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Original Article

Reporting Verbs in Results and Discussion Sections of Scientific Research Articles of Hard and Soft Disciplines

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Abstract

Reporting Verbs have gained considerable attention in corpus-based studies during the previous years. It is necessary to utilize reporting verbs appropriately to establish the writer's claims and situate them across formerly published studies. Given the importance of the reporting verbs, the current study explored the rates and the differences of reporting verbs across science disciplines. Hence, a total number of 200 Results and Discussion sections of research articles consisting of 50 excerpts from the four science categories introduced by *Science Direct* web of science, namely *Life Science*, *Social Science and Humanities*, *Physical Science and Engineering*, and *Health Sciences* were gathered and used as the corpus and analyzed based on Thomas and Hawes's framework. The results showed that authors in Life Science and Health Science used more reporting verbs in comparison to the other two science disciplines. Furthermore, the tentative reporting verbs had a higher frequency than certainty reporting verbs. The research findings have several implications for novice researchers within various science disciplines in reporting their claims using reporting verbs and for course designers to treat crucial problems of the students in their academic writings.

Keywords: Corpus Study, Reporting Verbs, Research Articles, Results and Discussion Sections

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1. Introduction

Researchers in the field of English for Academic Purposes (EAP) are recently paying more attention to the rhetorical structures of academic writings or research articles (RAs) to incorporate different corpus methods (Flowerdew, 2005). Scientific research articles provide primary communication channels for scientists to inform the public of their academic findings since preparing to write RAs requires understanding higher levels of discourse (Abasi & Graves, 2008). Hyland and Salager-Meyer saw academic texts as socially constitutive elements of subject areas, individual position and power, and knowledge itself (Hyland & Salager-Meyer, 2008). Furthermore, the RA and the scientific language are expected to adhere to the rhetorical, grammatical, and stylistic patterns in developing the general semiotic system to achieve efficient scientific discourse (Halliday, 1993; Swales, 2004).

The increasing demand for publishing RAs in high-value research journals highlights the importance of academic writing for postgraduate students. There are countless challenges for scholars, researchers, and second language learners from various countries with different cultures when publishing their research papers in reputable journals, especially in Iran. Researchers hope to publish their scientific articles in prominent and valid international journals. However, many of these articles are rejected and not published in famous journals because they do not satisfy the required writing criteria. Many novice researchers in different fields of study do not have enough knowledge of reporting verbs for proper citation and appropriate use of quotations (Tahamtan & Bornmann, 2019). According to Hyland (1999), citing one's claim or the claims of others is a challenging area associated with this issue because of requiring the appropriate selection of grammatical devices. Citations are essential tools writers use to indicate their affiliation to a particular discourse community they belong. Academic writers, especially novice researchers, must be cautious when putting forward their claims and arguments, as all the statements include the writers' lookouts (Maggio et al., 2017). They have to be accurate and modest in doing so to satisfy the demands of the discourse community to which they belong, gain acceptance for their arguments, and engage in a negotiation with their audience. Reporting verbs contribute significantly as a signal in citations and, hence, have attracted a lot of attention in citation research and teaching academic

language (Docherty, 2019; Thomas & Hawes, 1994; Wong, 2019b). Sakita referred to the critical contribution of reporting verbs across this process, reflecting the presentation, criticism, and examination of the claims by writers and speakers when they express their relevant opinions (Sakita, 2021). Hyland (1999) stated that reporting verbs are necessary grammatical devices, which enable the writers to represent their point of view in academic papers, particularly about the application of language in the current circumstances to reflect its usage (through ideas, thoughts, or speech utterances) in previous conditions. Thomas Hawes defines Reporting through the following statement (Thomas & Hawes, 1994) attributing propositional content to a source outside the author of the article in the present situation and marking this through various attribution signals .

Thompson and Yiyun addressed how authors might use reporting verbs to express their claims and opinions while conveying their interpretations of the claims of others (Thompson & Yiyun, 1991). Becoming a qualified academic writer requires familiarity with making appropriate grammatical selections when reporting claims. This may influence the claim's believability and rhetorical posture (Bloch, 2010).

