*J*ournal of *A*pplied *L*inguistics and *A*pplied *L*iterature: *D*ynamics and *A*dvances

Informants' Perception of Directives in Research Articles Across Disciplines: Impoliteness Strategies or Engagement Markers?

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Abstract

This study examines whether the use of directives in academic writing, esp. research articles (RAs) written in social and natural sciences, should be considered as an impoliteness strategy or engagement marker. Eighty RAs from four disciplines (two social sciences and two natural sciences) were analyzed, and 429 directives were identified. Two informants from each discipline assigned functions to the directives, and then rated them on a scale of impoliteness. Findings suggest except for text-external Implication/Suggestion directives in social sciences and Cognitive Warning directives in both social and natural sciences, which may carry shades of impoliteness, the other functions should be viewed as engagement markers. Thus, directives are not impolite strategies in this conservative genre. Furthermore, no significant differences in directive functions were observed between the two branches of science. RA authors often follow the prescriptive rules conventionalized in their fields; however, they also tend to use elements that are less legitimized in academic writing.

Keywords: academic writing, directives, engagement marker, impoliteness strategy, research article

Introduction

A deafening silence can be heard regarding the functions, degree of baldness, and level of engagement of directives in academic writing, which might potentially minimize the formal air of academic style in RAs. Defined as "utterances that instruct the reader to take an action or see things in a way determined by the writer" (Hyland, 2002, pp. 216-217), directives were traditionally (i.e., first wave of pragmatics) perceived as bald-on-record face-threatening acts that can render inequality between interlocutors (Brown & Levinson, 1987). Perceived as such, directives might run counter to the conventionalized peer relationships in academic writing (Swales & Feak, 2012). In the second and third waves of pragmatics (i.e., conversational implicature and relevance theory) (Spencer & Wilson, 2002), however, language realizations are viewed independent of static and traditionally assigned functions. According to these theories, writers or speakers' communication is relevant to the specific context it occurs in, and the language recipients are naturally inclined to process information that is maximally relevant to their cognitive environment. In this sense, directives can also be perceived as positive engagement markers in academic texts, giving substance to dialogic communications (Hyland, 2002); thus, probably not impoliteness strategies. In fact, more recent publications (Culpeper, 2010; Leech, 2014; Ronan, 2022) on the typology of speech events refute the idea that all directives are bald-on-record face-threatening acts. There are some semantic strategies of directives like indirect (on-record) interrogatives, e.g., 'Isn't it hot in here?' which ought to be interpreted as a directive requesting an interlocutor to take some action, for instance, turn on the AC. Therefore, this hint is an indirect directive, and it can be categorized as off-record with no apparent face-threat involved.

Although directives are utilized widely in RAs (Jalilifar & Mehrabi, 2014), research has not clearly voiced whether they might be perceived as impoliteness strategies (Culpeper, 2010) or solely as engagement markers (Hyland, 2002, 2005). While the former function can be interpreted as a divergent strategy, relegating the readership to a lower status in relation to the RA writer(s), the latter is presumed to be a convergence strategy, through which authors bridge the gap between themselves and the readers. In a corpus-driven study discussing the use of directives across various genres, Ronan (2022) documented that in distance discourse like lectures, where there is little, if any close relationship between the participants, and the language is more public or more formal, interactants use more indirect strategies to sound more polite. However, whether this finding can be extended or generalized to academic written discourse is subject to further examination. This is one of the aims of this study.

This study builds on the tenet that directives are context-dependent tools, aligning with the second and third waves in pragmatics, and integrates recent theorizations in (im)politeness and relevance theories (Culpeper, 2010; Leech, 2014) to shed light on the directives' disciplinary functions in RAs in light of the dichotomy of engagement markers or impoliteness strategies. Informed by Leech's (2014) categories of directive strategies (or semantic manifestations), Hyland's

(2002) classification of the functions of directives in RAs, and Culpeper's (2010) conceptualization of impoliteness strategies, this study aims to reveal what functions lend themselves better to impoliteness strategies and what functions lean toward engagement markers. The study employs manual analysis to identify directives and relies on informants' judgments to determine their functions and degree of impoliteness and/or engagement.

Review of the Literature

Directives are speech acts that speakers/writers employ to have the hearer/reader do something (Searle, 1976). Searle goes on to classify directive acts: request, command, question, permission and prohibition. This definition has undergone various modifications by Searle's successors; however, one thing has remained constant in all the subsequent definitions: directives concern using speech to get someone to do something. As a general class of speech acts, directives include, but are not restricted to, such acts as coercing, ordering, requesting, demanding, suggesting, recommending, advising, and so on. Based on Leech's (2014, pp. 147-159) model, directives can be semantically realized using the following strategies, as Examples 1 to 7 illustrate.

(a) Direct strategies (imperatives or performatives)
(1) Look at the excerpt. (imperative)
(2) I am asking you to look at the excerpt. (performative)

(b) Indirect (or on-record) strategies (declaratives, interrogative, non-essentials)
(3) It is necessary to look at the excerpt (declarative)
(4) Can you look at the excerpt? (interrogative)
(5) The excerpt on page 45. (This grammatically incomplete form is a directive to ask the readers read further through the text.)

