

The Pronoun “this” in Civil Engineering Research Articles

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Abstract

Cohesion, particularly through sentence boundaries, makes up the principal semantic features providing the text with the required unity. Cohesive relation is both helpful in the text unity and the readers' textual interpretation. Among the different cohesive relations, encapsulation contributes significantly to developing the text, by which textual segments, including clauses, sentences, sequences of sentences, and paragraphs, are condensed and synthesized using cohesive markers. This study aimed to identify the frequency, textual segments encapsulated, and syntactic structure of encapsulated segments by the demonstrative pronoun “this”. Hence, 20 research articles from the discipline of Civil Engineering from five top journals published by Elsevier were selected and analyzed. Results showed that a) “This” was more frequent in the sentence-initial compared to other positions; b) “This” was utilized more to serve the function of “Encapsulation” than point-to-point cohesion; and c) “This” was used to encapsulate two syntactic structures, namely one sentence and one clause structures. The results of this study could provide a practical guide for writers (especially novice writers) of research articles in Civil Engineering and disciplines close to it about how to use the pronoun “this” to serve the function of encapsulation.

Keywords: civil engineering, encapsulation, pronoun “this”, research article, semantic cohesion.

Introduction

English is a global language that is in high demand nowadays. English is by far the most widely spoken language on the planet. One of the four skills of this language is writing, which is commonly believed to be the most challenging and demanding. This challenge becomes more evident when it comes to academic writing at the tertiary level because academic writing seems necessary for the success of university students (Andrews, 2003; Elander, Harrington, Norton, Robinson, & Reddy, 2006; Lea & Street, 1998; Lillis & Turner, 2001; Whitehead, 2002). As proposed by research on academic writing at university, students sometimes need a high degree of precision on writing or at least knowledge of the basics of academic writings before they even start their academic life (Elander et al., 2006; Lillis & Turner, 2001; Whitehead, 2002). At tertiary

levels, students have to produce different types of writing, among which are reports, research articles (RAs), essays, etc. One of these types is research article writing. Ard (1983) notes that the genre of research articles developed from the informative letters that scientists wrote to each other (cited in Swales, 1990, p. 110). At a more precise level, Jalilifar defines a research article as a piece of writing on a certain subject published in a scholarly journal or book for an intended audience. It represents accumulated knowledge of a field and reports a specific research study (2009, p. 7).

Writing and publishing research articles at the tertiary level is a must nowadays, as graduation is directly related to publication quality. Most students suffer from the difficulties in having their papers accepted in high-impact and indexed journals. They mostly have their papers rejected for one of the two issues; first, they are rejected because they do not follow the macro structure imposed by the journal's rules or disciplinary conventions of writing research articles. Second, in most of the rejection texts sent to mailbox of author, we could trace the cohesive problems in the submitted research articles. This problem becomes more evident when it comes to engineering disciplines.

Cohesion was traditionally neglected when teaching text writing due to the generation, manipulation, and assessment of sentences in isolation. However, since the mid-1970s, the assumption prevailed that cohesive writing requires treating text more than a series of grammatical sentences coming successively. They should be considered interwoven, with each sentence relying on the previous ones on the one hand and simultaneously advancing the discourse.

According to Halliday and Hasan (1976), every text has to fulfill two points to be considered cohesive. The texture is the first point, whose concept is thoroughly adequate to demonstrate the characteristics of being a text. Texture, which includes structural and non-structural dimensions (Halliday & Hasan, 1976), differentiates the text from anything else. The structural aspect represents inter- or intra-sentence structures, such as thematic organization and progression, while the non-structural aspect indicates the cohesive ties found among various aspects in a variety of sentences, such as references, substitutions, ellipses, and conjunctions.

