A Rhetorical Analysis of Critical Thinking in the "Discussion" Section of Applied Linguistics PhD Dissertations

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Abstract

One of the important sections of PhD dissertations where authors must evaluate and interpret their research findings critically is the dissertation Discussion chapter (DDC). Given the significance of this section and the undeniable role of critical thinking in presenting arguments in DDC, the rhetorical structures of 120 DDCs in applied linguistics from Anglophone and Iranian state universities were compared and analyzed manually employing Crombie's (1985) taxonomy of interpropositional relations. The findings of the study indicated that, at the semantic level, the three most frequent binary semantic interpropositional relations used by both groups of the study were Reason/Result, Ground/Conclusion, and Simple Comparison, respectively. These findings reveal the high potential of the coherence relations for establishing arguments and thus incorporating critical thinking in DDCs. The study has important implications for postgraduate students to develop a deeper understanding of the rhetorical means used in the DDCs and the necessity to incorporate critical thinking into this chapter.

 Keywords: Academic Writing; Critical Thinking; PhD Dissertation; Discussion; Interpropositional Relations

1. Introduction

Writing unveils, develops, restricts, and modifies human thoughts, and triggers new ideas (Fulwiler, 2002, p. 32). One of the most important types of writing through which human thinking could be solidified is academic writing. It is one of the main stages of academic research which makes reporting "situations of thinking, experience, observation, application/testing, etc." possible (Akkaya & Aydin, 2018, p. 129). Academic writing is important since it is the most prominent means of exchanging information among discourse community members and can be considered an eminent channel through which sharing knowledge becomes possible for academics (Jalilifar, Heidari Kaidan & Don, 2018). As argued by researchers, due to its significance in academia, academic writing needs to be "clear, understandable, remarkable, and concise, and to be presented in a certain order by ensuring coherence and cohesion among its subsections" (Akkaya & Aydin, 2018, p. 130).

The past thirty years have witnessed extremely rapid advances in text analysis in general and research articles in particular. A typical example of a written genre that has garnered the attention of discourse analysts and textographists (Hyland, 2006; Swales, 1998) is the PhD dissertation. The

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dissertation is known to be a rich and unique source of information, often the only source of research work that does not find its way into various publication channels (Bhat & Mudhol, 2014, p.1). It is "the longest and most challenging piece of assessed writing" that a post-graduate student will ever produce (Loan & Pramoolsook, 2015) and is considered a partial or complete requirement for the fulfillment of the degree of doctor of philosophy in many countries including Iran, America, Britain, Australia, and Canada.

One of the most important sections of a dissertation is the Discussion section because this is where authors must evaluate and interpret their research findings (Thyer, 2008). Dudley-Evans (1994) and Lewis, Graham, Boland & Stacey (2021) declare that supervisors and students attach great importance to the Discussion section of a dissertation where evaluating research findings is a cognitively demanding enterprise because it involves complex causal, conditional, and purposive argument (Arsyad, 2013; Parkinson, 2011). The development of a sound and sensible argument in the dissertation Discussion chapter (DDC) presupposes incorporating critical thinking as a necessary construct for twenty-first century learning as emphasized by research on dissertation writing (e.g., Bitchener, 2009; Dwyer, 2017; Evans, Gruba & Zobel, 2011; Haber, 2020; Holiday & Hollins, 2019; Lucchiari, Sala & Vanutelli, 2019; Rudestam & Newton, 2007). The Discussion chapter is assumed to perform a critically evaluative function in relation to the overall findings of the study being reported in terms of how they answer the research questions and how they relate to relevant, previously-published research and theory in the same field (Bruce, 2018).

At college level, Hyytinen, et al (2019) assert that most colleges declare in their mission statements that their principal goal is to develop students' higher-order cognitive skills such as critical thinking (CT) and reasoning. Finally, according to Browne and Keeley (2018), it is generally accepted that the development of CT skills is a top priority of higher education. However, according to Rahimi and Askari Bigdelli (2014) although access to the Internet, research engines, online utilities and applications has made the accessibility to virtual libraries, books, journals, and articles easier, the process of writing a research project (e.g. a thesis or dissertation) still remains a challenging and multifaceted task for postgraduate students in general, and non-native speakers of English in particular; the reason for this difficulty may originate from the complex and manifold nature of CT and its association with other mental and personality factors (Fahim & Zaker, 2014). Informed by the need to develop a comprehensive account of the rhetorical organization of the Discussion chapter of PhD dissertations, the present study aims to investigate critical thinking in this high-stakes academic context. Given the significance of the Discussion chapter of dissertations as a sub-genre of academic writing and also the undeniable role of critical thinking in presenting arguments in it, the present study addressed the following questions:

Research Question One: What are the common textual means used by Iranian applied linguistics PhD students to express critical thinking in the DDCs in Applied Linguistics?