(c) Hints (or off-record strategies) (declaratives and interrogatives).
(6) The excerpt will show you the point. (declarative)
(7) Did you see the excerpt on page 45? (interrogative)

A few studies have probed into the use of directives in academic writing. For instance, Hyland (2002) points out that authors can achieve the rhetorical purposes of guiding and engaging their readers via directives. Investigating only one of the direct semantic strategies of directives, i.e., imperatives, Swales et al. (1998) found that despite being face-threatening acts (*a potentially impolite strategy*), authors use this strategy for reader engagement, text truncation, or displaying personal style. They concluded that there is no solid evidence that using imperatives is linked to the current trends toward impoliteness in academic writing. They added that the imperative sentence is but one element of a group of linguistic features that allow academic writers to dissociate themselves from an "objectivity-reifying impersonal style" (Swales et al., 1998, p. 118). Having reviewed style manuals and guidebooks on academic writing in the field of linguistics, Chang and Swales (1999) realized that RA authors and journal editors held dismissive attitudes regarding the use of imperatives, as a congruent strategy of directives, in academic writing.

Hyland (2002) studied directives in RAs and maintained that directives perform a variety of functions across genres and disciplines, but they disharmonize the balance between writer-reader relationship and the expository nature of a text.

Using Hyland's (2002) model, Jalilifar and Mehrabi's (2014) carried out cross-disciplinary and cross-cultural comparisons and found intralingual and interdisciplinary variations. They point out that directives are used as a means of persuasiveness in most of the disciplines they investigated. Recently, Ishak et al. (2021) developed a truncated corpus-informed form-function model of directives to compare L1 and L2 writers' corpora. The general findings of their study suggest that directives are used differently in these two corpora, indicating that Indonesian writers do not use directives to engage their readers in developing mental processes of understanding. Non-L1 authors, however, preferred to engage readers mainly by imperatives, reader pronouns + necessity modals, and it is + Adjective + to-clauses.

The major drawback with these studies is that they have not situated using directives within any pragmatic or discourse frameworks. The authors of these studies also tended to associate imperatives with reader engagement, disregarding the notion of impoliteness that might accrue using directives in academic genre. Moreover, most of these studies have only examined direct imperatives, while other less direct or incongruent directives (see Leech' (2014) classification above) have not been considered. In addition, cross-disciplinary comparisons in view of the degree of engagement/impoliteness seem to be few and far between. These drawbacks throw doubts on the functions assigned to directives in academic prose, thus calling for more detailed analysis of various realizations of directives, with the eventual objective to help novice writers apprehend unstated disciplinary conventions.

Analytical Frameworks

Directives as Impoliteness Strategies

For an utterance to be considered impolite, based on Culpeper's (2005, p. 38) model, two conditions must be met: "(1) the speaker communicates face-attack intentionally, or (2) the hearer perceives and/or constructs behavior as intentionally face-attacking, or a combination of (1) and (2)." However, later, Culpeper (2011) contends that intentionality is not categorical and proposes a socio-cognitive model of impoliteness to account for the relativity of intentions. This revised model depends on societal, situational, and contextual expectations, in addition to personal identities, desires, and /or beliefs. Situated behaviors are considered impolite when they clash with expectations or flout social and institutional conventions (Culpeper, 2011).

Following Culpeper's (2011) idea of situated impoliteness and a more recent theorization of pragmatic and discourse-based (im)politeness (Blitvich and Sifianou, 2019), I argue that determining whether directives bear impoliteness in academic writing entails three levels of analysis. At a macro level, we should consider how the institutional (disciplinary) conventionalization stipulates how RA authors ought to use directives to guide and direct their readership. While Chang and Swales (1999) have made it clear that researchers hold an indifferent attitude toward using imperatives in academic writing, researchers' perception of other types of

directives have remained unexplored. At a meso level, genre-specific norms of directives (i.e., their density, frequency, saliency, rhetorical functions, and move-step realizations in various RA section) should be spelt out in relation to the degree of impoliteness. At a micro level, impoliteness is associated with the actual semantic realizations of directives in the texts. Additionally, in this study, I align with Culpeper's (2011) assertion that for an utterance to be considered polite or impolite, intentionality is not important. Thus, the directives in RAs across disciplines were analyzed through informants' etic perspective.

Directives as Engagement Markers

Engagement markers are used to establish writer-reader relationships and create a gesture of deference and/or reverence in academic texts. Among other interactive metadiscourse markers, directives are recognized as interactive devices which maintain rapport between interlocutors in certain spoken and written genres, however, they may at times contradict this general tendency in academic writing (Swales et al., 1998). Directives used to be considered bald-on-record face-threatening acts (Brown & Levinson, 1987), which apparently breach the harmonious relationship and bring about varying degrees of imposition. This view has been refuted by renowned figures like Leech (2014), who do not perceive directives strictly as such. Swales et al. (1998, p. 117) assert, as a main class of directives, "the presence of imperatives would be seen by peer scholarly readers as a kind of 'manipulative' or face-threatening practice. "Bald-on-record" is by no means an inevitable reading." Swales and his associates conclude that RA authors opt for using imperatives in the main text and endnotes/footnotes in varying occurrences in different disciplines for attaining brevity, stylistic idiosyncrasies, and a need to seize the reader's attention. These functions indicate a detachment from positivist traditions that are set on objectivity and utmost formality.

