

## Modality in the moves of the discussion section of research articles

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### ABSTRACT

Various studies have been conducted on the rhetorical mechanism of Research Articles (RAs). However, the use of modal verbs in the Discussion section of a Research Article (RA) has not been adequately addressed. Thus, this study analysed modal verbs within the four generic moves in the Discussion sections of RAs using the model of Kanoksilapatham (2007). A corpus of 60 RAs written in English was selected from four Applied Linguistics journals: Language Testing, TESOL Quarterly, Pragmatics, and Second Language Research. The analysis of the corpus included two phases: (1) the identification of moves in the Discussion sections and (2) identification of modal verbs and their use within the identified generic moves in the Discussion sections. Chi-square was used to determine the distribution of modal verbs within the moves in the Discussion sections in each journal. The study revealed the significant distribution of modal verbs within three moves: 2, 3, and 4. The study also showed that the way modal verbs are distributed reflects the importance of their use as they have pragmatic functions in the Discussion section of a RA. It is hoped that this genre-based analysis of modal verbs in the Discussion section can make novice writers aware of how expert writers use modal verbs effectively in the moves of the Discussion section.

**Keywords:** Discussion sections; English for academic purposes; modal verbs; move analysis; research articles

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### INTRODUCTION

In many disciplines, it has been recognised that Research Articles (RAs) are considered to be a key medium for scientific communication. Among scholars, RAs are the established channel for communication of scientific and research findings, and they are considered to be an important venue to disseminate knowledge (Hyland, 2016; Samanhudi & O'Boyle, 2022). However, non-native speakers of English encounter tremendous challenges in academic writing, even at advanced levels where they are required to write RAs, theses, and dissertations (Chang & Kuo, 2011; Parkinson, 2011; Swales, 1990; Zhang & Hu, 2010). Awareness of

these academic writing challenges has motivated researchers to examine how expert writers manage the rhetorical structure of RAs. In the last two decades, the analysis of academic and professional genres has been carried out for pedagogical purposes and for understanding how novice and expert writers construct language for the achievement of successful academic communication (Tocalo, 2021; Wang, 2018; Zaree & Hejazi, 2019).

Among academic genre analysis, the abstracts of RAs and theses (Cutting, 2012; Pratiwi & Kurniawan, 2021; Samraj, 2005; Willey & Tanimoto, 2013) and dissertations (Can & Cangir,

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2019; Koutsantoni, 2006; Zare-ee & Hejazi, 2019) have been studied. Researchers have also paid considerable attention to the analysis of the moves in RA sections such as the Introduction section (Del Saz Rubio, 2011; Hirano, 2009; Swales, 1990, 2004), Literature Review section (Bruce, 2014; Kwan et al., 2012), Method section (Bruce, 2008; Cotos et al., 2017), Results section (Basturkmen, 2009; Bruce, 2009), and Discussion section (Basturkmen, 2012; Parkinson, 2011). These studies have been influenced by CARS (Create-a-Research- Space) model which was proposed by Swales (1990). The findings of these studies have raised writing instructors' awareness of the need to teach students different skills of writing RAs. However, these studies have not adequately examined how modal verbs are distributed across the moves of the Discussion section of RAs written by expert writers in top journals of Applied Linguistics. This is the gap that our study intended to address. In other words, our study aimed at analysing the variations of the use of modal verbs in the four moves in the Discussion sections in a corpus of 60 RAs.

It is important to justify why we examined the modal verbs in the Discussion sections in RAs. Further, it is essential to highlight the significance of this study and its contributions to the field of English for academic purposes. In fact, the rationale behind selecting the Discussion section is that this section abounds with modal verbs that serve flexibility and tentativeness of claims (Salager-Meyer, 1992, 1994). With a clear picture of how expert writers use modal verbs with respect to the moves in the Discussion section, the findings of our study can provide insights that are potentially valuable for non-native speakers of English, especially novice writers who should be aware of academic writing conventions in order to become successful writers. Although writers may have implicit knowledge of how to write the Discussion section, they may hardly have the explicit knowledge of the way modal verbs and generic moves are used in the Discussion section of RAs. Moreover, the results of this study can help academic practitioners minimise students' weaknesses and maximise their strengths by familiarising them with the proper use of modal verbs in RAs, especially in the Discussion section. Finally, it is significant to study the use of modal verbs in the Discussion section as modal verbs have various functions such as showing stance, reflecting the degree of certainty of the proposition, and expressing other meanings such as obligation and necessity (Vázquez, 2010).

Despite the fact that previous studies have looked at modality in other sections in RAs, our study has its contributions as it focuses on the Discussion section, which is a difficult section for

many novice writers and postgraduate students. For example, Bitchener and Basturkmen (2006) have reported that postgraduate students encounter various difficulties in writing the Discussion section because they lack awareness of various functions and content parameters of this section. Hence, our study can provide suggestions to novice writers concerning how expert writers in top journals can use various modal verbs in the Discussion section. It is worth mentioning that although our study selected RAs from top journals, the findings of our study are not similar to previous studies. This is because previous studies have examined modal verbs in other sections of RAs not the Discussion section. It is well-established in academic writing that each section in a RA has its own communicative purposes, resulting in differences in the functions of modal verbs in each section.