Research Question One: What are the common textual means used by applied linguistics PhD students in Anglophone contexts to express critical thinking in the DDCs in Applied Linguistics?

2. Literature Review

2.1. What is Critical Thinking?

The concept of CT, first introduced as "reflective thinking" by Dewey in 1910, is defined as "an active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it" (Dewey, 1910, p. 6). From then on, a plethora of definitions have been proposed by different scholars. Ennis (1985), for example, defines it as "reasonable reflective thinking focused on deciding what to believe or do" (p. 44). Glaser (1941) characterizes CT as involving

knowledge of the methods of logical inquiry and reasoning. McPeck (1981) defines it as the appropriate use of reflective skepticism within the problem area under consideration and finally, Ruggiero (2012) considers CT as "the art of thinking about thinking" (p.5)

Nevertheless, the consensus definition developed by 46 experts from various disciplines who participated in a research project called the Delphi study is accepted for reference in this study (Facione, 1990), for it eschews an appraisal-only sense of CT. In fact, it includes categorizing situations, decoding graphs, and paraphrasing statements, as well as the more familiar skills of devising testing strategies, formulating alternative solutions or hypotheses, judging the acceptability of premises and inferences, and drawing conclusions. According to the definition suggested by the Delphi experts, CT is the "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (Facione, 1990, p. 3).

2.2. Dissertation Discussion and Critical Thinking

A dissertation is a research project completed as part of a postgraduate degree that allows students to present their findings in response to a question or a proposition. It is "a labor of love requiring much work, sweat, and tears, as well as organization skills and extensive resources from others who are involved with the process" (Grant & Osanloo, 2014, p. 12). In many universities that offer post-graduate degrees, the student scholar needs to submit a dissertation, adhering to the guidelines and regulations of the institutions to which he or she will submit their work (Qassem, 2014). One of the most important sections of a dissertation is the Discussion section because this is where authors must evaluate and interpret their research findings and comment on every issue in the research questions (Thyer, 2008). Thyer's view entails the importance of incorporating CT and argument in DDC. Furthermore, Parkinson (2011) draws on the importance of argument in the Discussion section by stating that what makes a Discussion chapter difficult is that it involves complex, causal, conditional, and purposive arguments.

Given the close relationship between CT and DC, a number of studies have been conducted to investigate CT in the Discussion section using multiple analytical models (Bruce, 2008a; Bruce, 2016; Bruce, 2018; Cooley & Lewkowicz, 2003; Paltridge, et al 2012). Among these studies, two of them seem to be groundbreaking. In his study, Bruce (2016) explored the means used by writers to establish a critical stance. The study identified the particular statements in essays that overtly expressed a critical evaluation, and explored the textual resources that these statements employed. To this aim, he manually analyzed two samples of 15 student essays from the subject disciplines of English literature and sociology in terms of the social genre/cognitive genre model of the author (Bruce, 2008a). The analysis revealed that two generic elements, operating together, emerged as the principal means used by writers to express a critical evaluation. First, taking Crombie's (1985) taxonomy of interpropositional relations into account, the critical statements included a small range of coherence relations. Most frequently the critical statements used were: *Grounds/Conclusion*, *Concession/Contraexpectation,* and *Reason/Result*. Secondly, two devices from Hyland's (2005) metadiscourse model, embedded within these relations, were also found to help construct a critical stance, specifically *hedging* and *attitude markers*. Bruce (2008a) concluded that in order to be able to formulate critical statements and develop the ability to incorporate them into their own writing, novice writers need to develop an awareness of the use of these important textual elements.

