

Citation: Azhar, M., Nisa, R., & Nawaz, S. (2020). Hedging as an Indicator of Disciplinary Variation in Pakistani Academic Discourse: A Corpus Based Study. *Global Language Review*, 1(1), 46-56. doi:10.31703/glr.2020(V-1).06

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p-ISSN: 2663-3299

e-ISSN: 2663-3841

L-ISSN: 2663-3299

Vol. V, No. I (Winter 2020)

Page: 46 – 56

Hedging as an Indicator of Disciplinary Variation in Pakistani Academic Discourse: A Corpus Based Study

Abstract:

Hedging is a pragmatic phenomenon which is practiced to signal interpersonal communication. In academic discourse, hedges are used to signal writers' presence in a text. This article explores the use of hedges particularly with reference to epistemic and deontic modality markers—important and frequently used types of hedges— in Pakistani research dissertations belonging to three major disciplines: Sciences, Social Sciences and Humanities. The material is based on a special purpose corpus of Pakistani academic writing developed with 235 M.phil and PhD research theses. To find out the frequencies of modal verbs AntConc 3.5.6 was used. All the frequencies were listed and every 50th example was analysed using the theoretical distinction between epistemic and deontic modality outlined by Biber et al. (1999). Statistical analysis of the data reveals, that disciplinary affiliation has a considerable influence on the proportion of epistemic and deontic modality.

Key Words: Hedging, Epistemic and deontic modality, Disciplinary variation, Pakistani Academic Writing

Introduction

Hedging, considered as a pragmatic phenomenon, is used for interpersonal communication. Most of the recent studies on academic discourse have focused the interpersonal aspect of hedging with a view of analyzing this strategy in relation to the communicative situation and to explore its impact on the relationship between writer and reader. Hedging is a device by which “the author reduces the strength of what he is writing” (Zuck & Zuck, 1985:172), thus hedging is seen, functioning as an interpersonal politeness strategy to avoid disagreement “modify the writer’s responsibility for the truthfulness of an utterance” (Varttala, 2001: 14) and to signal a tentative or cautious assessment of the truth of the referential information” (Krismore & Kopple, 1988: 185). Different studies have signaled an array of linguistic devices which can be typically used as hedges. The main categories include for example: auxiliaries and semi auxiliaries, adverbs and adverbials, full verbs, impersonal expressions, agentless passives, modal verbs and the list has been broadened to prosodic and kinesics hedges.

Modality, as a type of hedging, is one such device used to signal authors’ presence in academic writing to create an atmosphere of interaction between writer and reader, “a resource for taking up different positioning” (Simon-Vandenberg & Aijmer 2007: 42) and a way to represent writer’s view point to the truth of the proposition. Modality generates space for negotiation between writer and reader and

is used as a persuasive strategy to communicate writer’s views or as an invitation for alternative interpretations. Various studies on modality in academic discourse have been conducted for example to reveal differences among native and non-native writers, male and female writers, and academic disciplines (e.g., Varttala 2001; Grabe & Kaplan, 1997; Meyer, 1997; Gledhill, 2000; Fløttum et al. 2006a; Vold 2006; Pique-Angordans et al, 2002). Most of the studies on academic discourse have taken research articles as a genre into consideration for exploring different structural organizational patterns (Crookes, 1986; Swales, 1990; Nwogu, 1990, 1997; Bhatia, 1993; Berkenkotter & Huckin, 1995) and linguistic components. However, a few (e.g. Gabrielatos & Mcenery,

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2005) have taken into account research dissertations for investigating the use of epistemic modality markers. Although Research dissertations as a genre of Pakistani academic discourse have been investigated from multiple perspectives (e.g. [Azher & Mehmood, 2016a](#); [Azher & Mehmood, 2016b](#); [Azher & Mehmood, 2018](#)) which identify linguistic variation across Pakistani academic writing and differentiate it from other registers, yet, no systematic study has been conducted on type and functions of modal verbs in this context of disciplinary variation. It is important to investigate how Pakistani academic writers signal their presence and interact with the readers by expressing their stance and persuade them on what they believe in.