Recent studies on the use of directives in academic writing have taken prompts from prior attempts at analyzing the lexico-grammatical features of imperatives (e.g., Swales et al., 1998) and then have extended their efforts to identifying the rhetorical and pragmatic functions of these acts (Hyland, 2002; Ishak et al., 2021; Jalilifar & Mehrabi, 2014). In this study, since the intention is to explore whether directives are means of reader engaging acts or not, some notions of Hyland's (2002) original model are employed. This model classifies directives into textual, physical, and cognitive acts. The textual acts include "internal reference" (e.g., see section 1) and "external reference" (e.g., see Smith, 2014). The physical acts include "research focus" (e.g., the duration of the course must extend) and "real-world focus" (e.g., teachers should provide feedback on …). Cognitive acts involve "rhetorical purpose" (e.g., consider, suppose, let's examine), "elaborative purpose" (e.g., this can be viewed as), and "emphatic purpose" (e.g., it should be noted that …, remember).

Methods

Corpus Selection

To have a fair sample of disciplines representing social and natural sciences, applied linguistics and psychology were chosen to represent the former,

and physics and biology represent the latter (Morillo et al., 2003). To select the representative disciplines and their related journals, consultation was sought from the heads of departments at the colleges of education, social sciences, and natural sciences in Sultan Qaboos University, Oman. This purposive sample of disciplines would facilitate inter-disciplinary comparisons. To capture the intradisciplinary variations, two journals from sister sub-disciplines were chosen, leading to a total of eight Quartile1 high ranking journals based on the Scimago Journal list. Ten RAs were taken from the last two volumes of the journals in 2021, amounting to a corpus of 80 RAs. Table 1 provides an overview of the corpus.

Since the purpose of the study is to investigate the form, function, and (im)politeness of directives in RAs, regardless of their aims and objectives, the research design and methodology of the RAs were not considered as intervening factors. Moreover, the authors' nationality, first language, and the geographic location from which the RAs originated were not considered overriding factors in the analysis because the effects of these variables are mitigated in the blind review process of the journals. Only experimental RAs, following IMRD/C style, i.e., Introduction-Methods-Results-Discussion/Conclusion, were selected from the social sciences journals. However, in natural sciences RAs with IMRC/D were few and far between, as most of them contained functional headings. Nonetheless, RAs were selected that could be categorized based on IMRC/D structure with some degree of innocuous variations by a skimming review of their contents. To compare RAs from social and natural sciences, the latter were arbitrarily sectioned as IRMC/D in this study.

Table 1

Corpus Breakdown

Branches of Science	Disciplines	Journals*	RAs	Word count
Social Sciences	Applied linguistics	*International Journal of Applied Linguistics (InJAL)*	10	10478	
		Applied Linguistics (AL)	10	9432	37736
	Psychology	*Journal of Applied Psychology (JAP)*	10	8794	
		Annual Review of Psychology (ARP)	10	9032	
Natural Sciences	Physics	*Physics Reports (PR)*	10	16332	
		Reviews of Modern Physics (RMP)	10	10098	48407
	Biology	*Nature Reviews Molecular Cell Biology (NRMCB)*	10	11279	
		Cell (CL)	10	11698	

*The journal names are presented as acronyms for the rest of the study.

Participants

This study was basically built upon informants' judgements on the functions of directives in the RAs. To invite the informants, the heads of departments at the colleges of education, social sciences, and natural sciences were

sent emails to inform their faculty members, teaching applied linguistics, psychology, physics and biology, about the purpose of the study to find volunteers. Thirteen university professors volunteered, of whom only eight matched the requirements set for this study: 1) being assistant professor, 2) having five years of experience at least, and 3) having research publications in the disciplines chosen for the purpose of the study (see Table 2). These participants are all L1 speakers of English and work as full-time lecturers in their departments. In fact, no L2 speakers of English were invited in this study to ward off L2 pragmatic influence.

Table 2
Participating Informants

Branches of Science	Disciplines	Informants	Gender	Age	Position	Experience
Social Sciences	Applied linguistics	Informant 1	Female	45	Assistant Professor	5
		Informant 2	Female	42	Assistant Professor	9
	Psychology	Informant 3	Male	50	Assistant Professor	8
		Informant 4	Female	42	Assistant Professor	8
Natural Sciences	Physics	Informant 5	Male	42	Assistant Professor	7
		Informant 6	Male	44	Assistant Professor	11
	Biology	Informant 7	Male	51	Assistant Professor	14
		Informant 8	Male	48	Assistant Professor	12

Research Design and Procedures

This study employed a grounded quantitative-qualitative research design. The quantitative aspect tends to explore a new dimension regarding the (im)politeness of directives in academic writing through quantification (or operationalization) of the concept and the informants' perceptions, the qualitative (thick textual) analysis aimed to confirm, add to, remove, or reject the functions of directives already identified in previous studies. The grounded side of the design refers to the constant refinements and recycling of the identified functions. To identify the form and function of directives, the unit of analysis was the sentence, while to determine their (im)politeness a larger unbounded pragma-rhetorical unit was utilized. In other words, the informants determined whether an instance of directives is polite or not by looking at pre- and post-co-text as well as situational and institutional context. The analysis was carried out as follows.