Scholars and students, particularly non-native students, feel the need to develop practical academic literacy skills due to the increasing demand for advanced communication skills in written discourse. Thus, no matter what language background they come from, novice researchers need to gain a range of skills to produce appropriate texts. In such a context, discourse analysis has widened its focus to include the rhetorical organization of written texts while taking into account the interactions present in the texts as a function of situational and cultural variables within the discourse community (Hyland, 2018). As research indicates, due to the complexities of text synthesis, novice writers employ different methods of text integration, including idiosyncratic or non-standard ways of embedding quotations like inappropriate citations and reporting verbs (RVs), while writing from sources (Docherty, 2019; Wong, 2019a). Such a lack of knowledge/skill in intertextual strategies (List & Alexander, 2019; Shuart-Faris & Bloome, 2004), whose function is cross-textual linking to facilitate multiple-text integration, can make writing for academic purposes a nightmare for students, whether in L1 or L2. Writings provided by such students may lack originality in lexis and structure, raising the concern of the vulnerability of the new texts to accusations of

plagiarism. In addition, using the elements of writing from sources can challenge students' writing practices (Hirvela & Du, 2013; Petrić, 2012; Shaw & Pecorari, 2013). Moreover, writing in any language is an important mood of expressing thoughts and ideas; however, writing in a second language is still a complicated task that needs high effort for the majority of language learners. For postgraduate students who are required to write articles and report the findings in the discussion and conclusion sections of scientific research articles via appropriate reporting verbs, their academic need for improving this skill becomes more obvious. Thus, they should go through different processes to learn how to report their research articles appropriately. Fewer studies have focused on the functional analysis of reporting verbs in the result and discussion sections of research articles across different fields. Aiming to contribute to this growing literature, this the study is interested in analyzing RVs used in the "Results and Discussion" sections across discourse communities. Through a corpus-driven methodology, the study extensively examined the forms and functions of scientific research articles employed by authors in each science.

2. Literature Review

The rhetorical setting of a research article has been claimed for over a century to combine the presenting novel arguments concisely while considering earlier relevant studies. Later, though, how writers came up with these conditions was regarded as a process of establishing an argument to support the writer's statements in more classical rhetorical terms. Traditional perspectives viewed claims based on logical certainty and categorized them as naturally resulting from scientific studies. Thus, claims only had to have a clear and concise position across the studies performed previously. Yet, claims are supposed to be believable from a more recent stance, considering academic research articles as naturally rhetorical instruments aimed to convince the audience about the justification and significance of their claims (Li, 2006; Parkinson, 2013). The theoretical methodology underpinning this research is Halliday's systemic Functional Linguistics (SFL), treating language as a system of meaning-making directly related to its particular setting (Halliday & Matthiessen, 2013). According to SFL, language, thus, cannot be separated from its speakers as well as from its context. According to

SFL, there are two essential layers for context, including the context of the situation (register theory) and the context of culture (genre theory). The term context of situation leads to the concept of register and it is considered as the immediate environment where a text represents its function, however, the context of culture, as a more comprehensive background considered when interpreting the text, leads to the concept of the genre (Halliday & Hasan, 1989). In the context of genre studies, the verbs, in general, and reporting verbs, in particular, have gained special attention from researchers. Reporting verbs contribute as primary linguistic tools the writers employ for practical synthesis and incorporation of sources into academic texts, making them a central component of broader citation techniques required by the student writers whenever evidence-based argumentations are composed (Lee et al., 2018). It is worth noting that the rhetorical impacts of research papers usually rest on the connections made between the claims of writers and those provided by others. According to Hunston and Thompson, writers need to consider the strengths of their claims and attitudes regarding the claims made or reported to establish their research in the network of formerly published studies (Hunston & Thompson, 2000). Thus, it is essential to be highly careful while selecting the reporting verbs to reflect the reliability of the writers and their claims and increase the possibility of their acceptance by the readers (Hunston & Thompson, 2000).