Given that cohesion is an important aspect in writing, requiring the use of different linguistic features, teachers and researchers seek to carry out corpus-based research to highlight the pivotal role of linguistic features in developing cohesive texts. In literature, research has focused on vocabulary and lexis (Hyland, 2008), grammar (Gardner & Davies, 2007), and discourse characteristics (Mahlberg, 2006). One of the linguistic features which could have an impact on the cohesion of the text is a demonstrative pronoun. Yet, as previously illustrated by descriptive data, published authors utilize demonstratives as both pronouns and determiners. For instance, Roberts (1952) reported the occurrence of the pronominal "this" in a collection of non-fiction magazine writings, remarking a "vague reference" where the pronominal under study represented an entity other than a noun phrase that was the noun. Later, Swales (2005) and Gray (2006) analyzed the corpora of published research papers in different fields and highlighted the role of demonstratives as both pronouns and determiners used by academic prose authors. Thus, given the importance of writing a cohesive research article on the one hand and the significant role of the demonstrative pronoun, "this", on the other hand, this study intends to investigate the frequencies of this pronoun, enacting the encapsulation and the syntactic structures of encapsulated segments in research articles from the discipline of civil engineering.

Literature Review

Interpretation of different discourse elements depends on others due to the referential function of the demonstratives, giving the structures considerable cohesive weight. However, there are still controversies on the potential role of demonstratives as pronouns rather than determiners to ensure cohesion. According to Quirk et al. (1985), demonstratives can represent simple noun phrases, clauses, sentences, and even a sequence of sentences. A noun that follows a demonstrative contributes as the actual reference item and guarantees lexical cohesion. Demonstratives as determinants and pronouns are also different in that the latter represents a case of ellipsis. Several studies have examined anaphoric reference or cohesion (e.g., Hinkel, 2001; Tyma, 1981, Tadayon, Zohoorian, & Hooshmand, 2023), while there is scant research investigating the application of demonstratives in anaphoric reference and their contribution to text cohesion. In addition, literature has mainly focused on the use of pronouns. Syntactic and demarcation references have a structural nature, according to which the former occurs when the antecedent has the structural ability of substitution with "this". The latter occurs whenever there is a clear reference because physical boundaries such as paragraph breaks and quotation marks or function words such as but, however, yet, or moreover limit it. When it is possible to determine the antecedent, semantic reference will take place because demonstratives have only the potential of logical reference to a preceding element due to its meaning and the remaining parts of the sentence where the demonstrative is used. Overall, the already existing evidence has confirmed the general acceptability of unattended "this" in the case of a comparatively small distance between the antecedent and "this" or using "this" to indicate the main predication of the previous clause.

Thus, it may be essential to use "this" in the sense that represents textual segments without exceeding the sentence limits to avoid conditions in which readers have to make more attempts to track the antecedent in long textual segments. The readers' perception of clarity for interpretation is potentially influenced by the length of antecedents. A special cohesive phenomenon known as encapsulation has been highlighted, achieved by the use of "this" and helping characterize semi-popularization articles in English. More studies in this field allow a better characterization of both encapsulation and genre while providing deeper insights into the resources utilized to ensure the cohesion of scientific texts. The general predictive power represented by the logistic regression analyses firmly confirms the close verb-specific relationships with (un)attended "this". In some conditions, the choice had to be made between the attended and unattended "this". Given that previous studies have failed to consider the antecedents of "this", it is almost difficult to exclude the possibility that the verb selection results from the author's choice of unattended "this". According to Wulff (2012), other quantitative analyses may follow the results gleaned from academic student writings, including the examination of "this" cluster text-distributional features, mainly triggered by the results of previously conducted quantitative studies.

Gray and Cortes (2011) investigated the realizations of "this" and "these" as determiners vs. pronouns in a sub-corpus of academic papers from the Published Research Article Corpus. The academic articles were taken from the applied linguistics and materials and civil engineering fields. They found that both sets of research articles used the two structures in a similar manner. They also found that some nouns were more frequently used with "this" and "these". As stated, the knowledge gained from the findings of their study could improve the clarity and cohesion of written texts in academic settings.

Jiung and Wong (2018) examined the authorial applications of "this" in the sentence-initial position within 160 RAs taken from eight fields of study. The functions of lexical verbs and attending noun stance options were investigated together with unattended "this" distribution, types of verbs, and antecedents. In line with the previously conducted studies, nearly one-third of "this" realizations represented the unattended type within RAs, with mainly clausal "this" antecedent references.