Firstly, the directives were identified and highlighted using Leech (2014). See section 2 above. Through the pilot analysis, it turned out that academic directives can be realized in four ways: (a) sentences beginning with bare-infinitives, (b) verbs preceded by modal verbs necessitating an action (e.g., You must consider the teacher's interrupting the students' talk to provide oral feedback.), (c) verbs/adjectives followed by a subjunctive indicating obligation (e.g., It is important that the right annotating strategies be used.), and (d) adjectives followed by a to-infinitive phrase requiring the readers to do something (e.g., It is necessary to follow the instructions as put forward by …).

Secondly, the two informants from each discipline were asked to independently assign the highlighted directives primary functions using their own words and then negotiate their nomenclatures until they agreed on common terms. That is, after the two informants from each discipline analyzed the directives in the RAs, they met (face-to-face or virtually on their discretion) and discussed whether they agreed on the functions they had assigned to the directives. Afterward, the author of the current study combined and renamed the functions that bore similarity. This was followed by subsuming the informants' identified functions into Hyland's (2002) model of text-internal reference (referring to a portion of the same text), text-external reference (referring to a real-world object or phenomenon), and cognitive reference (requiring readers to read, think, consider, or deliberate on something). The informants were not instructed on the functions of directives a priori. They would read the directives and assign them functions based on their own perception. Twenty-three functions were identified by the informants. To minimize the individual discrepancies in the informants' function assignment to directive instances, the terms they coined to refer to the same function were coalesced and/or renamed. For example, the term 'Prior studies' used by the social sciences informants and 'Referring to previous reports' used by the natural sciences informants were merged as 'Reference to previous research.'

Thirdly, the informants decided if they would perceive each instance as polite, neutral, or impolite based on five-point Likert Scale using the three-strata model of macro meso and micro levels of impoliteness (Blitvich & Sifianou, 2019), explained in Section 3.1. A score of 3 and above indicated impoliteness, while scores below 3 were considered neutral or polite, depending on whether the informants found a directive breach the established institutional conventions of the discipline (scales 4 and 5), only violate genre-specific norms (scales 3 and 4), is only realized by incongruent language form (un)intentionally (scale 1 and 2).

Lastly, the same procedure was carried out to decide if each instance of directives leans towards engaging the reader (i.e., being an engagement marker) or distancing the RA authors from their audience, where a score of 3 and above showed engagement, whereas a scores below 3 were perceived as neutral or disengaging in light of the imposition they perceived intuitively based on Hyland's (2002) model of engagement markers, described in Section 3.2, where he argues that the imposition (which implies degrees of impoliteness) increases as one moves from textual toward cognitive acts.

To reduce bias in informants' ratings, I provided them with a brief description of what impoliteness is and a list of examples to ensure they understood what the concept means and how it should be rated in terms of impoliteness. This helped standardize their judgments. Moreover, further discussion rounds in cases of disagreement were conducted among informants ensured reliability in the interpretation of ambiguous cases.

Ten percent of the corpus was piloted through part-of-speech (POS) tagging with TagAnt v. 1.1.2 (Anthony, 2014) and analysed with WordSmith Tools v. 6 (Scott, 2015). However, it turned out that the corpus did not lend itself to

concordancing tagging, as there were many instances that did not fit into the categories of directives defined in this study based on Leech (2014). Therefore, the corpus was analyzed manually, and directives were selected from the main body, footnotes, and endnotes of the RAs. The manual analysis was employed to avoid missing out incongruent, indirect directives. To maintain the reliability of identifying the directives based on Leech's (2014) model, 10% of the corpus was independently analyzed by a colleague, a Ph.D. holder in applied linguistics. An inter-rater agreement of 92% was obtained. Reference lists and appendices of the RAs were excluded in computing RA word counts, resulting in a total of 37736 words in social sciences and 48407 words in natural sciences.

To ward off the inherent fuzziness in discourse and pragmatic categorization, each pair of informants discussed and rated the directives in the 20 RAs of the discipline they affiliate with interactively. This was to secure a satisfactory level of inter-rater agreement. Except for the two psychology informants, who had an 82% agreement, the other three pairs of informants working in the other disciplines showed above-90% level of agreement. The psychology informants were approached again and ambiguities concerning the functions of directives were resolved. Upon a second round of discussion, they reached 93% agreement.