### **Studies on the Discussion section**

Among different sections of a RA, the Discussion section is the most important and argumentative part because writing the Discussion section requires some specific cognitive demands (Basturkmen, 2012; Bitchener & Basturkmen, 2006; Loi & Lim, 2019). The purpose of the Discussion section is to articulate and disclose research findings, and clarify the author's claim (Parkinson, 2011). The significance of the Discussion section is highly reflected when it functions as an "inside-out" shift for writers to widen the relevance of their findings and generalise them to other contexts (Swales, 1990, p. 173). Martínez (2003) explains that in the Discussion section, researchers evaluate the findings with respect to the given problems, and make an attempt to persuade the readers of the importance of the results.

Various studies have focused on the analysis of the Discussion section in terms of moves structure. For example, Basturkmen (2012) examined the Discussion section of RAs in Dentistry to uncover their schematic framework and compare this to the Discussion section in Applied Linguistics. Afshar et al. (2018) investigated the cross-disciplinary variations in the rhetorical structure of the Discussion section of RAs in Applied Linguistics and Chemistry. Employing a comparative research design, Amirian et al. (2008) compared the Discussion section of English RAs published in international English journals with another corpus of Persian RAs published in professional Persian journals. The researchers intended to understand how English and Persian RAs differ in terms of move schemata.

It can be noticed that an increasing amount of interest has been paid to the analysis of the Discussion section. Most of these studies have

used the genre-based approach in order to understand how expert writers organise the Discussion section of their RAs and to reveal variations in the rhetorical structure of the Discussion section of RAs. The results of these studies have provided evidence of variations in the rhetorical patterns of Discussion sections in different disciplines. For example, Amnuai (2019) analysed 20 English RA Discussion sections published in the field of Accounting, while the corpus of the Discussion sections in Gao and Pramoolsook (2022) was from the Engineering discipline. However, the gap in previous studies is that they have analysed the rhetorical patterns of the Discussion section of RAs. In other words, previous studies have not targeted the use of modal verbs in each move in the Discussion section. This is the novelty of our study.

### **Modality in RAs**

Modality is defined as the subjectivity of discourse producers (Lyons, 1977; Palmer, 1986), and it is the linguistic encoding of the beliefs and attitudes of speakers/writers towards the proposition manifested (Biber et al., 1999). Modality has been considered as one of the main aspects of research writing because it makes a bridge between writers and their propositions. Further, modality reflects writers' degree of certainty of the proposition and the addresser's confidence in the accuracy and credibility of the proposition (Coberley et al., 2023; Yang et al., 2015). Downing (2014) identified two facets of modality: epistemic and deontic. Epistemic modals help language users specify whether a proposition is true in terms of certainty or possibility (Carrió-Pastor, 2020; Lombardi, 2022). Hoyo (1997) defines epistemic modality as a phenomenon that is "concerned with matters of knowledge or belief on which basis speakers express their judgments about state of affairs, events or actions" (p. 42). On the other hand, deontic modals refer to the devices that language users can employ to exert obligation or to give permission (Chen & Zhang, 2017). Hoyo (1997) stated that deontic modals can refer to the "necessity of acts in terms of which the speaker gives permission or lays an obligation for the performance of actions at some time in the future" (p. 43).

It is argued that mastering the rhetorical strategies of scientific discourse is important (Vold, 2006). Among various strategic devices in academic writing, hedges in general and modal verbs, in particular, are significant ones (Hyland, 1998, 2005). Modal verbs are determined by the general structure of discourse and writers' communicative purposes. Constituting specific types of hedges, non-native speakers of English rarely use modal verbs (Mauranen, 1997). Moreover, studies have found that non-native

speakers of English encounter various types of challenges in academic writing (e.g., Alghail & Mahfoodh, 2019; Bacha, 2002; Morrison & Evans, 2018). For example, it has been shown that very few non-native writers know how modal verbs serve particular functions in different genres and how they are expressed in various fields (Hyland, 1996).

The literature is replete with studies on the function of modality and its frequency of occurrence (e.g., Haselow, 2011; Hinkel, 2009; Van linden & Verstraete, 2011; Vold, 2006). These studies are basically concerned with how writers use modal markers to express their ideas through examining the frequency of these markers. According to Alonso-Almeida and Carrió Pastor (2017), the majority of studies on modality in RAs considered modality as one type of stance within a broad concept of modality (Pho, 2013). It has also been noted that another line of research treated modal verbs as a hedging device (Hyland, 1998; Mauranen, 1997). Further, it has been pointed out that current studies have shown that modality can be realised only by modal verbs (Peacock, 2014; Vázquez, 2010). In our study, we adopt this recent view of modality. However, these inquiries do not deal with how writers construct their argumentation and discussion via these modal markers including modal verbs (Basturkmen, 2012). Thus, the current study is an attempt to provide a detailed description of modal verbs within the generic moves in the Discussion section of 60 RAs published in four international journals, through addressing the following research questions:

1. Are there significant statistical differences in the use of modal verbs in the Discussion sections of RAs in Applied Linguistics?
2. How are modal verbs distributed across moves in the Discussion sections of RAs in Applied Linguistics?