In another study, applying his social genre/cognitive genre model as the analytical framework, Bruce (2018) identified the textual resources used to express CT in the Discussion chapters of five PhD dissertations from the discipline of Applied Linguistics. The results of this study revealed three generic elements to express critical evaluations as part of constructing an overall argument in the Discussion

chapters examined. The first element was the recursive use of a move pattern described as *point*, s*upport*, *evaluation*. The second was the use of key coherence relations of *Reason/Result*, *Concession/Contraexpectation,* and *Grounds/Conclusion* to make critical statements in the Evaluation part of this content schema. *Embedding* within critical statements of the metadiscourse devices of *hedging* and *attitude markers* was found to be the third generic element in expressing critical evaluations.

More recently, Abbasi, et al (2021) attempted to explore the evaluative potential of that-constructions in shaping the structure of academic arguments in the Discussion section of 60 selected empirical RAs from four fundamental journals in applied linguistics. To this aim, they carried out a textual analysis to identify the forms and functions of that-clauses in the Discussion sections using Hyland and Jiang's (2017) scheme. The findings of their study revealed that the subtleties of the writers' intended purposes depict themselves in the way they linguistically structure their arguments through the evaluative potential of that-clauses to specify the findings of their research, to specify the interpretations and implications of their findings, and to comment on the works of others.

The current study is informed by research on the difficulties of writing the Discussion chapter of a PhD dissertation reported by scholars. First, some PhD supervisors and examiners report weaknesses on the part of their students in writing the DDC. Shaw (1991), for instance, reported that second language (L2) writers of PhD dissertations in English regarded the Discussion chapter as the most difficult since it was the least supported type of writing. Supervisors and students indicate that postgraduate L2 writers have problems with developing and sustaining coherent arguments in the Discussion chapter particularly in presenting an appropriate critical evaluation of their findings in relation to the disciplinary literature (Dong, 1998*;* Swales & Feak, 2003; Thompson, 1999). Similarly, research has found that novice writers have problems reporting findings and justifying the validity of their claims appropriately (Min, San, et al 2013; Paltridge & Starfield, 2007). This can be possibly a serious problem when postgraduate students cannot decide what they should write in the DDC because of their limited knowledge of the genre in focus (Nodoushan & Khakbaz, 2011).

Second, previous research has mainly focused on the related sections of a research article (RA); however, there seems to be a dearth of research that has evaluated dissertations in general and the Discussion chapter in particular from a CT perspective. One possible reason for this underestimation may be attributed to the size of the texts involved. Thompson (1999) considers the sheer size of theses and dissertations as a text for analysis as the main reason for researchers' lack of interest in this regard. The paucity of research in this area is even more vivid in the Iranian academic context. Studies that have evaluated master's and PhD theses from a genre-analytic perspective in Iran are few and far between (e.g. Hosseini Massoum & Yazdanmehr, 2019; Nodoushan & Khakbaz, 2011). Moreover, the assessment of CT in DDC remains largely a mystery. Compared to the number of PhD dissertations that are written by postgraduate students in Applied Linguistics and the urgent need for the target community of students as well as discourse analysts to know about the intricacies of the rhetorical organization of information in a dissertation, debates continue about the nature of CT using a multi-variable coherent genre model.

Moreover, the majority of research studies conducted previously have mainly focused on the internal organization as well as the communicative functions of the Discussion section and little research has examined the specific textual elements and devices commonly employed to express CT although they contribute a lot to the construction of argumentation in this genre (Bruce, 2018). While not discounting the roles of functional moves and their related lexico-grammatical features, the present study undertakes a somewhat more holistic exploration of the textual expression of CT in DDCs using Crombie's (1985) taxonomy of interpropositional relations*.* The principal reason for taking this

approach is that the expression of this significant characteristic needs to be examined within the functioning discursive and textual whole that constitutes the DDC.

3. Method

3.1 Research Design and Corpus

This research is a genre-based study in which the rhetorical structures of 120 DDCs from 9 Iranian state universities and 18 Anglophone universities were analyzed manually adopting Crombie's (1985) taxonomy of interpropositional relations (for a detailed account of these dissertations refer to Appendix 1 & 2). The researchers provided descriptive information in terms of the length of the discussions (word count) in each of the groups, the mean length of the Discussion, and the proportion of CT skills to the average length by applying the framework.