Similar to Swales' description of a genre as a set of social interactions (Swales & Swales, 1990), Hyland (2000) discovered that the utilization of reporting verbs is reliant on the various sorts of social interactions contained in a paper. He defined the genre as an event conveyable to others with straightforward rhetorical objectives, supporting the requirement to understand the rhetoric of such discourse acts whenever making lexical decisions. Hyland distinguishes between research acts (such as demonstrate), that pertain to efforts taken within the study, discourse acts (such as conclude), associated with cognitive or research activities, and cognitive acts, belonging to cognitive or research activities and cognitive acts, representing the mental processes employed to report claims (Hyland, 2002). The writers' stance concerning the reported claims is revealed to a great extent as a result of combining these processes. The pedagogical challenges when incorporating such techniques into composition classrooms become more complicated since several slight distinctions, including whether the writers have positive or negative attitudes towards a specific claim, are only

understandable within the broader rhetorical context considered when making that claim. Thus, according to Hunston and Thompson, a great deal of specificity may be required when using reporting verbs to achieve reliability concerning the writers and the claims made and increase the possibility of their acceptance by the readers (Hunston & Thompson, 2000).

During the previous decades, there has been a bulk of research on discourse analysis of RVs in different disciplines. For example, Manan and Noor examined the utilization of RVs in master theses compiled in Malaysia to assist instructors in providing students with better guidance when writing their theses (Manan & Noor, 2014). They studied 30 research articles in three disciplines, including economics, politics, and linguistics, and examined the forms and sentence patterns, functions and classifications, and frequency distribution of Chinese reporting verbs. They also compared Chinese and English RVs and found that Chinese writers used more research verbs compared to English articles, indicating more likelihood of Chinese writers to cite others' research behaviors, reporting rather than evaluating their research results.

Agbaglo investigated how RVs were used in research articles written by the lecturers in the department of English (Agbaglo, 2017). The author focused on a corpus of 16,811 words from the literature review sections of research papers. The theoretical underpinning for the investigation was Hyland's classification of RVs (Hyland, 2002). In comparison to the categories of the Research Acts Cognitive Acts of RVs, the study discovered that these lecturers preferred to utilize Discourse Acts type of RVs. This research, like all others, contributes to the corpus of knowledge about academic discourse. The results showed that the research articles under study used all three categories of RVs defined by Hyland (2002), with Discourse Acts RVs as the most common and Research Acts and Cognitive Acts RVs in the following ranks, respectively. In the Discourse Acts RVs, the verb *discuss* appeared as the RV with the most occurrences, but in the Research Acts RVs, the verb *examine* emerged as the RV with the highest frequency of occurrence. The verbs *consider* and *believe* were the first Cognitive Acts RVs to come up, with each documenting three instances.

More recently, Liu and Wang (2019) tried to investigate the forms and sentence patterns, functions and classifications, and frequency distribution of the Chinese reporting verbs. The four forms of Chinese reporting verbs identified were verbs, verbal phrases,

discontinuous constructions, and lexical chunks. The results showed that Chinese reporting verbs were described through four forms and five fundamental sentence patterns. In terms of function, they could be divided into 3 categories, reflecting the attention a referrer paid to the research of a referee and the referrer's evaluative perspectives. It was found that discourse verbs, expressing the writer's concerns on the interactive associations of the authors and the academic community in which they usually express their evaluations, were frequently used. The verbs with the lowest frequency were Cognition Verbs, which writers utilized for speculation on the mental and cognitive status of the cited individual.

Un-udom and Un-udom (2020) investigated the RVs with the highest frequency of application in applied linguistic papers and their usage over the citation process. To this end, Antconc software's concordance function was employed to analyze 52 articles from three applied linguistic journals. The researchers focused on RVs utilized in the literature review section as they believed that this section included a more significant number of reporting verbs than other sections of the articles. Analysis of the RVs of the articles was conducted into a concordance line, followed by classification into Hyland's Framework of RVs (2002). It was shown that the application of RVs could be categorized into research acts, with the highest frequency of RVs application, followed by discourse acts and cognition acts.

As stated, despite the presence of enough literature on RVs, there is a research gap as to the functional analysis of reporting verbs in the result and discussion sections of research articles within the fields of study. Hence, each study or research that can bridge this gap is significantly important. In sum, the present study aims to fill the void mentioned above using discourse analysis through the following research questions:

1. What RVs do authors in each discipline mainly rely upon in the Results and Discussion sections of research articles?
2. What sorts of RVs do the authors use in each discipline?