By adhering to Biber's (1999) framework of modal verbs, this research is an endeavor to explore the type and usage of modal verbs occurring most frequently in Pakistani research theses to indicate epistemic (EpM) and deontic modality (DeM) across three major disciplines: Humanities, Social Sciences and Sciences. It aims to establish whether any disciplinary variation occurs on the use of modal verbs and to identify the types of modal verbs which are specific to each discipline. The study is based on a special purpose corpus of 235 research dissertations of M.Phil and PhD graduates collected from different universities and HEC research repository. Such a study is an attempt to offer insights into the type of discourse of each discipline, and the way the writers present their attitude through the use of modal verbs. The present research seeks to answer the following research question:

- i. Do disciplines favour different use of epistemic and deontic modality markers in Pakistani academic writing?
- ii. Are some modal verbs more epistemically or deontically oriented depending on the discipline?

Literature Review

Hedging is a linguistic device to convey the speaker's or writer's attitude and opinion with regard to "the contents of the sentence" ([Palmer, 1986: 14](#)) or "the proposition that the sentence expresses" (Lyons, 1977: 452). Modality is the type of hedging and a linguistic phenomenon in which modal verbs play a distinct role. [Quirk et al. \(1985: 219\)](#), discusses modality in terms of epistemic and deontic modality. Epistemic modality refers to "matters of knowledge or belief on which basis the speakers express their judgments about states of affairs, events or actions" (Hoye 1997: 42). Epistemic modality refers to the degree of certainty and mainly concerns itself with the claims the writers make on the basis of their beliefs and knowledge. Epistemic modality is considered to be characterized by the judgment about the fact and involves the meanings of necessity, prediction and possibility, whereas deontic modality shows the meanings of obligation, permission, volition and ability and indicates speakers' attitude and judgments about the proposition being presented. Tsui-hsing (2002) explained that "the epistemic meanings carried by Will, Would and Shall perform the function of prediction and those carried by modals like, Can, Could, May and Might perform the function of possibility. Whereas deontic modality expressed through modals like Will, Would and shall performs the function of volition and that carried by Can, Could, May and Might perform the function of deontic permission".

Epistemic	Deontic
Necessity	Obligation
Prediction	Permission
Possibility	Volition

- "Permission, ability, possibility: can, might, could, may
- Necessity, obligation: should, must, (had) better, have (got) to, need to, ought to, be supposed to
- Prediction, volition: shall, would, will"

Since modality is associated with opinion and judgment, many linguists have associated the epistemic and deontic modality with the notions of subjectivity and objectivity which are further associated with the

distinction between “speaker-related and content-related function” (Verstraete (2001: 1506). Modals associated with the speaker/writer are considered to be more subjective as compared to those related to the contents (e.g., Perkins 1983; Hengeveld 1988; Wierzbicka, 2006). Linguists like Verstraete’s (2001) have talked about the association of epistemic modality with subjectivity, dynamic modality with objectivity, and deontic modality with both objectivity and subjectivity (e.g., Verstraete 2001: 1525). However, a disagreement persists on this issue as, a number of researchers argue that markers of epistemic and deontic modality can stand both for subjectivity and objectivity (e.g., Lyons 1977; [Coates 1983](#)).

More specifically, deontic modality (DeM) depicts that the speaker “intervene[s] in the speech event by laying obligations or giving permission” (Downing & Locke, 1992: 382), as in One must look into this matter in detail ..., Shall we negotiate peace now? or This experiment should be repeated. On the other hand, epistemic modality (EpM) implies that the speaker assesses “the probability that the proposition is true in terms of the modal certainty, probability or possibility” (ibid.), as in It may be the case that Results might change if certain conditions ..., or The concert must be over.

Biber et al (1999: 485-486) in “Longman Grammar of Spoken and Written English” relates modal verbs with human actions and events controlled through possibility, necessity and prediction. He argues that modal verbs have similar and overlapping meaning. He categorizes modal verbs into three categories according as per their epistemic (intrinsic) and deontic (extrinsic) meanings. The groups are:

- i. Permission, ability, possibility: can, might, could, may
- ii. Necessity, obligation: should, must, (had) better, have (got) to, need to, ought to, be supposed to
- iii. Prediction, volition: shall, would, will