The criterion for selecting the dissertations from Anglophone countries was mainly their accessibility i.e., only the open access dissertations were selected which was the main limitation of the present research. Considering the criterion for selecting the Iranian dissertations attempts were made to choose the dissertations from the Irandoc data center of theses and dissertations called Ganj. From this data center, 60 PhD dissertations were selected as illustrated in Table 1. Sixty dissertations were also selected from four Anglophone countries. The benchmark to define Anglophone authors for the selected dissertations was solely the Anglophone context i.e. both native and nonnative authors studying in the Anglophone contexts were included in the present study. In most of the cases, dissertations with only "Discussion" or "Discussion and Conclusion" sections were selected. Dissertations that included a chapter named "Results and Discussion" were generally excluded unless the heading "Discussion" was clearly singled out in them and was long enough to provide a good basis for the analysis of arguments and CT. In order to make the analysis more consistent and lessen the impact of time, only PhD dissertations published from 2000 onward were chosen and included in the study. For a detailed account of the number of Anglophone PhD dissertations see Appendix 1.

3.2. Materials and Instruments

Table 1. Details of the Dataset for the Two Groups of Dissertations

Dissertations	Dissertation Discussion				
	No. of Texts	Words	Average Length	Longest	Shortest
Iranian Dissertations	60	308210	415798	18279	610
Anglophone Dissertations	60	415798	6929	36000	604

3.2.1. Crombie's (1985) Taxonomy of Interpropositional Relations

The analytical framework employed in this study, *Crombie's (1985) taxonomy of interpropositional relations*, accounts for lower-level, more specific, binary coherence relations, e.g., Reason/Result, Condition/Consequence, Means/Purpose, Concession/Contraexpectation (For a full explanation of these binary relations refer to Appendix 2). Some scholars (e.g., Barsalou, 1983; Murphy & Medin, 1985) indicate that complex categories are shaped in response to different types of intentions or purposes. Furthermore, according to Bruce (2018), PhD dissertations are social genres that could be regarded as complex conventional categories of whole texts which occur in particular contexts for certain audiences. Accordingly, complex categories in the present study were PhD dissertations as one example of complex social or textual phenomena. One subcategory of this complex genre is the DDC due to the need for presenting a critical evaluation of the findings of the study, comparing and contrasting the findings with the results of the previous studies (intertextuality), and providing and sustaining coherent arguments as well as justifications for the likely points of similarity and differences (Swales & Feak,

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2003). Besides, as Bruce (2008a) pointed out, since DDCs teem with semantic, coherent, and discursive elements, this makes them even more complicated. Therefore, in this study, the selected DDCs were examined to identify those semantic binary elements (in terms of the model) specifically used to express CT as defined in the model. The principal reason for using *Crombie's (1985) taxonomy of interpropositional relations* is the use of key coherence relations to frame critical statements and the existing literature attests to the efficiency of the framework (Bruce, 2018, p.15).

3.3. Data Analysis Procedure

The analysis involved reading the whole of every thesis to prepare for a closer study of the Discussion chapter of each dissertation. Then, in order to maintain the confidentiality of the researchers and to observe the research ethics, a coding system was applied wherein Iranian dissertations were numbered by codes such as ID1, ID2, and ID3, and Anglophone dissertations were codified as AD1, AD2, AD3, and so forth. After that, the Discussion sections were analyzed through close readings and marking up of the salient elements that relate to the expression of CT, drawing upon the above-mentioned model. Descriptive statistics were used in the form of charts (for example, total CT statements, mean length of the discussion, and the percentage of each binary semantic relation). The unit of analysis was a single word, a clause, or a set of clauses that show a clear indication of CT, signaled by linguistic clues or inferred from specific information in the text. Priority was given to explicit linguistic clues. Some examples of these linguistic clues are highlighted in the following excerpts from our sample dissertations:

(1) This finding contrasts to the results of previous studies showing that low-proficiency learners are less likely to benefit from CALL programs than high-proficiency learners do due to high cognitive load. (ID2, p. 150) (Reason/Result)

(2) The third finding showed that out of the six strategies, only affective and social strategies are used differently by males and females as the male participants made use of affective and social strategies significantly more than the female participants. (ID7, p. 63) (Grounds/Conclusion)

