1/0)			
Methodology	- describing samples, materials, statistical information (12/12)			
Result	- announcing and/or evaluating results (12/12)			
Discussion	- deducing conclusions from results (IDRAA:6) - demonstrating recommendation and/or suggestion (IDRAA:5)			
Note: Number/Number = Occurrences of Moves in TDRAAs/IDRAAs				

The first attempt of move analysis through the coding protocol and the descriptive statistics of the pilot study could reveal significant findings in terms of generic patterns of the two datasets. As Move B appeared 6 out of 12 (50%) for IDRRAs and 2 out of 12 (16.67%) for TDRAAs. Move B for both datasets was, therefore, optional because the percentage of appearance was less than 60% (Kanoksilapatham, 2005). On the contrary, Moves P, M, R and D were considered obligatory as they appeared 6 out of 6 (100%) for both datasets. Move B was normally written by present and present perfect

tenses corresponding to advancement of dental technology as used in current trends of dental treatment. Interestingly, Move B in TDRAAs consisted more of linguistic transitions, such as “when” and “therefore” to maintain coherence while IDRAAs mostly used simple sentence through less transitions.

(1) ***When*** *leveling severe crowded teeth with nickel titanium (NiTi) wire, the more severity of displacement, the higher force the wire exerts.* ***After*** *force application, periodontal ligament (PDL) compression occurs within the width of PDL space of 0.5 mm.* ***Therefore****, the force magnitude at 0.5 mm after deactivation is critical.* (Move B: TDRAA: 3)

Move P was used for identifying the aims of research studies and past tense was conventionally used for both datasets. However, present perfect tense could be seen from IDRAAs in Move 2.

(2) ***To better understand*** *these underlying neurobiological mechanisms and identify novel analgesic targets for pulpally derived pain, we* ***have developed*** *a powerful ex vivo model using human tooth slices* (Move P: IDRAA: 11)

In terms of linguistic realizations, IDRAAs used exclusive “we” (epistemic class: Class 2) to represent the researchers’ authorial stance towards their research study. Also, note that there was a prepositional phrase in Example (2) embedded as Move P, while the main clause “we have developed” served as Move M. This embedding strategy can reflect grammatical dexterities performed by the international writers.

(3) *In this phase II trial,* ***we*** *determined the efficacy of APF (without cetuximab) followed by CRT in similar patients.* (Move P: IDRAA: 3)

(4) ***We*** *hypothesized that higher socioeconomic position in childhood would predict favorable oral health beliefs in adolescence and early adulthood…*(Move P: IDRAA: 4)

There was no major difference regarding linguistic features in Move M as sentences were totally written by past tense. There was neither attitudinal nor epistemic adverbs, adjectives and nouns employed throughout the move. There were a few cases of self-reference pronouns "we" articulating the researchers' engagement. Neither that-clause structures nor report verbs were used in this move. Move M, thus, established itself as objective and action-oriented narrative, supported by the lack of authorial stance.

Move R in the two datasets are used to report statistical findings and to explain the results of a particular study.

(5) *The results* ***revealed*** *that the Pangbong root extract exerted the best anti-microbial activity in the primary screening test.* (Move R: TDRAA: 7)

(6) *The bio-inspired FGM layer significantly* ***reduced*** *stress concentration at the interface between the crown and cement…*(Move R: IDRAA: 9)

(7) *From statistical analysis, the tensile bond strengths of all groups except in 15 wt%* ***were not significantly different****.* (Move R: TDRAA: 11)

Examples (5), (6) and (7) were drawn from the first sentence of Move R. Example (5) showed a report verb "revealed" commonly used in this move. Example (6) showed that results was announced through an action verb. Example (7) showed the preference of statistical findings to evaluating the results. These showed a variation regarding Move R and were of interest to find common patterns regarding linguistic features. For instance, since evaluating the results required higer-order thinking (Anderson et al., 2001), when compared to announcing the results, this could have linked to the writers' ideology where the issue of grammatical dexterity could affect a means of writing. Regarding linguistic features, passive voice was mostly employed and active

voice could be seen from the use of self-reference “we,” as can be seen from Example (3). Past simple tense was used throughout the pilot and there was evidence of that-complement clause, as can be seen from Example (5).

Move D of the two datasets was mostly similar as it focused on deduction, conclusion, suggestion, recommendation and implication. However, a major difference found from the IDRAAs was the authorial stance (Pho, 2008) through the use of hedges and modalities. Examples (8) and (9) demonstrated that modalities “may” and “would” were used for predictive effect.