According to Biber et al (1999), each modal carries two forms of meaning, which can be categorized into intrinsic and extrinsic meanings. Intrinsic meaning refers to deontic meaning, whereas, extrinsic meaning stand for epistemic meanings. “Intrinsic modality refers to actions and events that humans (or other agents) directly control by laying obligation or giving permission. Extrinsic modality refers to the logical status of events or states that proposition is true in relation to certainty and possibility” and truth value of the proposition, thus marking the extent to which the information conveyed by the proposition can be relied. Biber further identifies structural correlates of modal verbs with intrinsic and extrinsic meanings. Intrinsic meanings (deontic) are represented through the structures in which (a) “the subject of the verb phrase usually refers to a human being (as agent of the main verb), and (b) the main verb is usually a dynamic verb, describing an activity or event that can be controlled. In contrast, modal verbs with extrinsic meanings (epistemic) usually occur with non-human subject and/or with main verbs having stative meanings”(p.486).

Multiple researches from different perspectives have been conducted on the use of modal verbs in academic discourse. Most of the contrastive studies are carried out to draw comparison between native and non-native usage of modal verbs. [Mukundan and Khojasteh \(2011\)](#) compared the use of modal verbs in Malaysian and British text books from level 1 to 3. The study had two major purposes: to investigate the form of modal verbs in the Malaysian prescribed text books in comparison with those in British national corpus; and explore the differences and similarities in the modal phrase structures in the two corpora. The study revealed that modal verbs are used quite differently when used in text books and real life. [Bao \(2010\)](#) analyzed the use of “Must” in Singapore English. The results of the study showed that “must” in Singaporean English is mainly used to convey deontic sense and that epistemic sense of Must was rarely communicated in the corpora.

However, modalization, or the use of hedges, has also become a major line of investigation in relation to RAs, both from a synchronic (Gosden, 1995; Grabe & Kaplan, 1997; Meyer, 1997; Gledhill, 2000) as well as from a diachronic perspective (Atkinson, 1992; Skelton, 1997; [Salager-Meyer, 1998](#)). There is also a recent interest in the disciplinary variations to be detected regarding the use of hedging in RAs, as the works of Hyland (1994, 1996), Crompton (1997), and Lewin (1998) illustrate. Biber et al (1999) compared four major registers namely fiction, academic writing, conversation and news in terms of their linguistic and communicative functions. Identifying the type and use of modal verbs across these four registers, he concluded

that can is extremely common in conversation and academic prose; could is particularly common in fiction; may is extremely common in academic prose; rare in conversation.

Modality and Disciplinary Variation

Cross disciplinary studies on different features of academic discourse have proved discipline as a decisive factor in determining the nature and style of the discourse. Multiple studies on the use of modal verbs have been conducted to reveal significant differences among disciplines to indicate the degree and nature of author's presence. Agata, R, 2017 compared the use of modal verbs as indicators of author's presence in natural sciences, humanities and social sciences and concluded that "in the natural sciences, the author's presence tends to be minimal, while in the humanities and social sciences, authors mark their presence more explicitly" (P: 73). Piqué-Angordans, Posteguillo and Andreu-Besó (2002) analysed the possible use of modal verbs in different academic contexts (medicine, biology, and literary criticism) to see how discipline determines the epistemic and deontic functions of modality. Their results revealed that literary critics are more inclined to the combined use of epistemic and deontic modality, whereas, medical researchers or biologists restrict the use of deontic expressions and favor the use of epistemic modalizing devices.

Rozumko, A (2017) studied the tendencies in the use of adverbial markers of epistemic modality across six academic disciplines belonging to different branches in research articles and concluded that humanities and social sciences are more inclined to use epistemic adverbs, whereas, sciences are shown as less prone to the use of epistemic adverbs.

The Material and the Method

To answer the research questions, three distinct corpora were developed on the basis of PhD and M.Phil research dissertations, representing three disciplinary groups: Humanities, Social Sciences and Sciences. The disciplinary groups represent a wide array of subjects as given in the table.1 below.

Table 1. Organization of the three Corpora

	Corpus 1	Corpus 2	Corpus 3
Discipline	Humanities	Social Sciences	Sciences
	Mass com	Sociology	Chemistry
	English	Psychology	Bio chemistry
	History	Education	Earth sciences
	Gender studies	International relations	Zoology
	Communication studies	Economics	Botany
			Pharmacy
Total Words	3,852,622	2,663,503	1,868,875

In the present research only research dissertations were selected and other genres of academic writings like book reviews, research articles, text books, short research notes were discarded. Total 13 different modal verbs, as outlined in Biber 1999, were picked for analysis, however, better and be supposed to were excluded from the final results due to their very low frequency in the corpora.