Results and Discussion

Forms of Directives in Academic Writing

429 directives were identified, from which verbs preceded by modal verbs had the largest share in both branches of science, whereas adjectives/verbs followed by subjunctives had the lowest frequencies, as Table 3 displays. Since the total word counts for the two branches of science were not equal, the frequencies were normalized. To do so, each frequency was normalized to that of the largest category. For instance, the frequency 11 for directives with initial bare infinitive in social sciences was multiplied by 48407 (the total word count of natural sciences) and then divided by 37736 (the word count of social sciences), which equals 14.

According to Table 3, RA authors in natural sciences use more directives than social sciences. While a minor difference is observed in verbs/adjectives + subjunctive forms like *conditional, hope-clauses, and wish-clauses* (see Example 8) between the two branches, natural sciences outnumbered social sciences in two linguistic forms, i.e., sentences with initial bare-infinitives, with verbs like *note, see, consider, take, bear, and look at* (see Example 9) and modal verb like *should, must, may, might, and would* + bare-infinitives (see Example 10). The only linguistic form that was used more often in social sciences was adjectives like *important, essential, noteworthy, necessary, imperative, and critical* + to-infinitive phrase (see Example 11). These findings confirm Hyland (2002), and Jalilifar and Mehrabi's (2014) results, who found minor interdisciplinary variations in the use of directives between hard and soft sciences in terms of frequency. The findings also confirm Ishak et al.'s (2021) finding, who investigated the form-based variations of directives, and found that using modal verb + bare-infinitive directives was the most common type across languages in applied linguistics research.

Table 3
Linguistic Forms of Directives

Linguistic Forms	Social Sciences (Word Count: 37736)		Natural Sciences (Word Count: 48407)		Total (Word Count: 86143)	
	f	Normalized	*f*	Normalized	*f*	Normalized
Sentences with initial bare infinitives	11	14	72	72	83	86
Modal verb + bare infinitives	97	125	168	168	265	293
Verbs/adjectives + subjunctive	8	10	8	8	16	18
Adjectives + to-infinitive phrase	45	57	20	20	65	77
Total	161	206	268	268	429	474

(8) If the binary fusions were controlled at Specific Gravity 1.02-1.06 and 20˚ C, you would be able to replicate the process. (Article 67, AL, Natural sciences)

In Example 8, the author directs the reader, who most likely is a member of the physics discourse community and is familiar with binary fusion and controlling lab conditions, to replicate the experiment. This is because the author himself/herself has not carried out the experiment under such conditions. The use of unreal subjunctive mood enables the author to instruct a certain course of action, without subjecting their results to question.

(9) Note the differences in the hedging and boosting devices in the observation reports written by the student teachers and junior counterparts. (Article 12, AL, Social sciences)

In Example 9, the use of imperative, without any apparent vocative, implies that the authors need to direct the readers' attention to a specific point in their data. Other forms of directives could have been used; however, it seems using imperatives, in this example, is the quickest form to obtain the readers' attention.

(10) More generally, it should be pointed out that finding bounds on physical properties … has enthralled physicists for … (Article 48, PR, Natural sciences)

In example 10, the expletive subject is followed by a verb in the passive voice only to cast some more weight to the that-clause. This shift of attention from the old information to new information (to use discourse terminologies) could give rise to directed attention. Otherwise, if the sentence had been written without the initial passive phrase, it could not have directed the readers' attention to the fact stated as much. It is important to note that indirect forms of directives (like Example 10) that impose less on the recipient differ from other prototypical directives (like Example 9), where there is a clear call to action to the reader.

(11) It is critically important to videotape the interviews with the parents' consent. (Article 40, ARP, Social sciences)

This linguistic manifestation can be regarded as a clear reminder for the readers who may want to use the same methodology. The verb 'is' in the present tense suggests that the readers, be researchers or psychologists, must bear in mind to follow the instruction if they aim to get better results.

The higher tendency to use modal verb + bare-infinitive verb directives can be because authors can both address their readers to act in a certain way and simultaneously regulate the imposition that might be exerted (Halliday & Matthiessen, 2013). The infrequent use of sentences with bare-infinitive initials might be ascribed to the general assumption in academic writing that this form of directives bears bald-on-record imposition on the reader, compared to other forms that are more polite, as indicated by Ishak et al. (2021). These findings suggest that not all forms of directives have the same level of appropriacy in academic writing, considering the rapport, intimacy, and engagement they express in the text.

Functions of Directives in Academic Writing

Probable links between the density of directives in each section of the RAs and the functions they perform were scrutinized in this study. Tables 4 and 5 show the distribution of functions of directives in RA sections in social and natural sciences, respectively. Regarding the density of directives in the RA sections in social sciences, directives were used most frequently in the Results and Discussion sections, while the fewest instances appeared in the Introduction sections. Similarly, in natural sciences, the highest frequency of directives occurred in the Results and Discussion sections; however, the lowest frequency was found in the Conclusion sections. The Methods sections in both branches of knowledge witnessed a relatively high number of directives, although fewer than the instances found in the Results and Discussion sections. This suggests that authors use more directives in the middle of RAs than the initial and final sections.