### **METHOD**

#### **Research design**

This study employed the qualitative approach which combines move analysis and corpus linguistics. Move analysis is an approach in which discourse structure and organisation can be investigated using corpus analysis (Biber, 2007; Upton & Cohen, 2009). Biber (2007) used the term 'top-down approach' to refer to this approach in which the researcher's task is to analyse the discourse structure of a particular genre. On the other hand, our study follows corpus linguistic studies which are generally considered to be a type of discourse analysis as these studies intend to describe the use of linguistic forms in their contexts (Biber, 2007).

### **Corpus compiling**

In this study, a corpus of 60 RAs was compiled. This number of RAs was the target in order to collect an adequate sample displaying a variety of modal choices and generic structures. These RAs were selected from four of the prestigious journals in Applied Linguistics: *Language Testing*, *TESOL Quarterly*, *Pragmatics*, and *Second Language Research* published from 1998 to 2014. These four journals were selected for four reasons. First, based on journal ranks by Scimago Journal and Country Rank (refer to [www.scimagojr.com/journalrank.php](http://www.scimagojr.com/journalrank.php)), these four journals are among the top 100 journals in Applied Linguistics in 2020 (we compiled the corpus in 2021). Second, based on journal metrics in Scopus (<https://www.scopus.com>), these four journals are also among journals in Quartile 1 (Q1). Third, as these journals are in Q1, RAs in these journals can be considered written by expert writers. Fourth, these journals belong to three different publishers: Sage, Wiley, and Elsevier. Then, the analysis of the Discussion sections in RAs from different journal publishers can, as we assume, enrich the corpus with variations.

Fifteen RAs were randomly selected from each journal for four main reasons: (1) to exhibit a high degree of representativeness, (2) to encapsulate a variety of subject matters, (3) the selected RAs should have the Discussion section as a separate one, and (4) to cover a wide range of modal choices and rhetorical moves. These reasons can be considered the inclusion criteria which were employed for the selection of the corpus. The issue of proportional number was not our concern because we had the four inclusion criteria, as explained here.

The corpus of RAs in most of the previous studies that have analysed the Discussion sections vary; with the majority of these studies have compiled 20 Discussion sections. For example, the corpus of the Discussion sections in Loi et al. (2016) and Amnuai and Wannaruk (2012) consists of 40 Discussions sections for each. Even in a recent study by Amnuai (2019), the corpus was only 20 Discussion sections. In the light of the corpora analysed in these studies, the corpus in our study can be representative as we compiled the corpus from four of the top journals in Applied Linguistics over an extended period of time.

The RAs in the study were selected based on certain guidelines. First, due to the fact that different disciplines have their own specific writing regulations (Samraj, 2002, 2005; Swales, 1990, 2004), the corpus was compiled from a single discipline: Applied Linguistics. Second, the corpus was limited to empirical studies which show a conventional structure of IMRD (introduction-method-result-discussion) pattern (Swales, 1990; Weisi & Asakereh, 2021). RAs that conformed to

the IMRD format were included in the corpus. Third, the corpus was selected in a span of 16 years (articles published from 1998 to 2014). It is worthy to note that only those RAs longer than 2500 words were included in the corpus. The justification behind the selection of RAs which have more 2500 words is that we wanted to get a representative sample of the Discussion section. This procedure is supported by Li and Ge (2009) who used this criteria for the selection of RAs in their study. In short RAs, the Discussion section may be combined with the Conclusion section in order to save space. RA writers were not differentiated by their language background (native or non-native English) because the international community is the only target for these writers (Parkinson, 2011). The focus of this study was on the published articles since the main paragons for students' writing are the RAs, internationally published in the English-medium journals (Bolton et al., 2003). There are some reasons for the selection of the period of time (RAs published from 1998 to 2014). First, the rationale behind selection was that the rhetorical structure of RAs is liable to change depending on the structural needs in various periods of time (Swales & Najjar, 1987). It has been argued that rhetorical needs during various periods of time can influence the structure of a genre, resulting in changes in the structure of RAs (Swales & Najjar, 1987). Second, accessibility was another criterion for the selection of this period of time. The researchers ensured that all the RAs were accessible and the full versions of the RAs could be downloaded. The universities of the two researchers did not have subscription to all the issues of the selected journals, especially the recent issues. Taking these factors into account, the researchers avoided selecting RAs published in very recent years to avoid missing the full version of any issue in the selected journals.