(8) *The inverse relationship between air-thinning and adhesive bond strength, observed elsewhere, **may** be **partially caused** by this same effect.* (Move D: IDRAA: 1)

(9) *…higher socioeconomic position in childhood **would** predict favorable oral health beliefs in adolescence and early adulthood,…*(Move D: IDRAA: 4)

(10) *Surface treatment with silane coupling agent **played** an important role in increasing the flexural strength of the glass fiber-reinforced PMMA.* (Move D: TDRAA: 10)

Regarding tense and aspect of Move D, IDRAAs use present tense with passive or active voice; however, there was a case of past tense, as can be seen from Example (10) in TDRAAs. This was thought-provoking where the international writers seeked generalizability of the research while the Thai writers seemed to weigh less on this issue. As research implications and suggestions could play an important role at the international level, the present tense could associate with applicable aspects of dental technology for the time being.

The results gained from the pilot study revealed that the proposed framework for move identification yielded satisfactory results for further investigation. It can be used to identify moves based on top-down approach alongside linguistic realizations emerging from each move. Since the samples in the pilot study were small, a larger sample size could establish more common patterns for a comparison between TDRAAs and IDRAAs. Moreover, the larger sample size could originate dental sciences

a unique generic structure from other medical sciences, according to Kanoksilapatham's (2015) statement that each academic discipline was unique and needed thorough analysis for its rhetorical structure (p. 114). To sum up, the main findings can be illustrated as follows:

Table 3: Summary of move analysis: Pilot study

Move	***Findings***
Move B: Background	(1) Present tense and present perfect tense were often used. (2) Defining "gaps" were found in IDRAAs. (3) Transitions "when," "therefore" could be found in TDRAAs
Move P: Purpose	(1) Self-reference "we" could be seen from IDRAAs. (2) Past tense was normally used. Present tense could be seen from IDRAAs. (3) Report verbs "aim," "study," could be seen from both datasets (4) Embedding with Move M (IDRAAs)
Move M: Methods	(1) Passive voice was mostly used. (2) Self-reference "we" could be seen from IDRAAs (3) Embedding with Move P (IDRAAs)
Move R: Result	(1) Report verbs ("revealed") could be seen (2) That-complement clauses were used with report verbs (3) TDRAAs mostly announced reports while IDRAAs mostly evaluated reports
Move D: Discussion	(1) Hedges and modalities could be seen from IDRAAs (2) Past simple tense was found in TDRAAs

(2) Move sequence

Through 12 samples of each TDRAAs and IDRAAs, move sequence could be seen arranged chronologically from BPMRD (2/6) and PMRD (10/6). There was no switching order among these moves. Also, there was one embedded move (P+M) which was intriguing to explore regarding grammatical dexterities expressing

through the international writers. No cyclical move was found within the pilot study; however, more variations of move sequences, embedded moves, cyclical moves, reversal moves would be found, if samples used in the analysis were larger.

C: Transitivity analysis

Given that two datasets had been semantically ranked and each verb was identified through Halliday's (1994) and Thompson (2000)'s transitivity, the following tables revealed the number of processes employed in each move. As the identification of transitivity was solely based on a small number of abstracts from TDRAAs and IDRAAs, the researcher would point out only significant findings from both datasets.

Table 4: Types of transitivity in TDRAAs

TDRAAs	Material	Relational	Mental	Verbal	Existential	Behavioral	Total
B	1	3	2	0	4	0	10
P	2	1	3	0	0	0	6
M	23	1	0	0	0	0	24
R	3	8	0	0	9	0	20
D	2	6	0	2	4	0	14
Total	31	19	5	2	17	0	74
Number of words: *TDRAAs (1,428 words)* Number of words in each move: *B (191), P (175), M (460), R (399), D (203)*							

According to Table 3.9, the total number of transitivity used in this dataset was 74. Material processes were found throughout the TDRAAs abstracts and mostly found in Move M. Relational processes were also seen in all moves and mostly found in Move R. There were 2 and 3 mental processes in Moves B and P, respectively. There were 17 existential processes in Move B (4), Move R (9) and Move D (4). Verbal processes were twice used in M5. There was no behavioral process appearing in any move. Overall, the number of transitivity was mostly used in Move M, a little higher than Move R. The least

number of transitivity was found in Move P. These numbers affirmed that the writers tended to frequently use main verbs in Methods section.