Directives in the middle of RAs are often used to revert to previous research, theories, frameworks, principles, and findings (see Example 12) to construct or justify new methodologies and arguments. These functions, according to the function-based classifications of directives in Table 4, fall more into the text-internal and -external directives, which aim to refresh the readers' memory, link text-bound ideas to entities, and clarify ambiguities. However, cognitive directives emphasize or highlight propositions and prepare readers to anticipate something in the text, as illustrated in Example 13. These findings align with Hyland's (2002, p. 225) results that researchers are more likely to construct facts situated within "larger narratives of citations, providing an intertextual framework for their immediate research findings."

> (12) In contrast, non-integral citations do not play any significant evaluative or rhetorical role ... They simply indicate the source of the materials referred to (see Example 8) or "the originator of a concept or a

product", as you can see in Thompson and Tribble (2001). (Article 4, InJAL, Social sciences)

As Example 12 shows, the reference to Thompson and Tribble (2001) is either to direct readers to a framework introduced in earlier sections of the paper (text-internal), or a study that has not been introduced in earlier sections (text-external) to back up the claim presented.

(13) Concentrations of PRC1 components inside Polycomb bodies are in some contexts below what is thought to be required to support liquid–liquid phase separation, bringing into question whether Polycomb bodies are formed by this process152,163. **Further study of Polycomb protein condensates and their relevance to Polycomb functions is therefore required.** (Article 78, NRMCB, Natural sciences)

In Example 13, the authors call an already accepted proposition into question because in different contexts they got unexpected results. In the last sentence of this excerpt, they request further study be done under specific conditions. The bold phrase at the end of the exception necessitates a certain procedure to be carried out (or reminds) the audience to pay heed to this requirement, which is basically a cognitive function.

Comparing the functions of directives in the Introduction sections of social and natural sciences RAs reveals that authors in social sciences use fewer directives with limited functions in this section, the most frequent of which is reference to an example/illustration, followed by reference to previous research (see Example 14). In contrast, authors in natural sciences use more directives with a range of functions, the most frequent of which is reference to another section of RA and reference to a table/graph/diagram/figure (see Example 15), the function that was absent in the social sciences. The difference lies in the abundance of abstract notions in social sciences, which require exemplifications and illustrations, on the one hand, and the profusion of solidly established entities in natural sciences, which can be shown using graphs and diagrams to introduce already recognized concepts, on the other hand (see Examples 14 and 15).

Table 4

Functions of Directives in Social Sciences RAs

	Functions	RA Sections				
		I	**M**	**R or R&D**	**D or D&C**	
		Normalized f	Normalized f	Normalized f	Normalized f	**Total**
Text-internal	Reference to another section of RA	0	8	3	2	13
	Reference to an example/illustration	12	13	17	0	42
	Reference to a table/graph/diagram	0	14	11	2	27

Text-external	Reference to previous research	8	2	15	4	29
	Reference to a theory/framework	6	13	6	0	25
	Reference to a principle/maxim	0	4	2	0	6
	Implication/suggestion	0	0	7	32	39
	Instructions	0	0	0	0	0
Cognitive	Reminding	0	0	7	4	11
	Pondering	0	0	10	1	11
	Warning	0	0	3	0	3
Total		26	54	81	45	206

(14) Most importantly, it requires active strategizing to recognize and work against the culture of power and structures of inequity in which language educators and students are positioned, as well as, assuming responsibility for change (see Liggett 2009; Picower 2009; Maddamsetti 2020 for examples of White teachers' critical self-reflexivity). (Article 17, AL, Social sciences)

The authors have coalesced the reference to previous research with examples in those studies to cast light on the fact that racist pedagogy is abundant and persistent in materials. Although no actual examples can be seen in this excerpt, it is clear the authors needed to refer to examples in other studies to point to the abstract notion of 'critical self-reflexivity.'

(15) Interestingly, this activity was exclusive to vPRC1 complexes and relied on their capacity to ubiquitylate H2AK119 (review part C) (see Fig. 3a). (Article 78, NRMCB, Natural sciences)

To make their point clear, the authors have supported their finding with a reference to an internal section in the study as well as an illustration, where the authors have used a full sentence in the brackets to direct their readers to the relevant part of the study.

Additionally, in both branches of science, text-internal and text-external directives are more common than cognitive directives in the RA Introduction sections, as Tables 4 and 5 demonstrate. This finding lends support to Swales et al. (1998) and Hyland's (2002) findings, who view cognitive directives more relaxed in tone and tenor and tend to lean towards interactional/interactive functions. In addition, it seems pondering directives are used to cast more light on propositions the authors want their readers to invest more attention to.

