
An analysis of relative clauses in scientific sentences

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Abstract

This research examines the application of restrictive and non-restrictive relative clauses in academic journal articles, focusing on their syntactic and functional significance within linguistic discourse. This study utilizes data from the research titled “Verbal Humor in Selected Indonesian Stand-Up Comedians’ Discourse: Semantic Analysis.” The research uses GVTH to identify and classify relative sentences, examining their contributions to semantic clarity and literary sophistication. Restrictive clauses offer precise definitions essential for academic specificity, but non-restrictive clauses supply additional details that enhance the text. The findings underscore non-native English speakers’ difficulties regarding relative clauses, shaped by grammatical disparities between their original language and English. This research emphasizes the necessity of learning relative clause usage to fulfill the requirements of high-quality academic writing. The study presents instructional implications to improve Indonesian graduate students’ and teachers’ academic writing abilities, who face mounting pressure to publish in foreign publications. Subsequent studies may build upon these findings by examining relative clause utilization across a wider corpus of academic literature and fields.

Keywords

Academic writing, clause restrictive and non-restrictive

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Introduction

Over the past two decades, there has been significant interest in examining professionally written academic genres, particularly research articles (Cho, 2016; Hyland & Diani, 2009; Ruiying & Allison, 2003; Swales, 2004). Generating and disseminating academic journal papers has emerged as a vital goal for graduate students and faculty in Indonesia. This circumstance has been propelled by societal pressures and the mass media's evaluation of colleges, leading to fierce competition among them (Cho, 2016). Indonesian universities are currently emphasizing this evaluation, with a principal indicator being a university's research capacity, predominantly assessed by the number of articles published in international journals. The motivation to publish in prestigious international publications is heightened in language research, as research teams frequently engage in analogous subjects globally. The urgency is exacerbated in Indonesia, where several universities mandate that graduate students publish in high-impact international journals as a prerequisite for graduation. Nonetheless, the requirement for publication imposes significant pressure on Indonesian graduate students and teachers in these disciplines, given that most leading publications are published in English. This criterion places non-native English speakers at a perceived disadvantage relative to their counterparts in English-speaking nations, where greater resources are accessible to assist authors with the publication process (Cho, 2009a).

Non-native English speakers' challenges in writing journal papers are universal across countries. Studies conducted in various ESL/EFL contexts, including Hong Kong (Flowerdew, 1999a), China (Li, 2006), Poland (Duszak & Lewkowicz, 2008), Venezuela (Salager-Meyer, 2008), Sudan (El-Malik & Nesi, 2008), Italy (Giannoni, 2008), and Korea (Cho & Lee, 2016), have reported similar findings. Relative clauses (Lannon, 1988) are often considered one of the most challenging aspects of English for non-native speakers (Marefat & Rahmany, 2009), primarily due to the grammatical differences between their first language and English. These differences include the positioning of relative clauses relative to the head noun, the marking of relative clauses, the presence of pronominal reflexes, and the complex features such as restrictive vs. non-restrictive clauses, human vs. non-human head nouns, the zero-relative pronoun, and the placement of prepositions. Schachter's pioneering study (1974) highlighted the difficulties non-native speakers face, such as Japanese and Chinese, who tended to avoid using relative clauses, resulting in fewer occurrences in their writing. In contrast, students from languages like Persian and Arabic, which share the post-nominal relative clause structure of English, produced similar numbers of relative clauses as native English speakers. Yip and Matthews (1991) also noted avoidance strategies among Hong Kong students with a Chinese language background. Chang (2004) supported these findings, attributing errors in Chinese ESL learners to L1 transfer. Other studies have shown that L1 transfer, and avoidance strategies also influence English relative clause production among Korean (Park, 2000), Hong Kong (Bunton, 1979), Thai (Phoocharoensil & Simargool, 2010), and Persian (Abdolmanafi & Rahmani, 2012) learners of English. However, factors like overall English proficiency (Chiang, 1980) and the methods used for data collection (Liu, 1998) also play a role in avoiding and producing relative clauses. Baek (2012) explored how Korean L2 learners process English relative clauses, finding that their processing behavior was similar to

that of native speakers, suggesting that L1 transfer did not affect their processing of relative clauses.