(3) Similar to the above-cited studies, Penner (1995); Asassfeh et al. (2012); Aubrey (2011); Littlewood (2013); Chang (2011); Yoon (2004) conducted studies on the barriers in the educational context regarding the implementation of the new curriculum and the new method of English language teaching and reported similar findings. Thus, the results of these studies are in line with what has been found in the present study. (ID35, p. 170) (Simple Comparison)

The major part of the analysis was conducted by one of the researchers of this study; however, in order to further validate the analysis and minimize the risk of arbitrariness, a subset of five Discussions from the corpus was randomly selected to be analyzed, independently, by the researcher and a scholar who specializes in applied linguistics to determine the coder reliability and agree on the method of analysis; Cohen's Kappa coefficient index for inter-coder reliability was 0.88. One of the main points of disagreement occurred in the categorization of some tokens in the binary relations of the model. The following excerpt is an instance of disagreement in which we could not easily concur on whether to place the highlighted section in the subcategory of "Reason/Result" or "Grounds/Conclusion".

(4) The results also showed that topical knowledge is an important factor for EAP reading tasks. This component is either ignored or marginalized in the existing models of reading comprehension. So based on the results of the present study and the participants' responses to the survey question, the following model could be accepted for EAP reading comprehension. (ID5, p. 245)

In the above example, upon further reflection and negotiation, we agreed that the highlighted part could signify both of the relations since the sentence "the following model could be accepted for EAP reading comprehension" could be regarded as both a "Result" for the independent clause "topical knowledge is an important factor for EAP reading tasks" signified by "so", and a "Conclusion" for the phrase "based on the result of the present study" which acts as the "Ground" in this category. The sample dissertations of the present study teemed with such intricacies which called for the meticulous reading of them and considering such instances in their particular contexts. The following excerpt is another point of disagreement which was resolved by relying on the definitions provided by Crombie (1985).

(5) <u>The results also showed that</u> the participants in the multiple-method group significantly performed better than the participants in other groups in terms of vocabulary development and recall and reported more satisfaction and enjoyment of the strategy used. (ID5, p. 241)

The applied linguist scholar believed that Excerpt 5 clearly focuses on the "result" of the study and must therefore be subsumed under the category of "Reason/Result". However, to the text analyst of the present study, it was regarded as a "Grounds/Conclusion" relation since the clause "the results also showed" provides a ground for the part "that the participants in the multiple-method …" which acts as a "conclusion" here. Although the analyst's justification was convincing to the applied linguist scholar, we decided to consider example number (5) as a "Reason/Result" relation because the analysis was based on Crombie's (1985) paradigm and the disagreement seemed to be rooted in the subjective interpretation of the researcher. Therefore, by referring to Crombie's (1985) original work and also papers of well-known scholars who used Crombie's framework, such as Bruce (2018), we agreed to consider the above example and other similar instances as "Reason/Result" relation and discuss the limitations of the model and other possible interpretations of such texts later in a separate study. Throughout the study, attempts were made to agree on the method of analysis by negotiating and settling down other points of disagreement. Moreover, after a one-month interval, the samples were reanalyzed by the same coder and the obtained Cohen's Kappa coefficient index for intra-coder reliability was 0.93.

4. Results

4.1. CT Analysis Using Crombie's Taxonomy of Binary Interpropositional Relations

A central element in the expression of CT in Crombie's taxonomy is the use key coherence relations to frame critical statements which involve the writer's own position through overt expressions. To answer the research questions of the study, eleven coherence relations commonly used to express critical judgments were identified in the analysis of Iranian and Anglophone applied linguistics PhD dissertations. Table 2 illustrates the number and percentage of the relations that frame the critical statements identified in the DDCs.