Table 5

Functions of Directives in Natural Sciences RAs

Functions		I	M	R or R&D	D or D&C	
		f	f	f	f	Total
Text-internal	Reference to another section of RA	22	7	24	3	56
	Reference to an example/illustration	2	27	23	0	52
	Reference to a table/graph/diagram	13	3	17	0	33
Text-external	Reference to previous research	12	2	4	2	20
	Reference to a theory/framework	6	12	5	0	23
	Reference to a principle/maxim	5	10	0	0	15
	Implication/suggestion	0	0	0	0	0
	Instructions	2	2	8	0	12
Cognitive	Reminding	2	0	12	2	16
	Pondering	2	5	20	9	36
	Warning	1	2	0	2	5
Total		67	70	113	18	268

Regarding the Methods sections, it seems reference to previous research, theories, and frameworks are common in both branches of science. The main difference, however, is the reference to examples and illustrations, which is more frequent in natural sciences. Interestingly, reference to tables and diagrams is not among the common type of directives in natural sciences. Moreover, reference to principles and maxims is more typical of natural sciences too, as Example 16 demonstrates. Reliance on established principles and maxims brings more credibility to new arguments in hard sciences, as Hyland (2002) puts it. In Example 16, reference to the principle of fixed rates and the independence of axion frequency acts like a foothold for the authors to build their own new claims and convince their readers, as stated in *as in Eq. (121)* (underlined in the example).

(16) Note that when the search rate is fixed, as in Eq. (121), the number of events per sweep through the axion frequency is independent of t, t1 and tc. (Article 55, RMP, Natural sciences)

The reason for these differences could be the need for more detailed textual descriptions, supported by examples, illustrations, equations, and figures, in the Methods sections in natural sciences, while authors in social sciences rely more on tables and diagrams to present overviews of samples, participants, and other logistic information. Other functions such as reminding, pondering, and waring are sporadically seen in natural sciences, but not in social sciences (see Example 17).

(17) 'Note, however, that some short CDSs … are conserved across the Eukaryotic Domain.' (Article 49, PR, Natural sciences)

Authors use pondering directives like Example 17 to engage their readers in the natural mechanisms they are pointing to. In the cognitive category, verbs such as *remember, recall, keep/bear in mind, note, consider, think about, and be careful* can take on one of the three functions of reminding, pondering, or warning, depending on the intention of the authors and the immediate context where these directives appear, as Examples 18, 19, and 20 show. Jalilifar and Mehrabi (2014) and Hyland (2002) corroborate that authors these cognitive functions of directives serve to create a pause in the flow of information to make sure the readers have a deeper understanding of the content or make them note a key point in the text.

(18) We would like you to think about your English language role model: it might be a teacher, a famous actor or singer, a politician, a friend ... (Article 17, AL, Social sciences) (reminding)

(19) Additionally, the score increases for the three accents require careful interpretation. (Article 8, InJAL, Social sciences) (warning)

(20) Consider the case of an employee who assesses COVID-19 as a strong event and experiences depressive symptoms due ... (Article 23, JAP, Social sciences) (pondering)

The decision as to the extent of imposition each of the above examples carries might hinge on directness or indirectness of the directives (Searle, 1976) and the semantic strategies utilized (Leech, 2014; Ronan, 2022). In Example 18, the direct directive displays the least degree of imposition, as the authors have employed an interpersonal modality indicator (i.e., the modal verb would), as their semantic strategy, to tone down the directive to a mere reminder. However, the indirect directive expressed via a hinting strategy bears more imposition considering the strong verbal phrase i.e., require, and the adjective careful. In fact, the hidden side of the matter is what would happen if careful interpretation were not guaranteed. In Example 20, the degree of imposition oscillates in-between the imposition spectrum, where the reader is gently requested to imagine a situation. In this example, the readers do not experience as much imposition as they would from the directive in Example 19. However, what affects the degree of imposition is not only the presence/absence of a modal verb, but also whether there is a direct reference to the readers. Leech (2014) refers to speaker-oriented and other-oriented speech acts; this means orientation can be manipulated in the way a speech event is presented. Similarly, directly engaging with the reader may increase the degree of imposition. Hyland (2002) notes that only through introspective or retrospective recalls one may identify the exact function of the directives in academic writing. Overall, the variations in the functions of directives in the Methods sections in the two branches of science can be attributed to the authors' intention to use thick descriptions and/or exemplify/illustrate the essential concepts and entities to convince their readers of the rigor exercised in the methodology, or to provide more tables and diagrams to simply give a general overview of the instrumentation and procedures.

Differences can also be observed in text-internal and text-external directives towards the end of the RAs published in social and natural sciences. The most striking difference is the lack of implicational or suggestive directives in

natural sciences. This means, offering directives as implications is not a common characteristic in natural sciences. On the contrary, cognitive directives, especially the reminding and pondering functions, that call for deliberation are found more in natural sciences. Perhaps the length of RAs in natural sciences, with an average of 10800 words, make authors use directives to remind their readers of propositions addressed earlier or later in the text (see Example 21). Directives that require readers to ponder tend to underscore arguments in the Discussion and Conclusion sections or second propositions that might go unnoticed by readers.

(21) The characteristic hourglass appearance (see pp. 676 and 677) was the ultimate criterion used to define vasospasm. (Article 76, CL, Natural sciences)

Directives as Impoliteness Strategies or Engagement Markers

To determine the (im)politeness of directives in RAs, a score out of 1 to 5 was assigned to each directive. In this way, (im)politeness could be linked to the functions assigned in the previous stage. Directives scored 3 and above were considered impolite; thus, impolite, while directives scored below 3 are regarded as engagement markers. Table 6 presents the details on the impoliteness status of directives in the two branches of science.