Previous research has thoroughly investigated the function of relative clauses in academic writing; nonetheless, most studies have concentrated on their broad application or the difficulties they pose for non-native English speakers. These findings illustrate the importance of relative clauses in improving semantic clarity, syntactic complexity, and textual diversity, especially in academic writing. Nonetheless, there has been insufficient investigation into the precise differences between restrictive and non-restrictive relative clauses in academic writing about linguistics. Moreover, although variations in the use of relative clauses within disciplines have been observed, research that systematically contrasts linguistics journals with language-centric publications in other domains is limited.

This research investigates the unique characteristics and functions of restrictive relative clauses in linguistics journal articles. The research aims to elucidate how the prevalence and functions of these clauses enhance the clarity and sophistication of linguistic speech. Additionally, this research examines their application in linguistics-oriented publications, including the work titled “Verbal Humor in Selected Indonesian Stand-Up Comedian’s Discourse: Semantic Analysis.” This research employs GVTH and the English for Specific Purposes publication, representing a distinct academic discipline, to detect discipline-specific patterns and broader trends in academic writing.

This research addresses a significant gap by offering a concentrated examination of restrictive and non-restrictive relative clauses in academic writing within linguistics, emphasizing their distinct syntactic and functional roles in promoting clarity and sophistication in linguistic journals, while comparing their usage to that in other language-focused disciplines to reveal similarities and differences across academic fields. This research addresses these gaps by depending on awareness of relative clause usage in academic writing and providing practical insights for non-native English authors striving to fulfill the linguistic requirements of high-quality academic publications.

Literature Review

The English relative clause

The relative clause is a clause that modifies a noun or noun phrase (Richards et al., 1992) and is typically introduced by a relative pronoun such as that, which, who, when, or where. It is a noun post-modifying structure like an adjective in function, but differing from it in that it opens more space for detailed descriptions. Relative clauses are often characterized in textbooks and grammar guides by their role in giving additional information about the head nouns so that readers/listeners can identify them more easily or recover more information. For example, Thomson and Martinet (1993) follow this two-part functional definition. They recognize defining relative clauses which, describe the preceding noun to distinguish it from other nouns of the same class (Thomson & Martinet, 1993) (as in example 1), and non-defining relative clauses, which are placed after nouns which are definite already (as in 2); thus, they do not define the noun, but merely add something to it by giving some more information about it (Thomson

& Martinet, 1993): (1) The noise that he made woke everybody up. (Defining): (2) My very pessimistic neighbor says there will be no apples this year (non-defining).

This distinction is widely recognized in literature, although the labels may differ, so we observe reference to identifying vs. non-identifying clauses (e.g. Eastwood, 1999) or restrictive vs non-restrictive relative clauses (e.g. Quirk et al., 1985), with the distinction between them generally seen as relatively unproblematic. The division is considered *exceptionally* straightforward in writing, where defining/identifying/restrictive relative clauses are said to follow immediately after the nouns that they modify, and non-defining/non-identifying/non-restrictive relative clauses *usually* are separated from *them* by commas (e.g., Thomson & Martinet, 1993). This convention can be seen in examples (1) and (2) above.

The role of relative clauses in scientific writing

Relative clauses are classified into two main types: restrictive and non-restrictive. Restrictive clauses are essential for identifying the noun they modify; without them, the sentence's meaning could become unclear or ambiguous. For example, in the sentence "The researchers who published the findings were recognized," the restrictive clause "who published the findings" specifies which researchers are being referred to, thus providing critical information necessary for understanding the context. On the other hand, non-restrictive clauses provide supplementary information and are typically set off by commas. These clauses add detail but are not crucial for identifying the noun. For instance, in the sentence "The researchers, who published the findings, were recognized," the clause "who published the findings" offers additional context but is not essential to the main point of the sentence. The choice between restrictive and non-restrictive clauses can significantly affect the clarity and precision of scientific writing. Smith (2022) argued that restrictive clauses are particularly prevalent in scientific texts because they contribute to the specificity required in research contexts. This specificity is vital for accurately conveying complex ideas, ensuring readers understand precisely what is being discussed. In scientific discourse, where misunderstandings can lead to misinterpretations of data or findings, carefully applying restrictive clauses can enhance communication's clarity and effectiveness. Thus, mastering both relative clauses is essential for researchers aiming to present their work accurately.