### **Corpus analysis**

The analysis of the corpus was done in two phases: (1) the identification of moves in the Discussion section of RAs and (2) the analysis of modal verbs within the identified moves in the 60 Discussion sections. For the identification of the moves in the Discussion sections of the RAs, the unit of analysis is 'move', which is defined as a meaningful unit in a text that has a communicative purpose and can contribute to the overall communicative purpose of the text (Kwan, 2006). In the analysis of modal verbs in each move of the Discussion sections, the unit of analysis is the modal verb.

The current study adopted the model of Kanoksilapatham (2007) as the basis for analysing and coding moves in the 60 Discussion sections. This model contains four moves which are Move 1: contextualising the study; Move 2: consolidating results; Move 3: stating limitations; and Move 4: suggesting further research. Before examining the

Discussion sections, the researchers read the RAs completely to avoid any biased comprehension or misunderstanding of the articles. In line with previous studies, the moves were identified on the basis of linguistic elements, comprehension of texts, textual partitioning, and typographical evidence (Connor & Mauranen, 1999; Ding, 2007; Nwogu, 1997; Peacock, 2002).

After the compilation of the RAs, we started move analysis through identification of moves in each RA based on the given framework. Further, we utilised the analytical framework of Swales (1990) to identify the textual boundaries between moves in each Discussion section by their content and linguistic criteria. The frequencies of individual moves in each Discussion section were entered in an Excel Sheet. This was done to ensure that frequency of the occurrence of each move was enough for each move to be considered “obligatory”. Based on Nwogu (1997) and Li and Ge (2009) concerning move stability, a cut-off frequency of 50% was chosen.

The identification of the moves provided a baseline for the examination of modal verbs in the corpus. In the second phase of the analysis, the researchers checked the identified moves in the Discussion sections in order to pinpoint modal verbs (*may, might, can, could, must, should, would, and will*). These modal verbs were counted manually with particular attention given to the context of their use. The frequency of occurrence of these modal verbs was calculated in percentage within the identified moves. In order to avoid missing any modal verbs, each one of the researchers repeatedly reviewed the analysis. This was an essential procedure that involved going back and forth within the moves. This was done through several meetings among the researchers. Within each move in the Discussion sections, the occurrence of each modal verb was marked so that its frequency and percentage could be calculated.

The frequency and the distribution of modal verbs were displayed through tabulation. To determine whether this distribution of modal verbs within the moves is significant or not, we employed inferential statistics (Chi-square with a significance of  $P \geq .05$ ). After checking the distribution of these modal verbs, the researchers first specified the pragmatic intentions underlying the use of modal verbs within each move. After that, the researchers identified the interplay between moves and modal verbs in the context of the Discussion section of each RA of the corpus.

#### **Reliability of moves identification**

As previously stated, the researchers used a number of techniques for the identification of moves in the Discussion sections. This identification process is inherently challenging (Basturkmen, 2009, 2012), mainly due to the subjectivity in identification and

detection. This is a usual matter in analytical analysis. For instance, one move can merge with another move or two moves can be embedded in one sentence (Basturkmen, 2012). To minimise the degree of subjectivity in the process of the analysis by two researchers, it was necessary to implement an inter-rater reliability procedure (Crookes, 1986; Kanoksilapatham, 2005). Thus, in addition to the two researchers, a third rater, who is familiar with coding of moves and genre analysis, was requested to assist the two researchers in moves identification and the analysis of modal verbs. This procedure was done to minimise the risk of arbitrariness and to reach a high level of agreement in the analysis of moves in the Discussion sections and modal verbs in each move.

The corpus was analysed by the two researchers and their colleague, who was the third rater. The two researchers did the analysis and met to reach a complete agreement. After that, they invited their colleague to analyse a subset of 45 RAs from the corpus. The third rater is a PhD holder in Applied Linguistics, with experience in doing research on genre analysis. After the analysis of each Discussion section had been completed, the two researchers and the third rater went through the analysis to identify instances of disagreement. Discussion and negotiation of issues related to the analysis were solved among the two researchers and the third rater. Intra-rater agreement was achieved through re-coding 35 Discussion sections which were randomly selected from the corpus. This recoding was carried out six months after the completion of the initial analysis. For both inter-rater and intra-rater agreement, a high level of reliability index was obtained. It was above 80%. Further, on the basis of inter-coder reliability analysis, the Kappa statistic was used to determine the degree of agreement between the two researchers. A value of 0.88 was achieved for the Kappa statistic, indicating a high level of inter-coder agreement (refer to Antonisamy et al., 2017; Kraska-Miller, 2013). This uniformity makes the interpretation of the results more reliable and allows more valid generalisability.

#### **FINDINGS**

##### **The statistical differences in the use of modal verbs in the Discussion sections of RAs in Applied Linguistics**

This section reports the frequency of the modal verbs in the four moves of the Discussion sections. This is reported for the corpus in each journal. The section also reports the statistical differences of the distribution of the modal verbs in the four moves in the Discussion sections in each journal.