Table 2. Relations Framing Critical Statements in the Iranian and Anglophone PhD Dissertations

Interpropositional Relations	R/R	G/C	Comp	S/E	Amp	C/C	Cont	M/R	M/P	Para.	Cond/Cons
Total CT Statements (Iranian DDCs)	2202 19%	1753 15%	1708 14.5%	1277 10.8%	1159 9.8%	1003 8.5%	966 8.2%	524 4.4%	497 4.2%	350 2.9%	321 2.7%
Total CT Statements (Anglophone DDCs)	2284 17.9%	2213 17.4%	1730 13.6%	1201 9.4%	12.44 9.8%	1091 9.3%	1043 8.2%	533 4.1%	462 3.6%	383 3%	465 3.6%
Interpropositional Relations	R/R	G/C	Comp	S/E	Amp	C/C	Cont	M/R	M/P	Para.	Cond/Cons
Total CT Statements (Iranian DDCs)	2202 19%	1753 15%	1708 14.5%	1277 10.8%	1159 9.8%	1003 8.5%	966 8.2%	524 4.4%	497 4.2%	350 2.9%	321 2.7%

Where: Amp=Amplification; Cont=Contrast; Comp=Comparison; R/R=Reason/Result; M/R=Means/Result; G/C=Grounds/Conclusion; M/P=Means/Purpose; Cond/Cons=Condition/Consequence; C/C=Concession/Contraexpectation; Para=Paraphrase, and S/E= Statement/Exemplification.

As Table 2 indicates, the trajectory of the use of interpropositional relations across the two groups of text was approximately similar: RR/GC/C constituted almost 50% of the relations followed by SE/Amp/CC/Cont (around 36 or 37%), and MR/MP/Para/Cond/Cons (slightly over 14%). In other words, Reason/Result, Grounds/Conclusion and Simple Comparison were found to be the most frequently used relations in both samples of dissertations. Finally, as we moved toward the least frequently used relations of Means/Result, Means/Purpose, Paraphrasing and Condition/Consequence, we observed a sharp decline in the occurrence of these relations which could indicate a weaker bond between these coherence relations and CT. Condition/Consequence was the least frequently used binary semantic relation applied in the Iranian dissertations while in the Anglophone counterpart Paraphrasing ranked the least frequently used one (For an extended account of the numbers and percentages of the relations that frame critical statements in the Iranian and Anglophone PhD dissertations refer to Appendices 3 and 4). Below, each of these coherence relations is further described in order of their frequencies in the two samples of dissertations.

4.1.1. Reason/Result

Among the binary relations employed by the critical statements in the Iranian and Anglophone dissertation samples, Reason/Result was found to be the most frequently used one exceeding the total percentage of the four least frequent relations mentioned above. This indicates that both Iranian and Anglophone PhD students preferred to frame their critical statements mainly through reasoning which seems to have a stronger relationship with the concept of CT. Both groups of PhD students signaled this relation through employing prepositions, conjuncts, subordinators, causative verbs, and nouns. The following are examples of Reason/Result relations from the dissertations in which the linguistic clues signaling this relation are highlighted:

(6) The PSE variability on *how*-type and *why*-type English MWQs can be <u>due to</u> the scrambling property of their L1 Persian. (ID26, 2014, p. 109)

(7) <u>The reason why</u> the participants in the multiple-method group significantly performed better than the participants in other groups in terms of vocabulary development and recall <u>can be attributed to</u> the

fact that EAP students are also varied in terms of their interests, capabilities, intelligences, etc. (ID5, p. 242).

(8) Some teenagers in our study had an apparent preference for American culture and copying Western styles in appearance, dress, and code of behavior, and <u>consequently</u> their language choice was greatly affected. (ID6, p. 119)

(9) For Simone this appeared especially resonant <u>due to</u> her concern that lack of student engagement in class <u>could lead to</u> more students focusing on social media or their mobile phones during class. (AD46, p. 235)

(10) <u>A possible reason</u> why students in both groups did not achieve significant results in fluency skills could be related to the fact that there is only one activity within the ABRA program that is fluency-related. (AD32, p. 105)

(11) <u>This may be why</u> other research has also reported that learning of the past tense is affected differently by a focus on form than other linguistic features. (AD38, p. 104)

(12) In addition to the questionnaire, the student interviews were a critical segment <u>since</u> they provided deeper insight into students' individual perceptions of their teachers' use of teaching strategies. (AD3, p. 137)