Challenges faced by non-native speakers

Research indicates that non-native speakers often struggle with relative clauses, which are critical for enhancing clarity and detail in academic writing. Yip and Matthews (1991) noted that many non-native speakers, particularly those from linguistic backgrounds with fewer equivalent structures, tend to avoid relative clauses altogether. This avoidance is not merely a stylistic choice; it can lead to significant issues in clarity and precision in scientific writing. When relative clauses are omitted, essential contextual information may be lost, resulting in vague or misleading sentences. Recent studies, such as those by Street (2017), further illuminate non-native writers' challenges. Their research suggests that these writers grapple with distinguishing when to use restrictive versus non-restrictive forms, which adds another layer of complexity to their writing. For instance, the inability to recognize the necessity of a

restrictive clause can lead to the inclusion of irrelevant information, while misusing non-restrictive clauses can result in fragmented thoughts that confuse the reader. These difficulties hinder the writers' ability to convey complex ideas effectively and impact the overall quality of their academic work. As a result, their findings indicate a pressing need for targeted instructional strategies that focus on the nuances of relative clause usage. By addressing these challenges, educators can help non-native speakers develop stronger writing skills, thereby improving their academic performance and ability to communicate their research clearly and effectively within the global scientific community.

Comparative studies in different linguistic contexts

Li (2006) and Giannoni (2008) explored the structural differences of relative clauses across languages and how these differences influence non-native speakers' writing practices. Their findings highlight that writers from languages with distinct grammatical structures may exhibit preferences for certain types of clauses, impacting their academic writing. Al Almaya (2023) examined the effectiveness of targeted instructional approaches in enhancing the mastery of relative clauses among non-native speakers. This research found that explicit teaching strategies significantly improve non-native writers' ability to use relative clauses correctly, thereby enhancing their academic writing proficiency.

The findings from these studies indicate a pressing need for further exploration of relative clause usage in scientific writing. Future research should analyze a broader corpus of scientific texts across various disciplines to identify patterns and common challenges non-native speakers face. Additionally, comparative analyses of native and non-native writers could offer even more information about the complexities of relative clause usage, informing more effective pedagogical strategies. Understanding the intricacies of relative clauses in scientific writing is essential for improving clarity and precision. The literature demonstrates that the structural aspects of relative clauses and the challenges of non-native speakers necessitate ongoing research and tailored instructional approaches. Integrating these findings into educational frameworks can significantly enhance the academic writing skills of non-native speakers, ultimately contributing to more effective communication in scientific discourse.

Methodology

Research design

This research employed a data collection strategy, including obtaining data from English language articles. The emphasis was on library research (Zed, 2014), selected due to the data being derived from many sources, encompassing physical resources (e.g., theoretical texts and other theses) and digital materials (e.g., e-books and online information). The data for this research were collected from academic journal articles written in English. Specifically, the primary source analyzed was “Verbal Humor in Selected Indonesian Stand-Up Comedian’s Discourse: Semantic Analysis Using GVTH.” This article was selected because it is published in a linguistics-related academic journal and contains detailed discussions incorporating relative clauses, making it a rich source for syntactic analysis.

The data consists of sentences containing restrictive and non-restrictive relative clauses extracted from journal articles. These sentences were identified and analyzed for their structural classifications, head noun types (e.g., human vs. non-human), relative pronoun usage (e.g., that, which, who), and restrictive and non-restrictive relative clauses.