3. Research Method

This section explains the design of the study, instruments, and data collection and analysis procedures.

3.1. Context of the Study

The research corpus was a total of 200 sections allocated to Results and Discussion in research articles consisting of 50 excerpts from each science introduced by science webs, including Life Science, Social Science and Humanities, Physical Science and Engineering, and Health Sciences. Convenience sampling was used to select the corpus of the study out of leading journals in each of the four sciences, published from 2015 to 2020. The articles were chosen randomly from different journals, such as Radiotherapy and Oncology, Advances in Digestive Medicine, System, European Journal of Medical Genetics, Cancer Genetics, Life Sciences, Ocean & Coastal Management, Engineering Software, Case Studies in Construction Materials, Advances in Accounting, and Australasian Marketing Journal. The reason behind selecting source journals only from one database is that the ScienceDirect web of science was only selecting sufficient empirical RAs within 5 years from 2015 to 2020, with the required format for further sampling. The whole corpus consisted of 212492 words (about 50,000 words for each discipline). The data of the study were small and specialized. Justification for the use of small size specialized corpus can be found in the writings of several authors like Flowerdew and Forest (2009), Fuertes-Olivera (2008), and Ghadessy (2001), suggesting that the corpus that includes the texts of the same genre and discipline may lead to enough data for analysis regardless of their size. Limiting data to a specific genre within a particular discipline also controls possible disciplinary variations (Kanoksilapatham, 2005). Besides, a small corpus enables some analyses that require the hand-coding of RVs, which otherwise cannot be handled manually within large data (Flowerdew & Forest, 2009). Therefore, to meet the requirements for more reliable data, the researcher of the present study chose the sections of the research articles allocated to results and discussion, with which she tabulated and categorized the desired sections.

3.2. Framework for Analysis

The current study used Thomas and Hawes's framework (1994) for analyzing the data. They proposed three RV categories, including (a) real-world or experimental activity, (b) discourse active, and (c) cognition verbs. Thompson and Yiyun (1991) called the category of 'discourse activity verbs' like 'textual verbs', arguing that they represent the processes whereby verbal

expression seems obligatory. They gave several instances such as *state, write, term, challenge, point out,* and *name*. Cognition verbs reflect mental procedures, some instances of which include *believe, think, focus on, consider,* and *prefer*. The category called 'real world or experimental activity verbs' by Thomas and Hawes is consistent with Thompson and Yiyun's 'research verbs', reflecting 'mental or physical procedures as components of research work'. Some instances include *measure, obtain, quantify,* and *find*. It is acknowledged in the field that such categories are not indisputable, and some overlapping may be found between them, leading to challenges in allocating RVs to a distinguished category.

3.3 Data Collection Procedure

Data analysis was performed using the classification system that Thomas and Hawes (1994) introduced for RVs, classifying the RVs based on the type of the desired function. Because of the increasing accuracy of the research, this study focused on discourse activity or textual verbs. Thomas and Hawes further divided these verbs into two subcategories of discourse verbs, including tentative and certainty (Thomas & Hawes, 1994). As they mentioned, the second category represents the reported propositions through definite and conclusive statements. This category was subsequently grouped into two sub-classes informing and argument verbs.

Thomas and Hawes referred to the associations of informing verbs and neutral information transmission from the original author to the audience through the reporting writer (ibid). There are no comments or interpretations by the writer concerning the reported information. These verbs do not represent evaluations, the writers' perspectives, or any explicit indications of persuasive intent on the writers' part. As emphasized by Thomas and Hawes, the verbs are not indicative of neutrality in information transmission as the writer's views intervene. They then refer to the adoption of a particular stance based on the semantics of the verbs belonging to this category. Some instances of such verbs include *suggest, maintain, assert,* and *criticize*, indicating the writer's adoption of a particular point of view.