Jin (2019) analyzed unattended "this" and "these" used by ESL students at lower and higher levels, indicating considerably more applications of "this" and "these" at higher levels. The study reported a more significant application of the unattended type of both demonstratives.

Recently, Lee, Tytko, and Larkin (2021) comparatively analyzed the realizations and application of (un)attended "this/these" across argumentative essays written by high- and low-level undergraduate L2 university students. The study systematically compared the two sets of writings for the frequency, antecedent, verb pattern, and stance options of attending nouns in the case of (un)attended "this/these". The corpus of this study included 174 argumentative papers that Chinese ESL undergraduate students had compiled. The students participated in a first-year composition course and were placed in high- and low-level groups. The study reported different applications of "this/these" in both groups to ensure rhetorical cohesion throughout the produced argumentative essays. They also showed preference to more frequent employment of attended "this/these". On the other hand, essays written by the low-rated students included considerably greater numbers of unattended "this/these". These essays used a higher number of copular verbs and phrasal antecedents, while essays written by the high-rated group showed a preference toward lexical verbs and clausal/extended discourse referents. It was concluded that the frequency and use of (un)attended "this/these" were significant in compositions analyzed, thus requiring instructors to include instructions on these pronouns in their writing courses.

According to Celce-Murcia and Larsen-Freeman (1999), demonstratives may represent thoroughly genre-specific applications in written discourse (P. 119). Hence, more studies should be conducted using a balanced RA corpus belonging to one field of study to highlight the possible role of discipline-specific writing conventions on the encapsulation by "this" pronoun. Thus, the current paper intends to examine the encapsulation through the use of the pronoun "this" in Civil Engineering RAs.

The study seeks to answer the following questions:

1. How frequent is "this" pronoun in the sentence-initial position?
2. How frequent is "this" pronoun as an encapsulator?
3. What syntactic structures use encapsulated "this" pronoun in the sentence-initial position?

Method

This study analyzed the function of “this” as a tool to write cohesive texts. To achieve this goal, the frequency of the use of “this” was counted in academic papers, followed by dividing these identified items into different groups, as follows: “this” at the initial of a sentence, “this” as the encapsulator of meaning and processes, “this” as a device to reach cohesion, and “this” as used to reach coherence.

Corpus

A corpus of 20 research articles was selected from the disciplines of Civil Engineering to carry out the current study. The research articles belonged to four popular journals published by Elsevier, including Water Research, Building and Environment, Composite Structures, and Structural Safety. The full text of the research articles was investigated. Five research articles, published in regular issues in 2019-2021, were chosen from each journal. The rationale behind the selection of this corpus was to make sure that the analyzed data were provided by successful writers because publishing in these journals requires high academic writing literacy. Thus, the findings of this study could act as a good guide to help writers use the pronoun “this” in writing RAs.

Procedure

First, 20 research articles were downloaded from the four journals and saved in one PDF file. Second, the pronoun “this” was searched in the file, and each realization was highlighted. Third, only the realizations of the pronoun “this” in the sentence-initial position were considered for the analysis following the literature (Charles, 2003; Gray & Cortes, 2011; Jung & Wang, 2018; Swales, 2005). Fourth, the syntactic structure of encapsulated segments (nominal group, clause, sentence, and paragraph) was identified. Fifth, the results were tabulated and discussed. It is worth mentioning that two other raters monitored the whole process of analysis, and an agreement was reached when required. It is also noteworthy that an expert researcher was invited to check a sample analysis of five RAs to increase the reliability of the data analysis.

Results and Discussion

The corpus was analyzed to determine “this” pronoun acting in the process of encapsulation and identify encapsulated segments. The results are presented and discussed in the following subsections.

Frequencies of “this” in Civil Engineering Research Articles

To answer research question 1, the corpus was analyzed for the frequencies of the demonstrative pronoun “this” in the sentence-initial position (the first nominal element acting as the subject of the sentence (Munoz, 2016)). Table 1 presents the results of the analyses.