Table 2. The most Frequent Modal Verbs in Pakistani Academic Discourse

Humanities	Can, may, will, would, should, could, must
Social Sciences	Can, may, will, should, would, could
Sciences	Can, may,

The frame work selected for the study is Biber's 1999 theoretical distinction between epistemic and deontic modality categorizing modals of necessity, prediction and possibility.

Using AntConc 3.5.6 all instances of modal verbs from the corpus of Pakistani academic writing were listed. Every 50th instance from the three corpora was taken as a sample and individually analyzed applying the theoretical distinction between EpM and DeM as outlined in section 1. In other words, considering the function of each modal verb in the pragmatic context, it was classified as deontic or epistemic on the basis of the criteria mentioned in section 2 on literature review. In all instances, the full context of the modal was taken into account to identify the function of the verb. Sometimes this involved considering a full paragraph or even a complete section in a paper. Each corpus was analyzed by one of the authors of this study. However, complex instances, where the modal verb used was difficult to classify were discussed by the authors with experts to determine function of the verb. To further analyze the data and to see statistically significant differences on the epistemic and deontic modality markers across three disciplines, the statistics package Epi Info 6 was used.

Results and Discussion

Epistemic and deontic modality representing three major disciplines are reported and discussed below.

Table 3. EpM and DeM Totals in Social Sciences, Humanities and Sciences

EpM (f)	DeM (f)	Total (Modals)	EpM (f)	DeM (f)	Total (Modals)	X ²	p
Social Sciences			Sciences			11.43	.001
356	35	391	119	0	119	7	
Social Sciences			Humanities			2.76	.096
356	35	391	454	29	483		
Humanities			Sciences			3.182	.074
454	29	483	119	0	119		

χ^2 representative if $p < 0.05$

Table 3 shows statistically significant differences in the overall use of EpM and DeM when the social sciences and sciences corpora are compared ($X^2=11.437$, $p = 0.001$). Table 6 also shows no significant differences in the overall use of EpM and DeM when the social sciences and humanities corpora are compared and Humanities and sciences are compared. However, as can be seen in the above table that only a moderate use is made of DeM, by social sciences and humanities and literally no use by sciences. If so, sciences would appear as a distinct discipline in the use of modality, thus reinforcing the possibility that epistemology and communicative purposes of science may be somehow substantially different from social sciences and humanities. Humanities can also be seen using EpM modality maximum of all followed by Social sciences and Sciences again is very far away in its frequency of use of EpM modality, thus showing that it may be feasible to consider social sciences and humanities as highly similar epistemologically speaking.

Table 4. Discipline wise comparison of epistemic and deontic modality markers

Modals	Humanities		Social Sciences		Sciences		Total	
Ep M	454	93.99%	356	91.04 %	119	100%	929	93.55%
De M	29	6.004 %	35	8.95 %	0	0%	64	6.44%
Total	483		391		119		9936	

The results indicate that sciences similar to the results in Agata (2017) demonstrate minimum usage of modality markers in comparison with social sciences and humanities that shows low reliance of sciences on hedging in the presentation of academic discourse and that authors indicate minimum use of authorial stance in this discipline. Humanities, though slightly more than social sciences, are seen as the most prone discipline to the use of modality with the highest frequency rate in the use of modal markers. The Initial count of EpM and DeM modal verbs in three disciplines indicates a very low tendency of deontic modal verbs with 6.44 % in the total of 9936 analyzed instances of modal verbs and very high propensity of EpM with 93.5 % in all three disciplines, as similar to the tendency revealed in Rozumko (2017) and Piqué-Angordans, Posteguillo & Andreu-Besó (2002).

Sciences are marked with 100 % usage of epistemic modality and are indicative of authors' high level confidence and certainty in the presentation of academic discourse, which makes sciences a distinct discipline as compared to social sciences and humanities. Social sciences are seen as most inclined discipline to the use of deontic modality as compared with other two disciplines that shows their comparatively lower level of confidence and certainty in the presentation of academic discourse. However, both social sciences and humanities take somehow similar position in the presentation of authorial stance in academic discourse.