Along with the two significant subclasses of Discourse Verbs mentioned above, some verbs represent verbal activity while carrying a further semantic component. This extra semantic component is absent in the verbs of other categories, as all of them restrict the

generality of a claim to some extent when they qualify or deny some aspects or indicate the need for further work. Thompson and Yiyun call it the Author Act, reflecting the qualifications performed by the reporter rather than the reporting writer (Thompson & Yiyun, 1991). Qualification Verbs in the corpus include *cautioned*, *raised the question*, and *called attention to the fact.*

3.3. Data Analysis Procedure

At the onset of the study, the articles were downloaded, after which the results and discussion sections were extracted and converted into Plain Format for convenient application in other programs. The frequently utilized RVs were determined in the corpora and underwent comparisons to provide a list of RVs and illustrate their different applications in line with the research objectives. Thus, the present study follows the procedure of collecting RVs frequency and percentage and determining their different applications. Quantitative analysis of the collected data on the frequency of RVs in research articles in the corpora was performed based on Thomas and Hawes' framework and its different sub-categories, as explained above (Thomas & Hawes, 1994).

After gathering the corpus, the researcher analyzed it based on the framework under study, and the analysis reliability during the data categorization process was ensured by rechecking 10% of the data. A second researcher, who was familiar with the data analysis of RVs, independently reanalyzed the data for different types of RVs based on the framework under study. The field of study of this expert was also discourse analysis, and she was familiar with the data analysis phase. The second rater coded 10% of the data taken randomly from the corpus, and finally, the inter-rater reliability was estimated and reported. The inter-rater agreement, measured using Cohen's Kappa formula, was found to be Kappa = 0.943 and p = 0.000.

4. Results

As shown by the data analysis results, 212492 words were obtained (about 50,000 words for each discipline). The categories of RVs, such as tentative, non-tentative, and qualification reporting verbs, were considered to calculate and distribute their frequency. The first category

was divided into pre- and post-experiment. The former consisted of the verbs *proposed, postulated, and hypothesized*, while the latter consisted of verbs such as *suggested* and *indicated.* Table 1 shows the results associated with the tentative RVs within the results and discussion sections of RAs.

Table 1.

Tentative RVs Frequency and Percentage across Disciplines

			Disciplines			
		RVs	Life Science	Social Science	Physical Science	Health Science
Tentative RVs	Pre-experiment	Proposed	7 (3.7%)	1 (0.9%)	0	9 (7.2%)
		Postulated	1 (0.5%)	1(0.9%)	0	5 (4%)
		Hypothesized	4 (2.1%)	0	0	3 (2.4%)
	Post-experiment	Suggest	108 (57.9%)	75 (65.2%)	49 (64.5%)	68 (54.4%)
		Indicate	67 (35.8%)	38 (33%)	27 (35.5%)	40 (32%)
Total			187(100%)	113(100%)	76(100%)	125 (100%)

According to Table 1, the highest and the lowest percentages of reporting verb groups for life science discipline referred to the suggested RV in terms of tentative RV (57.9%) and postulated RV (0.5%), respectively. The other three disciplines led to the same result, with the difference that the verb hypothesized was absent in social science, and all of the pre-experimental RVs (proposed, postulated, and hypothesized) were not present in physical science and engineering. Furthermore, in total, the rate of RVs in life Science had the highest frequency (187), and the rate of RVs in Physical Science was the lowest (76 n frequency) in terms of tentative RVs. The other category of Thomas and Hawes' framework is non-tentative RV. Informing and argument RVs are the sub-divisions of certainty or non-tentative RVs. The reporting verbs *stated, documented*, *referred to, noted,* and *called attention* are related to the informing RV. The reporting verbs *maintained, invoked, cite evidence, provide evidence,* and *concluded* are related to the argument RV. Table 2 indicates the rates of non-tentative RVs across disciplines.

Table 2.