4.1.2. Grounds/Conclusion

The Grounds/Conclusion relation was the second most frequently used relation framing critical statements in the two sample dissertations of the present study. Despite being employed less often than the Reason/Result relation in the Iranian sample dissertations, it was still nearly as frequent as the total number of the four least frequent binary relations mentioned above which reveals a close bond between this relation and CT. In the Iranian sample, however, the percentage distance between these two binary relations was more noticeable (19% to 15%) whereas in the Anglophone sample this distance was really slight (17.9% to 17.4%) which indicates that the Anglophone writers of dissertations are inclined to use these two rhetorical tools with almost the same frequency. The following excerpts are examples of Grounds/Conclusion relations framing critical statements:

(13) <u>The findings of this research showed that</u> it is possible to provide EFL learners with such an encouragement in an effective way. (ID14, p. 170)

(14) <u>The results in Table 10 can also suggest that</u> emotional intelligence is partly biologically based and partly learned. (ID10, p. 147)

(15) The presence of idiomatic expressions, collocations and lexical bundles in documentary films make them take the second rank after news bulletins. <u>Therefore,</u> teachers need pay due attention to the teaching of such items if they wish to cover documentary films. (ID42, p.188)

(16) <u>What was revealed in this study was that</u> the emphasis on scientific academic language, especially the science process words, made students more aware of their thinking processes. (AD59, p. 84)

(17) <u>Qualitative findings indicate that</u> learners use more frequently Study and Study organization strategies. (AD25, p.122)

(18) <u>Therefore, it can be claimed that</u> student-focused approaches to teaching would provide better quality learning experiences. (AD15, p. 283)

4.1.3. Simple Comparison

The Simple Comparison relation was found to be the third most frequently occurring relation signaling critical statements in the two samples of dissertations which was very close to Grounds/Conclusion. Although Simple Comparison ranks the third in both samples in Table 2, it can still be regarded as an important rhetorical means, if not the most important one, as it is generally accompanied by the Simple Contrast relation which accounts for 8.2% of the relations employed in the DDCs of both sample dissertations. The following are examples of Simple Comparison relations framing critical statements:

(19) The moderate effect size obtained in the present study is consistent with moderate effect sizes reported by other researchers examining the effectiveness of CALL on language learning. (ID2, p.146)

(20) The results of the current study echoes Ammar and Spada's (2006) finding that prompting learners to self-correct is more effective than providing recasts. (ID36, p. 142)

(21) According to Gosden (1992, p. 210), "local thematic choices are very much determined and constrained by the global within-text structuring of the RA genre, and hence are part of a predictable dynamic progression." This was true with the results of our study. (ID20, 2015, p. 131)

(22) This finding was in accordance with the finding of Shvidko et al. (2015) who lent support to the claim that language educators need to instruct students to map out a language learning plan to manage their learning (AD57, p. 149)

(23) This finding supports the notion expressed in Warschauer (2000b) that the principal objective of multimedia and Internet use for L2 learning is agency (AD18, p. 259)

(24) Within the framework of form-focused instruction, measures of comprehension could be designed to assess the learner's understanding of the function of a specific linguistic form in relation to meaning, similar to the oral production and written tasks that were used in this study. (AD38, p.107)

As revealed by the above examples, various parts of speech can be used to signal this relation; sometimes a verb is used (e.g., 'is consistent with or 'are in line with' or 'echoes'); sometimes connecting words are applied (e.g., 'similar to') and sometimes a full sentence can signal this relation (e.g., 'This was true with the results of our study').

Overall, having taken into consideration the percentages of the most and least frequently used interpropositional relations, it seems that at the semantic level providing a reason for the stated result, providing a ground for the conclusion drawn, and comparing the results of the study with those of previous studies contributed more to frame CT statements. This could imply the closer link between CT and these relations and the higher potential of such relations for establishing arguments in DDCs.

5. Discussion and Conclusion

The present study aimed at investigating the textual means used by Iranian and Anglophone PhD students to figure out to what extent they use these textual elements to frame their critical statements throughout the Discussion chapters. Below, the findings of the study will be discussed in relation to the research questions.

The findings of the study revealed that Reason/Result, Grounds/Conclusion, and Simple Comparison were the first three most frequent binary semantic relations found in the Iranian and Anglophone dissertations, respectively. Since argumentation is an activity that involves reasoning (van Eemeren, et al, 1996) and strengthening claims through critical-analysis thinking based on evidence and

logical reasoning, the abundant presence of Reason/Result relation in our sample was quite expected as researchers aim to "provide argumentation as to why things happen as they do" in their discussion section (Jalilifar, 2009, p. 73). Thus, it is maintained that one of the principal ways to corroborate claims, establish arguments, and frame critical statements in the DDCs is through reasoning on the basis of the results which generally manifests itself in the form of Reason/Result relation.