Table 5. Epistemic (EpM) and Deontic Modality (DeM) Comparison in three Corpora

Modals	Humanities				Social Sciences				Sciences			
	Modals		EpM	DeM	Modals		EpM	DeM	Modals		EpM	DeM
	total no of instance	Instances analysed	F%	F%	Total no of instances	Instances analysed	F%	F%	Total no of instances	stances analysed	F%	F%
can	426	128	128 100%	0	5090	101	101 100%	0	2171	43	43 100%	0
Might	90	13	13 100%	0	663	13	13 100%	0	338	6	6 100%	0
Could	751	35	35 100%	0	1389	27	27 100%	0	697	13	13 100%	0
May	678	73	65 89%	8 10.9%	3678	73	72 98.6%	1 1%	1887	37	37 100%	0
Should	911	58	46 79%	12 20%	2294	58	43 74%	15 25%	337	6	6 100%	0
Must	016	20	17 85%	3 15%	814	16	15 93%	1 6%	142	2	2 100%	0
Have to	33	16	16 100%	0	343	6	5 83%	1 16%	24	0	0	0
Need to	89	12	6 50%	6 50%	583	11	11 100%	0	62	1	1 100%	0
Ought to	9	1	1 100%	0	14	0	0 0	0	0			0
Shall	69	5	5 100%	0	205	4	2 50%	2 50%	14	0		0
Would	009	55	55 100%	0	1435	28	22 78%	6 21%	159	3	3 100%	0
Will	430	67	67 100%	0	2740	54	45 83%	9 16%	409	8	8 100%	0
Total	5193	483	454 93.99%	29 6.45%	20488	391	356 91.04%	35 9.2%	6597	19	119 100%	0

The results on the usage of modal verbs as epistemic or deontic markers reveal that though majority of the modal verbs are exclusively used as markers of epistemic modality and indicate authors' confidence and level of certainty in making propositions in all three corpora, there are certain variations in the use of modal markers. Modal verbs like can, could and might in all three corpora show permanent tendency of EpM usage which suggests their usage in the three disciplines as markers of confidence and certainty on the part of

Pakistani academic writers. Modal verbs like should, must, would and will have shown certain instances of deontic modality mostly in social sciences as compared with the other two disciplines, though they have been mainly used for epistemic reasons in the three disciplines. This phenomenon indicates that most of the modal verbs may function as epistemic or deontic depending on the discipline. As for example, may tends to be used more as deontic in humanities as compared to social sciences, whereas, should tends to be more deontic in social sciences than humanities, though in sciences both these modal verbs are used as epistemic devices.

Discipline wise preliminary calculations of different modal verbs indicate that can (f. 13687), may (f. 9243), will (f.6579) and should (f.5542) are the most frequently occurring modal verbs in Pakistani academic writing. Humanities are marked with the abundance of can (f. 6424), may (f. 3678), will (f. 3430), would (f. 3009) and should (f. 2911). Modal verbs like ought to, shall, have to, need to and might are shown less frequently occurring in the corpora of humanities. All modal verbs except should, must, and need to indicate 100% of epistemic usage, thus showing minimum of deontic usage. The frequent use of epistemic modal markers indicates that humanities are marked with certainty and possibility of the proposition. As the examples from humanities illustrate:

1. "Those findings can be correlated with the findings in the content analysis and textual analysis
2. But this practice may be advised at the level of junior classes".

The examples exhibit modal verbs as indicators of the logical status of the proposition in relation to certainty and possibility.

Social sciences are also marked with the abundant usage of epistemic modality markers, though deontic modality has been shown in an increasing tendency (8.95%) as compared with humanities (6.45%). Social sciences also marked with the frequency of same modal verbs as humanities. The following examples from social sciences indicate the epistemic usage of modal verbs.

1. "Investments can be private as well as public.
2. Public expenditures were declined over the period of time as everyone could observe in the fourth bar of the diagram.
3. This might be of the reason that work pressure may directly affect the emotional exhaustion or may act indirectly by influencing the individual's ability to cope with stress.
4. Moos's social ecological model (1986) proposes that the way one perceives the environment tends to influence the way one will behave in that environment."

Social sciences in comparison with other disciplines indicate maximum use of deontic modality, that is, 8.95% of the total modal verbs and are shown to be lesser prone to the epistemic usage of modal verbs in comparison with other two disciplines. Comparatively higher tendency of using deontic modality indicates that social sciences writers tend to intervene in the academic discourse by "laying obligation or giving permission" (Downing & Locke, 1992: 382) and are less assertive as compared with humanities and sciences in Pakistani academic discourse.