Non-Tentative Rvs Frequency and Percentage across Disciplines

			Disciplines			
		RVs	Life Science	Social Science	Physical Science	Health Science
Non-tentative RVs	Informing	stated	1 (0.7%)	2 (4.3%)	12(24.4%)	4 (3.8%)
		documented	9 (6.6%)	0	0	1 (0.9%)
		Reported	111 (81.9%)	23(50.3%)	17(35%)	87(85%)
		referred to	1(0.7%)	0	3(6.1%)	0
		noted	6 (4.4%)	9(19.5%)	9(18.3%)	6(5.5%)
		called attention	0	2(4.3%)	1(2%)	0
	Argument	maintained	2(1.4%)	0	0	2(1.9%)
		Cite	0	0	1(2%)	0
		invoked	0	0	0	0
		cite evidence	0	0	0	0
		provide evidence	2(1.4%)	2(4.3%)	0	0
		concluded	4(2.9%)	8(17.3%)	6(12.2%)	3(2.9%)
Total			136(100%)	46 (100%)	49 (100%)	101 00%)

Based on the results in Table 2, the most significant percentage of RVs in the certainty or non-tentative category was related to life science (136 in frequency), followed by health science with a rate of 101. The other two disciplines were Life and Social Sciences. In all disciplines, informing RV had the highest percentage among the other RVs. Furthermore, two RVs of *invoked* and *cite evidence* were absent in all of the disciplines under study. In addition, the rate of argument RVs was low compared to the informing RV in the corpus. The last sub-division of RVs in Thomas and Hawes's framework (1994) was qualitative RVs that consisted of the verbs such as *cautioned, raised the question*, and *called attention to the fact*. Surprisingly, we could find no evidence of these verbs while analyzing the data across

disciplines. Following are the examples of different RVs obtained from the corpus under study.

Example 1: Tentative RV, pre-experimental category

Despite describing different treatments over the years [3,7,8], no definitive therapy has been proposed at the moment.

It is postulated that contrary to other cancers, *TERT* methylation may not be the primary determinant of survival in ESCC. Moreover, based on reports, high *TERT* expression is related to poor prognosis in different malignancies (17,30,31); nevertheless, lower *TERT* expression in esophageal cancer may lead to impairments in its effects on prognosis.

Example 2:Tentative RV, Post-Experimental Category

This observation *suggests* that using a CTV-PTV margin recipe that can ensure adequate tumor coverage for the large majority of patients will result in highly excessive dose delivery to healthy tissues for a subgroup of patients.

These findings *indicate* that only miR-210 and not miR-373 could contribute as markers for chronic hypoxia. Different miR-210 targets have been determined, including HOXA1 (impact on proliferation and oncogenic transformation of cells), FGFRL1 (impact on cell proliferation), HOXA9 (impact on cell proliferation and apoptotic cell death) [15], and RAD52 (impact on Unrepair via homologous recombination) [18].

Example 3: Non-tentative RV, informing category:

It could *be stated* that chromosomal imbalances had a much lower frequency compared to the chromosomal break at 1p36.3.

Current research reported that NE could induce IL-6 production in macrophages through the β-adrenoreceptor-NAD (P)H oxidase system-NF-Kb signaling pathway.

Example 4: Non-tentative RV, argument category:

We *maintain* that sealing the nasal fossae is a suitable but empirical treatment to control epistaxis; however, its actual therapeutic mechanisms are still not clear. More investigations of

HHT molecular basis are essential to developing the conventional molecular diagnosis and curative treatments.

It was *concluded* that race did not predict 5-year BFFS among patients in the low-, intermediate-, and high-risk groups, regardless of hormone therapy.

Discussion

This section presents further explanations concerning the analysis results while justifying the findings according to the previous studies. The current research aimed to obtain a sample of sentences authors may use in various disciplines instead of examining the potential differences within the corpora or the generalization of the single RVs application. Thus, it focused only on describing the rates and examples of RVs in the sentences found in the database and avoided making generalizations concerning the application of RVs. Two hundred Results and Discussions ections of RAs from the four sciences including Life Science, Social Science and Humanities, Physical Science and Engineering, and Health Sciences, were selected to represent the distinctions made by writers when selecting RVs. The findings demonstrated that the writers in Life Science used more RVs in general (323 instances of RVs containing both tentative and no-tentative RVs). The next place went to Social Science authors with a rate of 226 in frequency, whereas the authors in Physical Science and Engineering used fewer RVs (125 instances of RVs). The results are in line with the results of Hyland's (1999) and Bloch (2010) research, indicating that authors in the field of Social Sciences and Humanities utilized a considerably higher number of integral citations compared to those in the Sciences and Engineering. It is worth noting that they coded sample sentences consisting of the verbs *describe*, *point out*, and *state* as integral, while the current study placed the verb *state* under the category of non-tentative informing RVs.