Table 6
Directives as Impoliteness Strategies and Engagement Markers in Social Sciences RAs

Functions		Branches of Science			
		Social Sciences		Natural Sciences	
		Impoliteness strategy	Engagement marker	Impoliteness strategy	Engagement marker
Text-internal	Reference to another section of RA	0	13	0	56
	Reference to an example/illustration	0	42	0	52
	Reference to a table/graph/diagram	0	27	0	33
Text-external	Reference to previous research	0	29	0	20
	Reference to a theory/framework	0	25	0	23
	Reference to a principle/maxim	0	6	0	15
	Implication/suggestion	19	20	0	0
	Instructions	0	0	0	12
Cognitive	Reminding	5	6	5	11
	Pondering	0	11	0	36
	Warning	3	0	5	0
Total		27	179	10	258

According to Table 6, all directives, realized in various semantic strategies (direct, indirect, and hints), with text-internal functions are recognized as engagement markers in both branches of science. Text-external directives show a mixed picture. In this category, reference to previous research, theory/framework, and principle/maxim (mostly expressed using direct and indirect semantic strategies, but not hinting) are marked as engagement markers in social and natural sciences. However, implicational/suggestive directives in social sciences are split, as half of the instances are considered impoliteness strategies, and the other half are perceived as engagement markers. Upon a closer examination of these cases, I noted that in the implications and suggestions made in the Discussion or Conclusion sections, authors have used strong modality, i.e., modal verbs like *must and have to, as well as need to + verb*, or strong adjectives such as *incumbent, required, and necessary*, followed by to-infinitive phrases that address the readers to take a certain course of action. These directives are rated impolite by the informants (see Example 22).

(22) However, they [researchers] need to be mindful of generalizing the findings and instead … (Article 9, InJAL, Social sciences)

By contrast, weaker modal verbs such as *should, ought to, had better*, and other verbal phrases indicating a piece of advice or suggestion that offer choices to the reader but do not cause any imposition are rated as engagement markers (see Example 23). Directives functioning as instructions in natural sciences are all considered engagement markers, as Example 24 illustrates, on the account that the best means to describe processes in natural sciences are instructional directives. This suggests that researchers in natural sciences may want to use instructions in their RAs with little or no impoliteness implied.

(23) [Researchers] are advised to guide their students to discover field-specific citation practices in authentic textual discourse of their disciplines. (Article 9, InJAL, Social sciences)

(24) It should be noted that the above derivation is purely phenomenological and detailed microscopic mechanisms are still needed to ... (Article 50, PR, Natural sciences)

In cognitive directives, those functioning as reminders were in the middle of impoliteness/engagement continuum. In both branches of science, some instances were rated as impolite. These include directives with initial imperative verbs such as *remember, recall,* and *bear* in mind. Directives of pondering are taken as engagement markers in social and natural sciences, while those performing a warning function like *be careful* or *instructors are advised not to forget ...* are assumed to be impolite.

The total figures at the end of Table 6 indicate that in general directives are considered polite metadiscourse engagement markers in the RAs written in social and natural sciences. However, using appropriate structures to convey these directives can still play a role in making them sound polite or impolite. Therefore, authors are advised to address their readers as peers and should exercise utmost caution not to use forms that are obviously impolite. The findings of this research showed that directives in academic writing are impolite if formulated or situated

unfittingly. Based on these findings, the notion of directives being an impolite strategy in academic writing is rejected. It is perhaps better to consider directives as double-edge swords that can be engaging or impolite depending on the context of use and the linguistic means used.

Conclusion

This study has been a partial attempt to show whether the use of directives in published RAs in social and natural sciences should be seen as impolite strategy, which detaches the author from their readership, or as engagement markers, which minimizes the social and scholarly distance between them. Findings indicate that the appropriate linguistic means by which directives are expressed and the context in which they are used determine the distinction between their being impolite and engaging. It can be tentatively claimed that authors appear to abide by prescriptive rules in general; however, they also tend to implement a lax view towards using impolite strategies, particularly those that have rather been legitimized in academic writing.

The findings imply that novice writers should avoid bald-on-record impolite forms of directives in their academic writing. This study implies an informed rejection of the futility of contrasting metadiscourse markers and pragmatic concepts. In other words, this corpus-informed analysis of academic discourse proves how intricately pragmatics and textual discourse are intertwined. Moreover, they should pay special heed to the functions of directives in respective sections of RAs in their field of specialty. EAP practitioners and materials developers can raise awareness about the legitimized politeness and impoliteness strategies in academic writing and the required conditions that surround their use. Studies of this type support the view that the intricacy of language should be explored using larger corpora of language data. In fact, investigating pragmatic concepts such as the one in this study, i.e., impoliteness, might seem a far-fetched endeavor, but using carefully designed studies can enable tapping into these concepts even in conservative genres like academic writing. Future research can include a range of other text genres from a variety of disciplines to cast more light on the issue.

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