##### **TESOL Quarterly**

Table 1 displays the frequency of occurrence of modal verbs within the four moves in the corpus of

20 RAs which were selected from *TESOL Quarterly*. While a majority of modal verbs (70.9%) were found in Move 2, the first move accounted for 2.4% of the total number of modal verbs. Regarding Move 1, each of the three modal verbs (which are *may*, *could*, and *would*) was used once. However, the analysis shows the absence of *might*, *can*, *must*, *should*, and *will* in these 20 RAs. The analysis of this specific corpus indicated that the most heavily loaded modal verb within Move 2 was *may* which contained 39.7% of all modal verbs reported in this sub-corpus. On the other hand, the modal verbs *must*, *should*, and *will* were used in the smallest percentage, which individually made up 2.2% of all identified modal verbs. Within Move 3, *may* was the

most prominent modal verb with 46.1% of the total modal verbs. In this move, *will* with no case of occurrence was the least prominent modal verb. Unlike the finding within Move 3, *will* had the highest percentage of use in Move 4. However, in Move 4 no case of the verb *can* was identified. This finding resembled that of Move 1. As shown in Table 1, there are statistical differences in the frequency of the modal verbs in only Move 2. With regard to Moves 1, 3, and 4, all p-values which were calculated for the comparison of the modal occurrences within the moves were higher than 0.05, illustrating that the differences in the frequency of modal verbs in the Discussion sections in *TESOL Quarterly* was not significant (refer to Table 1).

**Table 1**  
*Modal verbs in the Discussion moves in TESOL Quarterly journal*

	Moves in the Discussion section			
	Contextualising the study	Consolidating results	Stating limitations	Suggesting further research
May	1(33.3)	35(39.7)	6(46.1)	2(10)
Might	0	8(9.09)	1(7.6)	2(10)
Can	0	10(11.3)	2(15.3)	0
Could	1(33.3)	10(11.3)	1(7.6)	3(15)
Must	0	2(2.2)	1(7.6)	1(5)
Should	0	2(2.2)	1(7.6)	5(25)
Would	1(33.3)	19(21.5)	1(7.6)	3(15)
Will	0	2(2.2)	0	4(20)
Total	3(2.4)	88(70.9)	13(10.4)	20(16.1)
Chi-square	.000	81.2	11.2	3.80
p-value	1.000	.000*	.08	.7

**Language Testing**

A summary of differences in the frequency of each modal verb in the 20 RAs in *Language Testing* is reported in Table 2. The frequency of modal choices was the highest in Move 2 (61.5 %). The second in frequency was Move 4 (21.1%) which contained relatively more modal verbs than Move 1 (11.5%). Just as expected, Move 3 contained the lowest percentage of modal verbs (5.7%). With reference to the verb *can*, it was found that it is far more frequent in Move 1 constituting 33% of all other modal verbs. In a similar vein, *can* was the most widely used modal in contrast to *must* which was the least

frequent modal (26% versus 3.1%). Within the last move, as shown in Table 2, *would* was the most prominent modal verb in the 20 RAs, while *can* was the least frequent modal verb in this sub-corpus (27.2% versus 4.5%). Surprisingly enough, the distribution of modal verbs within Move 2 was the only significant pattern given that p-value as their occurrences was .000 ( $p > 0.05$ ). Nonetheless, the p-values for the distribution of modals in other moves were less than 0.05. This reflects those patterns of modal verbs distribution were not significant (refer to Table 2).

**Table 2**  
*Modal verbs in the Discussion moves in Language Testing journal*

	Moves in the Discussion section			
	Contextualising the study	Consolidating results	Stating limitations	Suggesting further research
May	3(25)	16(25)	3(50)	3(13.6)
Might	0	4(6.25)	0	4(18.1)
Can	4(33)	17(26)	0	1(4.5)
Could	0	4(6.25)	2(33)	2(9.02)
Must	1(8.3)	2(3.1)	0	2(9.02)
Should	1(8.3)	3(4.6)	1(16.6)	2(9.02)
Would	2(16.6)	8(8.12)	0	6(27.2)
Will	1(8.3)	10(16.6)	0	2(9.02)
Total	12(11.5)	64(61.5)	6(5.7)	22(21.1)
Chi-square	4.000	30.2	.607	6.36
p-value	.5	.000*	.6	.4

**Second Language Research**

Table 3 shows that *would* was present in 41.1% and 26.5% of Moves 1 and 2, respectively. Hence, it was the dominant modal verb, compared to the proportion of others. With regard to Move 1, there was no case of occurrence of *might*, *can*, and *must*. *Must* was also identified as the least frequent modal within Move 2, comprising 3.06% of all the modal verbs. The most striking result was found within Move 3, where no case of modal verbs

except *could* (with one occurrence) was identified. As to the last move, the analysis showed that the majority of modal verbs occurred once except *may* which was used twice, while *can* and *must* provide no case in the corpus. Taken together, similar to the findings in the previous journals, 83% of the occurrences of all the modal verbs were found in Move 2, whereas 84% of the modal occurrences appeared in Move 3.