The RVs *suggest* and *indicate* were used in high frequency in the corpus as the tentative and post-experimental RVs. It is possible to use the verb *indicate* to modulate the power of a claim as Bloch stated, which seems to be a powerful rhetorical technique for preventing potential (Bloch, 2010). Meanwhile, the writers can still utilize boosters to represent the power of their adherence to the claim. The following two examples show doubled tentativity of the RVs with the modals of *could* and *may*.

A more negative histological pattern with a greater likelihood of malignancy may be indicated by the positive net change of IHb. This finding possibly indicates that H3K27me3 is not actively maintained in SS, but there may be other mechanisms that can generate the H3K27me3 mark. According to Hyland, words such as *indicate* may restrict a claim while minimizing its rejection potential due to its too strong expression (Hyland, 2002). Meantime, writers have the chance to enhance the level of their adherence through other lexical or rhetorical devices, avoiding the adoption of considerably strong positions that may lead to rejection by the audience. The highly frequent use of the verb *report* in all of the sciences also is evidence of the informing nature of the research articles that consequently reported their findings in the result and discussion sections with certainty.

5. Conclusion and Research Implications

The present study primarily focused on illustrating the rates and frequencies of RVs that writers used in reporting their claims and citing the findings in the result and discussion sections of scientific research papers across sciences, followed by providing instances of authentic applications of RVs as an effective practical guide for novice researchers in each field. The results showed that factors such as the field of study would affect RVs utilization in different genres. Furthermore, factors such as culture and language were also important, and their consideration was supposed to change the result of this study (Hyland, 2000). Most of the research in the area of contrastive rhetoric has focused on the concept of culture and they concluded that the prevailing cultural norms, values, and belief systems, particularly sociocultural contexts, may necessarily affect the rhetorical selections that the writers make (Doró, 2014). This concept can represent professional disciplinary culture in cross-disciplinary studies (Atkinson, 2004). According to evidence from academic texts, the cultural and disciplinary cultures may interact, collectively forming the discourse structures and rhetorical techniques, especially regarding research articles (Fløttum, 2012; Yakhontova, 2006). The linguistic and cultural practices of the writers' first language are supposed to affect writing in the second language. This can subsequently influence the organization of the written discourse, the type of Scripts or Schemes used by the writers, and different factors, such as the topic, audiences, and arrangement of the paragraphs (Fløttum, 2012).

As is the case with all human production, this study has some limitations which need consideration before making any interpretations. This study used the written medium to investigate the types of RVs in written texts. Therefore, researchers can explore the reporting verbs by analyzing spoken medium too. Besides, this study could facilitate and induce further research into the RVs practices across the genre of research articles or other genres, not to mention the proposed implications for non-native postgraduate students to enhance the text type in their proposals or theses. Hence, the research findings provide the chance to teach academic writing to novice writers seeking to compile research articles in various scientific fields. Some implications would arise from the present research. The obtained results can primarily provide researchers, educators, and syllabus designers with a deeper understanding of the characteristics of texts composed by authors of different sciences in using reporting verbs.

Nevertheless, a wide range of writing characteristics, including citation strategies as an example, is still unclear for inexperienced writers, especially when it comes to various functions of RVs and their distribution in different sciences. Besides, it is noteworthy that researchers and students may have multiple audiences, work toward various writing objectives, and use a variety of genres, which can affect their behavior in citations. Experienced researchers typically use peer citation, whereas postgraduate students refer to research conducted by researchers at a higher position, whereby, according to Petrić, there are different power issues that may influence their assessments of others and their certainty in doing so (Petrić, 2012). Teachers should teach about citation practices and the use of RVs during the MA/MS program and give the students the required awareness of and familiarity with the different purposes and rhetorical roles of reporting verbs. The students can be given writing assignments, sufficient practice, and experience to employ RVs for various text types and situations with different purposes.

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