(1) *Lateral cephalogram were **taken** at 3 times: preoperation (T0), immediate postoperation (T1) and 6 months postoperation (T2).* (Material: TDRAA: 3)

(2) *The results **indicate** no significant differences (p > 0.05) between the two techniques and exposure times.* (Relational: TDRAA: 5)

(3) *The study **aimed** at investigating the effects of juice extract of Eclipta prostrata (EP) and Eclipta alba (EA) on the viability, migration and proliferation of periodontal ligament cells (PDLCs)* (Mental: TDRAA: 9)

(4) *In conclusion, the bone grafting is strongly **recommended** in immediate implant placement case, especially in aging patient, in order to create the esthetic and primary stability.* (Verbal: TDRAA: 4)

(5) ***There was** a statistically significant reduction of labial alveolar bone thickness at 4 mm apical to CEJ (A) in older samples.* (Existential: TDRAA: 4)

Table 5: Types of transitivity in IDRAAs

IDRAAs	Material	Relational	Mental	Verbal	Existential	Behavioral	Total
B	0	4	0	0	1	0	5
P	4	1	5	0	0	0	10
M	24	0	1	0	0	0	25
R	0	15	2	0	4	0	21
D	1	5	1	2	0	0	9
Total	29	25	9	2	5	0	70
Number of words: *IDRAAs (1,532 words)* Number of words in each move: *B (47), P (315), M (544), R (420), D (206)*							

As regards Table 3.10, the total number of transitivity used in this dataset was 70, which was slightly outnumbered by the former dataset. Material processes were tremendously used in Move M (25) and sporadically found in Move P (2) and Move D (1). Relational processes were found in most of all moves, except Move M. Mental processes were likely found in Move P and Move R, but in a smaller quantity. There were 2 verbal processes in Move D. No behavioral process was found. There were only 5 existential processes throughout IDRAAs, mostly found in Move R. The quantity of transitivity was the highest in Move M (25), a little higher than that of Move R (21). The smallest number of transitivity was found in Move B. Similar to TDRAAs, these numbers also pointed out that the writers of IDRAAs also used the highest process types of transitivity in Move M.

(1) *Surface roughness analysis was **performed** using a non-contact surface-profilometer.* (Material: IDRAA:2)

(2) *Early SES and parental oral health-related beliefs were **associated** with the study members' oral health-related beliefs,…* (Relational: IDRAA:4)

(3) *Identification and isolation of CSCs **needs** to be improved further.* (Mental: IDRAA: 11)

(4) *The use of superelastic NiTi with caution is **recommended**.* (Verbal: IDRAA:3)

(5) *In terms of individual factors, **there was** no effect of anesthesia type, sex, or age on capsaicin-stimulated CGRP release.* (Existential: IDRAA:6)

The analysis from both datasets could signify certain patterns of transitivity appeared in DRAAs. For example, as existential processes were not frequently used in IDRAAs, it could suggest that TDRAAs seem to depend on grammatical subject: Epistemic Class 7 (existential "there") to describe situations uttered (Pho, 2008). The results reaffirmed the aforementioned how Thai writers tended to avoid voicing themselves into their research studies, as there was no use of Epistemic Class 2 (self-reference) in move analysis of TDRAAs, but preferred to take account of existential process to recount their realities.

The high frequency of material processes in Move M was apparently seen in IDRAAs (27) and TDRAAs (31). This could be explicated due to the nature of Move M where embellishment of methods was narrated through action verbs. Above all, the straightforwardness of both Thai and international writers could be realized through the highest frequency of material processes used throughout both datasets. Relational processes were often used in TDRAAs (19) and IDRAAs (25), and they were mostly employed in Move R. As relational processes contributed to relationships between two or more things, the findings suggested that the international writers had a propensity to put more weight on evaluating the results than announcing statistical findings. Dissimilar to mental process, which is based on "sensing" aspect, relational process was an appropriate way to put the writer's stance, or "being," to evaluate results, without a sacrifice of objectivity.

APPENDIX D
MOVE IDENTIFICATION: BLANK SHEET

(Type: Journal Name/Number) = <u>IDRAA: JOE/14</u>

*Porphyromonas gingivalis can synthesize an extracellular capsule and different serotypes have been described based on capsular antigenicity. **(___)**// On dendritic cells (DCs), the type of capsule present plays a role on the strength of the developed immune response. **(___)**// This study aimed to investigate the T-lymphocyte responses when stimulated with autologous mature DCs exposed to different P. gingivalis K-serotypes. **(___)**// Naïve CD4+T-lymphocytes were obtained from healthy subjects and stimulated with autologous DCs primed with increasing multiplicity of infections of the different P. gingivalis K-serotypes. **(___)**// The Th1, Th2, Th17 and T-regulatory cytokines and transcription factor levels were quantified. **(___)**// Distinct types of response were detected when T-lymphocytes were stimulated by DCs primed with the different P. gingivalis K-serotypes. **(___)**// T-lymphocytes stimulated by K1 or K2-primed DCs elicited higher levels of Th1 and Th17-associated cytokines, T-bet and RORC2 than T-lymphocytes stimulated with DCs primed with the other serotypes. **(___)**// Conversely, the serotypes K3-K5 induced higher levels of Th2-associated cytokines and GATA-3 than the others. **(___)**// These results demonstrate that DCs primed with the different P. gingivalis K-serotypes elicited distinct T-cell responses. **(___)**// Strains K1 (W83) and K2 (HG184) induced a Th1/Th17 pattern of immune response and K3 (A7A1-28), K4 (ATCC®49417™), and K5 (HG1690) a Th2 response. **(___)**//*