**Table 3**  
*Modal verbs in the Discussion moves in Second Language Research journal*

	Moves in the Discussion section			
	Contextualising the study	Consolidating results	Stating limitations	Suggesting further research
May	3(25)	19(19.3)	0	2(28.5)
Might	0	7(7.1)	0	1(14.2)
Can	0	16(16.3)	1(100)	0
Could	1(8.3)	10(10.2)	0	1(14.2)
Must	0	3(3.06)	0	0
Should	1(8.3)	9(9.1)	0	1(14.2)
Would	5(41.1)	26(26.5)	0	1(14.2)
Will	2(16.6)	8(8.1)	0	1(14.2)
Total	12(10.1)	98(83)	1(.84)	7(5.9)
Chi-square	4.66	32.2	0	.714
p-value	.3	.000*	0	.9

Given the fact that the p-value for the distribution of modal verbs within Move 2 was .000 (less than 0.05), it could be inferred that the frequency differences attributed to modal variation were significant in this Move only (which is Move 2). The distribution of modal occurrences, however, was not significant within the remaining moves.

**Pragmatics**

A total of 155 modal verbs were identified within the four moves in the Discussion sections in the journal of *Pragmatics*. Table 4 presents the frequency of each modal verb in the Discussion sections in this journal

**Table 4**  
*Modal verbs in the Discussion moves in the journal of Pragmatics*

	Moves in the Discussion section			
	Contextualising the study	Consolidating results	Stating limitations	Suggesting further research
May	2(50)	25(25)	0	22(47.7)
Might	0	5(5.1)	0	2(3.7)
Can	1(25)	31(31.9)	0	11(20.3)
Could	0	10(10.3)	0	4(7.4)
Must	0	2(2.06)	0	2(3.7)
Should	1(25)	12(12.3)	0	5(9.2)
Would	0	11(11.3)	0	3(5.5)
Will	0	1(1.03)	0	5(9.2)
Total	4(2.5)	97(62.5)	0	54(34.8)
Chi-square	.5	66.3	0	47.9
p-value	.7	.000*	0	.000*

Of the four moves, Move 2 contained the most frequently used modal verbs in the corpus (97%). This was followed by Move 4 (34.8%) and Move 1 (2.5%). Surprisingly, no case of modal verbs was realised within Move 3. Among the four modal verbs recorded within Move 1, two of these modal verbs were the manifestations of the modal verb *may*. However, the other two were equally

shared by *can* and *should*. Hence, no incidence of *might*, *could*, *must*, *would*, and *will* was observed in this Move. Of all the modal verbs employed within Move 2, *may* had the highest frequency (31.9%). This finding is similar to the results in *Language Testing* journal. *Will* was the only modal employed once within the move presenting the lowest proportion (1.03%). The analysis of RAs showed

that within Move 4, *may* was the most widely employed modal, making up 47.7% of all the modal verbs. The analysis also indicated that *might* and *must* similarly had the lowest incidence (3.7%).

To identify the statistical differences in the frequency of the modal verbs across the four moves in the Journal of *Pragmatics*, Chi-square was used. The analysis revealed that the patterns of modal distribution within Moves 2 and 4 were statistically significant ( $p < 0.05$ ). Whereas, the differences in the frequency of the use of modal verbs within Move 1 was not significant ( $p > 0.05$ ).

### The textual evidence of the modal verbs across moves in the Discussion sections of RAs in Applied Linguistics

The analysis of the corpus has revealed that the distribution of modal verbs varied across the four moves in the corpus. In Move 1, contextualising the study, the authors made frequent use of *can*, *would*, and *may* in *Language Testing*, *Second Language Research*, and *Pragmatics*. The following examples extracted from the corpus of the Discussion sections illustrate this issue:

**Example 1.** Analysis of differential item functioning *can* be helpful to language testers who must use different language versions of their assessments (Sireci, 2003).

**Example 2.** Both types of optional forms *would* arise in the face of robust input (Papp, 2000).

**Example 3.** This idiom typology is useful for studying how idiomatic information in ads *may* be processed (Lim et al., 2009).

**Example 4.** First, participants named the objects immediately prior to the comprehension trials, which *may* have boosted their performance in comprehension (Hopp, 2012).

Further, the analysis of the corpus revealed that Move 2, consolidating results, was recognised as the longest move incorporating a large number of modal verbs in the examined corpus. *May*, *would*, *can*, and *should* were the modal verbs that had the highest proportion in *TESOL Quarterly*, *Language Testing*, *Second Language Research*, and *Pragmatics*, as reflected in the examples below.

#### Example 5

We *may* conclude that superior academic ability is not a requirement for successfully learning English in intensive communicative classes (Collins, 1999).

#### Example 6

The following observations *can* be made about the relationships between the tests (Qian and Schell, 2004).

#### Example 7

A syntactic account of these facts *would*

more readily provide an explanation (Franceschina, 2001).