Table 1

Frequencies of “this” in Civil Engineering Research Articles

Position of the pronoun “this”	Frequency	Percentage
Initial	273	37.86
Other	448	62.14
Total	721	100

As can be seen, 721 realizations of the pronoun “this” were identified in the analyzed research articles (Example 1), and only 273 realizations (37.86%) were found in the initial position of the sentence (Example 2). These values are significantly lower than those reported in research on engineering semi-popularization carried out by Padula, Panza, and Munoz (2020). This could highlight the register differences concerning the use of “this” in the initial position of the sentence. The results are in line with what was found in studies carried out by Grabe (2009), Gray and Cortes (2011), Swales (2005), and Wulff et al. (2012). Approximately one-fifth of the corpus of engineering and applied linguistics RAs studied by Gray and Cortes (2011) confirmed the pronominal use of “this”. Wulff et al. (2012) reported that proficient student academic writing had 40% of the realizations of “this” in the sentence-initial position. In this vein, Grabe (2009) and Swales (2005) found that 24% and 35% of “this” pronoun realizations were in the sentence-initial position, respectively.

Example 1: This is emphasized by Rutherford (1994), reporting longitudinal dispersion coefficients from 30hu* to 3000hu* in natural river channels.

Example 2: This highlights a challenge in proving the validity of models capable of adequately capturing their hydrodynamic behavior in lotic ecosystems.

According to the literature, “this” usually performs two main organizational textual tasks in the initial position. First, “this” is responsible for linking the current part of the text with previously mentioned segments and enabling the readers to interpret the subsequent sections of the text. In addition, the segment encapsulated by the use of the pronoun “this” usually has more importance and is used to restate the previously provided content and move the text ahead.

In sum, the differences reported here could highlight that “this” is used with various frequencies in different registers and across disciplines; thus, writers, academic writing instructors, and syllabus designers should draw the writers’ attention to the application of “this” in the sentence-initial position within various registers and across genres.

Frequencies of “this” used as an encapsulator in the sentence-initial position

To answer the second research question, the corpus was analyzed, and the results were presented in Table 2. The results suggest that nearly half of the cases of “this” within the sentence-initial position were used for encapsulation (a cohesive link ensuring textual integration and playing an essential role in the text development) (Example 3).

Example 3: The obtained data can reinforce the available microplastic transport models, subsequently elucidating the fate of microplastics in a catchment. **This** can facilitate resolving the marine microplastic mass ‘imbalance’ and developing rehabilitation mechanisms to protect and enhance the quality of natural water.

Table 2

“This” frequencies as an encapsulator in the sentence-initial position

	Frequency	Percentage
Encapsulator	121	44.32%
Point-to-point cohesion	152	55.68%
Total	273	100%

The results of the current study are far less than those reported by Padula et al. (2020). Even though Padula et al. (2020) analyzed a sample of semi-popularization articles from disciplines in Engineering, it seems that the use of “this” is highly bound with disciplinary conventions. The results in Table 2 do not agree with the exploratory study conducted by Alvarez and Rego (2001), analyzing six papers on telecommunications semi-popularization. Applications of “this” as an encapsulator could be discussed based on the following arguments: a) the pronoun “this” could explicitly show the discursive significance of the sentence-initial position in organizing the text, b) “this” can connect the current and previously mentioned segments of the text, providing the readers with insights into the next text segments (Fries, 1994, 1995; Gosden, 1992; Whittaker, 1995), c) “this” explicitly shows the importance of the elements at the sentence-initial position in recapitulating the previously mentioned content and advancing the text (Geisler et al., 1985; Swales, 2005), d) “this” brings the ‘topic’ out of a ‘predication’ and places “this” new topic at the center of attention for more discussions (Geisler et al., 1985), and e) “this” belongs to the most effective anaphoric cohesive tools, condensing and synthesizing previously given textual segments and providing a point for the construction of the forthcoming discourse by the writers (Swales, 2005; Padula et al., 2020).