As the examples below indicate the deontic usage of modal verbs:

1. "Those owners should use this model who easily get loans from the banks.
2. Examiners must look into the students' papers on some specified criterion."

Slightly lesser tendency of epistemic usage of modal verbs indicates that academic writers in social sciences are lesser prone to express their judgments about state of affairs in comparison with sciences and humanities. However, in doing so, they tend to persuade the readers and make partners in the established stance, as "deontic forms represent a device to discretely address readers in a subtle strategy to make them co-participants of the authors' opinions" Piqué-Angordans, Posteguillo & Andreu-Besó (2002: 59).

Humanities in comparison with social sciences are more prone to the use of epistemic modality which indicates that academic writers in this discipline are more assertive in their statements and that epistemic

modality is used to question or assert the possibility of the proposition rather than to intervene with an opinion based discourse. The following examples from Humanities reveal the epistemic usage of modal verbs”

1. “The importance of nouns can be realized from the fact that the nouns are the first words learned by children
2. Those findings can be correlated with the findings in the content analysis and textual analysis
3. These individuals may add into the well being of society by influencing people around them in changing the conventional structures of their thinking and behavior.
4. But this practice may be advised at the level of junior classes.”

Sciences are marked with a very low frequency of modality markers. Sciences are marked with 100 % epistemic modality usage that indicates that academic writers are highly assertive in their stance and do not impose authors’ point of view about the certainty or probability of the statements. Though modal verbs can be used most frequently (though only 43 times) in the whole corpus of sciences and is used to indicate epistemic modality.

The following examples from Sciences indicate the epistemic usage of modal verbs.

1. “Drugs having acetylsalicylic acid can be easily determined by the suggested method without any separation.
2. It is given as single dose or in short-term alternating therapy; it can reduce mild to moderate ache..
3. Main source of pollution of these ions could be nuclear fission reactions.
4. While accumulation of heavy metals in vegetables may be a direct threat to the human health
5. Further increase in the collision energy would result in the fragmentation of the glucose and fructose molecules into number of small product ion peaks.”

Conclusion

It may be concluded from the above discussion that disciplines only partially vary from one another in the use of hedges as modality markers. All the three disciplines show a high tendency of using epistemic modality and are little prone to the use of deontic modal verbs with only 6.44%. Amongst all disciplines, Sciences show that modality for this discipline mean to be epistemic in usage only and that it is not to intervene in the discourse by laying obligation or granting permission as indicated by zero tendency of using deontic modal verbs and 100% use of epistemic modals. The zero tendency of deontic usage can be related to the fact the many of the modal verbs like can, might, could, will and may indicate 100% of epistemic usage in sciences which is true to the nature of this discipline being objective and detached in the presentation of proposition. Social sciences are the seen as most inclined discipline to the use of deontic modality as compared with other two disciplines that shows their slightly lower level of confidence and certainty in the presentation of academic discourse and that social scientists tend to persuade readers more than academic writers in humanities and sciences and that social scientists tend to intervene in the academic discourse by laying obligation and engaging readers in the discourse. The use of deontic modality makes social scientists more interactive and persuasive as compared with other two disciplines. However, the deontic modality usage is reduced to minimum in sciences in Pakistani academic writing where writers restrict in giving suggestions and opinions.

The results reveal that some modal verbs may be more epistemic or deontic as depending on the discipline. Where can, might and could persistently operate as markers of epistemic modality in all three disciplines, the rest of the modal verbs vary in their use as per discipline. The results also reveal that some of the modal verbs systematically operate exclusively as epistemic modality devices in Pakistani academic writing, such as the modal verbs like can, might and could. Modals like may, should, must, have to, need to, shall, would and will are used both as epistemic as well as deontic in all the three disciplines, though they mostly operate as epistemic showing certainty and confidence of academic writers in expressing their opinion and convincing their readers to become co-participants of their opinion.

Complementarily, it is pertinent to state that the present research contributes in the existing discrete linguistic studies on Pakistani academic writing as a register and can be extended to explore other disciplines and research sections of dissertations from the perspective of epistemic/deontic dichotomy.

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