Move analysis: (Type: Journal Name/Number): ___:___/___

Move sequence: _____ **Cyclical move: _____**

Embedded move: _____ **Reversal move: _____**

Linguistic features:

☐ B
☐ P
☐ M
☐ R
☐ D

☐ Grammatical subjects _____
☐ Verb tense and aspect _____
☐ Voice _____
☐ Modal Auxiliaries _____
☐ Epistemic words _____
☐ Attitudinal words _____
☐ Self-reference words _____
☐ Reporting verbs _____
☐ That-complement clauses _____

Abstract: Coding procedure (sample)

JOE/14

Porphyromonas gingivalis can synthesize an extracellular capsule and different serotypes have been described based on capsular antigenicity. ***(B)****// On dendritic cells (DCs), the type of capsule present plays a role on the strength of the developed immune response.* ***(B)****// This study aimed to investigate the T-lymphocyte responses when stimulated with autologous mature DCs exposed to different P. gingivalis K-serotypes.* ***(P)****// Naïve CD4+T-lymphocytes were obtained from healthy subjects and stimulated with autologous DCs primed with increasing multiplicity of infections of the different P. gingivalis K-serotypes.* ***(M)****// The Th1, Th2, Th17 and T-regulatory cytokines and transcription factor levels were quantified.* ***(M)****// Distinct types of response were detected when T-lymphocytes were stimulated by DCs primed with the different P. gingivalis K-serotypes.* ***(R)****// T-lymphocytes stimulated by K1 or K2-primed DCs elicited higher levels of Th1 and Th17-associated cytokines, T-bet and RORC2 than T-lymphocytes stimulated with DCs primed with the other serotypes.* ***(R)****// Conversely, the serotypes K3-K5 induced higher levels of Th2-associated cytokines and GATA-3 than the others.* ***(R)****// These results demonstrate that DCs primed with the different P. gingivalis K-serotypes elicited distinct T-cell responses.* ***(D)****// Strains K1 (W83) and K2 (HG184) induced a Th1/Th17 pattern of immune response and K3 (A7A1-28), K4 (ATCC®49417™), and K5 (HG1690) a Th2 response.* ***(D)****//*

IDRAA: JOE/14

Move analysis: JOE/14

Move sequence: BPMRD **Cyclical move:** N/A

Embedded move: N/A **Reversal move:** N/A

Linguistic features:

B: Present Tense (2), Present Perfect Tense (1), Active (1), Passive (1), 3rd Pronoun (1)

P: Past Tense (1), Active (1), Deictics (this), Report verbs (aimed)

M: Past Tense (2), Passive (2),

R: Past Tense (2), Active (2), Passive (1), Adverbials (conversely),

D: Present Tense (1) Past (1), Deitics (these), noun (results), Report verbs (demonstrate)

APPENDIX E
EFFECT SIZE

The present study provides the calculation of effect size based on the fact that statistical significance may not contribute to practical significance. The value of effect size provided within the study can contribute to future studies of genre analysis and/or transitivity analysis regarding the proper sample size. However, it is recommended to review literature of a similar topic for measures of effect sizes drawn from alternative methods and they are converted to a common measurement and averaged out to determine an effect size of a study in question. As there is lack of measures of effect sizes reported from previous literature, the present study uses Cramer's V statistics to calculate correlation in both move analysis and transitivity analysis to determine strengths of association after chi-square verifies statistical significance. In other words, chi square value only say there is an existence of significant relationship between variables; however, it lacks explanation of how the value of significance contribute to generalizable power. Cramer's V statistics is a post-calculation which offers insightful information with respect to generalizability, ranging from 0 to 1. The closer to 0, the smaller generalizable power. The close to 1, the When it approaches 0, the generalizable power of association is considered small. When it approaches 1, the generalizable power of association is considered large. According to Cohen (1988), magnitude of effect size can be classified as small (0.1), medium (0.3), large (0.5).

$$\text{Cramer's V} = \sqrt{\frac{\chi^2}{n \cdot \min(r-1, c-1)}}$$

Cramer's V Formula

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