The results in Table 2 could help instructors in teaching academic writing genres, e.g., research article writings, to include examples of how to use the pronoun “this” for encapsulation and point-to-point cohesion. Such conscious inclusion of instruction could enhance the appropriate use of the pronoun “this” as an important and frequent linguistic feature (Example 4).

Example 4: The microplastic injections led to a more scattered dispersion band (Figure S7a to S12a, Supplementary Material), particularly in lower discharges (2 to 5 Ls-1). **This** can be associated with the PE particles creating discrete pockets of fluorescence in comparison with the well-dissolved Rhodamine dye.

Syntactic analysis

As to research question 3, the results in Table 3 show that the pronoun “this” was used to encapsulate the previous clause or sentence.

Table 3

Textual Structure encapsulated by the use of pronoun "this"

Textual Structure	Frequency	Percentage
Clause	52	43%
Sentence	69	57%
Total	121	100%

Among various textual structures at a range of one clause to more than one paragraph, writers of Civil Engineering RAs intended more to encapsulate the previously mentioned clauses and sentences (Examples 5-6).

Example 5: Injection into the inlet pipe of the flume was then carried out, where it traveled nearly 1m and mixed with the turbulent inflow water prior to entrance into the flume (Fig. 1a). **This** aimed to establish full blending before entrance into the flume.

Example 6: The background concentration was removed before analyses to process the raw concentration data. **This** was expressed as the mean concentration over the initial 30 seconds before the tracer injection.

It may be essential to use "this" in the sense that represents textual segments without exceeding the sentence limits to avoid conditions in which readers have to make more attempts to track the antecedent in long textual segments. The readers' perception of clarity for interpretation is potentially influenced by the length of antecedents, as confirmed by similar results of previous studies (Alvarez & Rego, 2001; Gray, 2006). According to the present research, Civil Engineering RA writers tend to encapsulate the previously mentioned sentences because their audience lacks specialized scientific and technological knowledge but are somehow proficient in special areas (Muñoz, 2015). Hence, the previously raised argument is confirmed regarding the potential impacts of the antecedent length on the readers' perception of clarity for interpretation (Geisler et al., 1985).

Conclusion

The current paper sought to examine the applications of "this" as an encapsulator in a corpus of 20 RAs in Civil Engineering. Based on the research findings, "this" can facilitate achieving encapsulation as a significant cohesive device, helping characterize RAs in the field under study. More studies in this field allow a better characterization of encapsulation while providing deeper insights into the resources utilized to ensure the cohesion of scientific texts. More studies are required to examine "this" encapsulation as an anaphoric cohesive process across various academic genres. Besides, future research can also focus on other syntactic structures, including verbs utilized with "this" or the existing distance between "this" and the textual segments that are encapsulated.

Looking from the viewpoint of the genre, students can gain deeper insights into and mastery of specialized texts if explicitly taught the linguistic choices that denote certain genres (Hyland,

2003). Thus, writers and readers of Civil engineering RAs can benefit from the syntactic characterization of "this"-encapsulated textual segments. According to Grabe and Stoller (2012), low-level skills, including the realization of cohesive markers, contribute significantly to processing linguistic data and should be therefore taken into account in academic contexts. Reference tracking is an essential process to ensure fluency in reading and should be explicitly taught in ESP classes because synthesizing or condensing the previously mentioned textual fragments by cohesive resources may lead to complications for the readers (Flowerdew & Forest, 2015; Pecorari, 2014). Encapsulation using "this" may lead to more complexities because of the potential ambiguities of the referents and the subsequent problems for readers. Thus, it seems necessary to design activities according to research implications on the genre to familiarize students with encapsulation as a cohesive device.

The inadequate sample size limited the current study and subsequently the generalization of the results. Nevertheless, the corpus of Civil Engineering RAs could effectively provide preliminary data regarding the sentence-initial position of "this" as an encapsulator, especially for the syntactic features of the encapsulated segments. According to Sinclair (2001), certain research objectives can be addressed properly using small corpora like what was used in the current paper. Such corpora also play a role in wider connections between the linguistic patterns within the genre and real contexts across certain disciplines (Koester, 2010).

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Conflict of interests

The authors declare that they have no conflict of interest.

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