#### Example 8

Potentially, all meanings of legal and non-legal texts *can* be interpreted differently by people with different cultural backgrounds and social knowledge (Cao, 2009).

#### Example 9

Clear distinctions *can* be found between PET (the lowest) and CPE (the highest), but less distinctive patterns between adjacent levels (e.g., FCE and CAE) (Kang & Moran, 2014).

Regarding Move 3, stating limitations, some notable findings were observed. This move showed the least frequency of modal verbs in the selected journals except *TESOL Quarterly*. *May* was the most frequent modal in *TESOL Quarterly* and *Language Testing*, while no case of modal verbs was identified within Move 3 in *Pragmatics*. However, there was only one case of modal occurrence (*can*) in *Second Language Research*. The following examples show the use of both *may* and *can* within Move 3 in *TESOL Quarterly*, *Language Testing*, and *Second Language Research*.

#### Example 10

Another difference that *may* have influenced the outcomes is the positive attitude toward the learning of English that was present throughout the school (Collins, 1999).

#### Example 11

However, some items were not consistent with the DIF pattern, which *may* limit the generalization of the findings (Pae, 2004).

#### Example 12

Lack of positive evidence alone *can* account for the results (Inagaki, 2002).

#### Example 13

One of the threats to the wider validity of the results is that the participants' motivation in an experimental setting *may* be different from that of actual CSAT examinees (Lee & Winke, 2013).

Within Move 4, suggesting further research, there were three prevalent modal verbs, namely *should*, *would*, and *may* in the *TESOL Quarterly*, *Language Testing*, *Second Language Research*, and *Pragmatics*. These three modal verbs were used extensively in the corpus. As reflected in the findings, the last two journals were similar in their high use of the verb *may*. The following examples extracted from the corpus show the use of modal verbs in Move 4:

#### Example 14

Future research *should* also explore the use of CSR in combination with other approaches (Klingner and



Vaughn, 2000) **Example 15**

*On the other hand, a replication study with children with a delayed or disturbed language development **would** be worthwhile (Spelberg, de Boer & van den Bos, 2000).*

**Example 16**

*Future studies also **may** explore how alternative types of output affect vocabulary learning and other aspects of language learning (Barcroft, 2006)*

**Example 17**

*Future research **may** also broaden the scope of idiom application in advertising by*

*examining a greater number and variety of idioms (Lim, 2009).*

**Example 18**

*Such an analysis **would** also require a close look at the writing and publication process (Mur-Duen˜as, 2011).*

## DISCUSSION

This study intended to investigate the distribution of modal verbs within the rhetorical moves in the Discussion sections of 60 RAs which were selected from four academic journals in applied linguistics. The study made a close examination of the interaction between generic moves in the Discussion sections and modal verbs in this section. Although the analysis showed certain differences in the use of modals within each journal and across the four journals, some noticeable similarities within each distinct move were identified. Of the eight modals examined in the study, the more prevalent modal verbs in the investigated corpus are *may*, *can*, *should*, and *would*. These findings, thus, are in line with literature showing the variation of modal uses in academic writing (Hyland, 2005; Parkinson, 2011). More specifically, the overall findings have distinctly indicated similar distributions of modal verbs within each move.

Our study has also provided important observations concerning the variation of modal verbs within each move. Given that the p-value for the modal distribution within moves was less than 0.05, it was found that the distribution of the modal verbs was statistically significant within Move 2 across the four journals, Move 3 in *TESOL Quarterly* and Move 4 in *Pragmatics*. This suggests that English writers have a greater tendency to use modal verbs within these moves. Further, it could be inferred that the selection of modal verbs is determined by the moves. Salager-Meyer (1992) also found that moves have an influential impact on the choice of modals. However, such tendency is totally absent within Move 1. This can reflect those modal verbs have no clear relationship with this move along with its steps. Regardless of relative

variations of modal distribution across the journals, the significant distribution of modals within Moves 2, 3, and 4 could explain the pragmatic and rhetorical importance of these modal verbs in RA writing.

The findings of this study revealed a low proportion of deontic modals. This is congruent with what Hinkel (2009) has put as the less prevalence of deontic modals in formal academic discourse. These findings are also consistent with those revealed by Biber et al. (1999) who found that the overall distribution of necessity and obligation in academic writing is comparatively half of the uses of epistemic modals. Similarly, Smith (2003) has discussed the dramatic decline in the frequency of obligation/necessity modals in academic reports. The author argues that the decrease in the use of deontic modals is due to the socio-linguistic changes in academia. It is generally believed that writers employ deontic modals to intensify their claims and exert objectivity in the study which is more favoured in hard sciences than social sciences (Meyer, 1997).