According to Crombie (1985), in Grounds/Conclusion relation "a deduction is drawn on the basis of some observation" (p. 20). On the other hand, a deductive argument has all the explicit premises for supporting the argument, and the claim is derived based on previously established grounds. Thus, the relationship between deduction and argument and thus between Grounds/Conclusion and critical thinking could be explained; therefore, the high percentage of this binary semantic relation in the sample of the present study was expected.

Using Simple Comparison as a method of argumentation and thinking critically in this study was justifiable since according to Wilcke and Budke (2019) 'comparison' is a reflective and argumentative process that makes it easier for people to sharpen perceptions, practice categorization, and solve problems. Furthermore, when a researcher compares the findings of his/her research with those of a well-reputed authority in the field, in fact, he/she is trying to appeal to an authority to provide strong arguments for the claims made in the study and explain the findings of the research in light of that. As a result, it is argued that Simple Comparison has the potential to provide the writers with a strong tool to solidify their arguments by comparing the findings of their study with those of the previously conducted research studies.

This study produced results that corroborate the findings of the previous work in this field. For instance, the findings of this study are consistent with those of Bruce (2016) and Bruce (2018) who found that the three most frequently used coherence relations to express criticality were Grounds/Conclusion, Concession/Contraexpectation, and Reason/Result. The reason for the consistency of parts of the results of the current study (Reason/Result and Grounds/Conclusion) with those of Bruce might be the fact that since the quality of academic writing of dissertations cannot be compromised because of the non-native status of the writer, postgraduate students attempt to meet this requirement through following the academic writing style suggested by the experts in the field. This could lead to the similar use of some rhetorical means in the DDCs of these writers and the native speakers.

However, the findings of the current study do not support some of the previous research studies. The most important difference between the findings of the present study and the two studies carried out by Bruce (2016, 2018) is that Concession/Contraexpectation was not among the first three most frequent coherence relations used by Iranian and Anglophone PhD students. In addition, in contrast to Bruce's findings in which no evidence of Simple Comparison was detected in the first three most frequently applied relations, in our study, Simple Comparison was the third most frequently used relation in both samples. Regarding the difference between the findings of the present study and those of Bruce, it must be acknowledged that in his studies, Bruce examined chapters from only a small number of dissertations. As he stated, further research using larger samples of dissertations is needed to confirm the findings of his studies. Taking into account this limitation, we can explain why some relations (such as Simple Comparison and Statement/Exemplification) were more frequent in our sample while some others (such as Concession/Contraexpectation) were less frequent.

Moreover, compared to the above-mentioned studies, one seemingly interesting but unexpected outcome of the analyses was the relatively frequent use of Statement/Exemplification relation (10.8%) contrary to its infrequent use in the aforementioned studies. This finding suggests the dissertation writers' tendency toward adopting more logical relations in their texts by adding propositions in the

form of exemplifications and providing more concrete arguments; a finding which could be explained by considering the notion of 'argument by example' which is an argument in which a claim is supported by providing examples (Reinard, 2012) where the writer tries to make his findings and claims more acceptable through providing concrete examples so that a stronger basis could be established for the presented arguments.

These results, therefore, need to be interpreted with caution because reasons rather than sample size might have led to the contrasting findings which entail further research in this area. Finally, it is concluded that PhD students need to develop an awareness of the use of these important rhetorical elements in order to be able to formulate critical statements and develop the ability to incorporate them into their own writing to establish their arguments. Furthermore, considering the obtained results it is claimed that awareness of the interpropositional coherence relations may provide a lens through which postgraduate students can examine to what extent CT has been incorporated in the DDC. The present study is somehow limited in its scope since it has only focused on analyzing CT through identifying interpropositional coherence relations at the semantic level. Therefore, this study assumes that further research that takes into account the multi-dimensional nature of CT and attempts to analyze it at other levels (such as cognitive and metacognitive levels) would shed more light on understanding the complex nature of CT and applying it more frequently and efficiently in applied linguistics DDCs.

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