The results indicated a high presence of *may*, *should*, *can*, and *would* within the four moves across the whole corpus. This could reflect that the aforementioned modal verbs have been used for epistemic purposes, displaying tentativeness and hypothetical situations. The high frequency of *may*, *can*, and *would* within Moves 1 and 2 implies that these modal verbs can enable writers to soften the underlying forceful positions with respect to the politeness techniques in general. Further, the high frequency of these three verbs reflects that the writers used them to verify the safety of their claims in particular (González García, 2000). Since within Moves 1 and 2 authors try to make generalisations and describe the established knowledge [two steps of Move 1] and also to make claims and explain differences in the findings [two steps out of six in Move 2], the modal verbs, namely *may*, *can*, and *would*, can help writers modulate their assertions through softening modal verbs. Although some writers use *may* and *can* for their respective epistemic and legal functions and believe that the modal verb *can* does not have tentative interpretations, it is argued that uncertainty and assessment of possibility could be demonstrated through the negative form of *can* (Perkins, 1983).

The high frequency of *may* within Move 3 can show a fine pattern of epistemic modals. This strong tendency of English authors to use *may* can be explained in two ways. First, since writers are supposed to refer to the limitations of their studies within the move, the modal verb 'may' can appear to be an appropriate choice to help them argue the insignificant impact of limitations on the obtained results. The epistemic modals suggest low confidence and lack of certainty, thus indicating

less likelihood of insecurity of findings on the one hand and reliability and validity of them on the other. Second, the use of epistemic modal verbs makes readers wary of the fact that other limitations, besides those mentioned within the move, could have certain contributions in collecting the data and finally reaching the results of the study. Thus, by this token, modal verbs implicitly indicate the less effectiveness and certainty of given limitations within the move.

Based on the findings of our study, Move 4 displayed a diversity of modal verb uses across the four journals. *Should*, *would*, and *may* were the most frequent modals in the journals. This means that although writers in different journals have partial tendency towards a particular modal, the employed modals serve a unitary goal. Both *would* and *may* mutually underscore the probability of further research within the move. Although one might put that *should* is more likely to convey deontic meanings, *should* with a tentative meaning internally has a function of futurity (Hyland, 1998). In that sense, *should* within Move 4 is more used for its epistemic function, expressing assessment of probability on the basis of the facts realised by writers. Hyland (1998) argues that the modal verb *should* establishes a link between “subjectivity (i.e., the writer’s attitude to the proposition) and logical assumption (what is understood from the known facts)” (p. 114).

### **Pedagogical implications**

Concerning pedagogical implications, it seems vital to persuade novice writers in Applied Linguistics to become familiar with the use of relevant modal verbs within different moves in the Discussion section, particularly Moves 2, 3 and 4. Students are less aware of tentative constructs in the academic writing. In other words, they are more susceptible to employ putative structures while academic research writing demands to be more cautious and tentative (Parkinson, 2011). The need for such awareness is more essential for non-native English writers who may need more help in their academic writing (Peacock, 2011).

The results of the present genre-based study can also help material designers and instructors in English academic community design relevant writing materials that show how expert writers commit to their propositions and construct well-developed Discussion sections of RAs. Academic writing instructors may introduce relevant writing strategies to non-native writers and sensitise them to the expectations of a research community and to the reading-writing interface as well. In reading classes, awareness about mechanism of a genre can familiarise learners with both language choices and rhetorical structures in the Discussion sections, as revealed in this study. This awareness can also increase readers’ abilities to gain deeper insight as

to how and when modal devices are used in general and within moves in RA Discussion sections, in particular.

### **Limitations and suggestions for future research**

Although this study has offered some significant findings in terms of the use of modal verbs in the Discussion sections in a selected number of journals in Applied Linguistics, the study has some limitations. The first limitation is related to the distribution of the modal verbs and their statistical significance. Although this study has offered some interactions of the variations of the use of modal verbs across the four journals, future researchers can give attention to the examination of modal verbs across more journals. In addition to this, future studies may examine the statistical significance of a small number of modal verbs across some journals in applied linguistics. Second, this study analysed the use of modal verbs in only the Discussion section of RAs. Thus, further research could be conducted to examine the modality variations in other sections of RAs, such as the Results, Introduction, and Method sections. Third, the corpus of this study was limited to only RAs in applied linguistics. Therefore, future investigations may consider carrying out a comparative study that can focus on the use of modal verbs in the Discussion section of RAs across two or more disciplines, such as Applied Linguistics and Engineering. Further research may also investigate the researchers’ awareness of using modal verbs in RA sections, drawing a boundary line among disciplinary differences.

### **CONCLUSION**

The present study focused on the distribution and use of modal verbs within generic moves in the Discussion sections of 60 RAs in four journals in Applied Linguistics. The results indicated the effective role of modal verbs within the majority of moves. Thus, the cohesion of the Discussion section of RAs is influenced by interaction between modals and rhetorical moves. We may state that the distribution and use of modal verbs in the generic moves of the Discussion section do matter in formal language contexts and should be incorporated in academic writing syllabuses. Hopefully, this investigation takes us one step further in comprehending the significance of cohesion in writing RA Discussion sections in light of the interactive roles of modals and moves.

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