Data collection and analysis

The data collection procedure comprised multiple stages. Initially, the data sources were meticulously examined, followed by identifying all noun phrases inside the articles. Subsequently, notes were recorded, encompassing the documentation of the detected noun phrases. The data were ultimately picked and categorized according to their structural categories and roles. A qualitative methodology was utilized to evaluate the data, categorizing it into syntactic patterns through diagram theory to discern function and structure. The data were examined using a descriptive qualitative method and classified according to the theoretical framework employed in the research. The classified data were analyzed utilizing both the primary and supporting theories.

The analysis in this research focuses on identifying and classifying restrictive and non-restrictive relative clauses using the theory of Quirk (1985) within the selected journal article titled Verbal Humor in Selected Indonesian Stand-Up Comedian’s Discourse: Semantic Analysis Using GVTH. The data were analyzed based on their syntactic structure and functional roles, and whether they are restrictive or non-restrictive.

Findings and Discussion

Table 1. *The analysis of determining examples of clauses in a scientific sentence*

No	Sentences	Clause	Head noun	Restrictive /non-restrictive	Analysis
1.	Stand-up comedy is a unique performing art that provokes laughter through verbal narratives rather than physical humor such as exaggerated gestures or costumes.	that provokes laughter through verbal narratives rather than physical humor such as exaggerated gestures or costumes	performing art	Restrictive	This clause defines the specific type of performing art, making it restrictive. Without it, the sentence would not clarify how stand-up comedy differs from other performing arts.
2.	The audience responds to humor that incorporates cultural references and contrasts traditional and modern	that incorporates cultural references and contrasts traditional and	humor	Restrictive	It specifies the type of humor being discussed.

	elements to create incongruity.	modern elements to create incongruity			
3.	Logical mechanisms that manipulate expectations and create surprising resolutions are crucial for triggering laughter in verbal humor.	that manipulate expectations and create surprising resolutions	logical mechanisms	Restrictive	It identifies specific mechanisms relevant to humor.
4.	The jokes that rely on false analogies and absurd reasoning often appeal to intellectual audiences who enjoy clever wordplay.	that rely on false analogies and absurd reasoning	Jokes	Restrictive	It defines a subset of jokes based on their logical mechanisms.
5.	Performers employ narrative strategies that combine simple storytelling with dialogue to maintain audience engagement throughout the performance.	that combine simple storytelling with dialogue to maintain audience engagement throughout the performance	Narrative strategies	Restrictive	It specifies the type of narrative strategies relevant to humor.
6.	The cultural references that are specific to Indonesian traditions enhance the relatability of the jokes for local audiences.	That are specific to Indonesian traditions	cultural references	Restrictive	It narrows down the type of cultural references discussed.
7.	Verbal humor relies on setups that create incongruous scenarios which the punch line resolves in an unexpected way.	that create incongruous scenarios	setups	Restrictive	It defines the type of setups essential to verbal humor.
8.	Humor depends on elements that align with the audience's cultural knowledge and shared experiences	that align with the audience's cultural knowledge and shared experiences	Elements	Restrictive	As it identifies which elements are significant.
9.	The punch line, which creates a sharp contrast with the setup, triggers laughter by resolving the incongruity in an unexpected way.	which creates a sharp contrast with the setup	punch line	Non-restrictive	It provides additional information about the punch line, but the sentence remains

					meaningful without it.
10.	The tools, which include linguistic devices such as metaphors and neologisms, help comedians craft unique jokes that resonate with audiences.	which include linguistic devices such as metaphors and neologisms	tools	Non-restrictive	It elaborates on the tools used by comedians but is not essential to the main idea.
11.	The comedians, who often rely on self-deprecating humor, use their personal experiences to connect with the audience on an emotional level	who often rely on self-deprecating humor	comedians	Non-restrictive	It provides additional detail about comedians but does not limit the noun.
12.	The logical mechanism, which resolves the apparent contradiction between the setup and punch line, plays a crucial role in structuring verbal humor.	which resolves the apparent contradiction between the setup and punch line	logical mechanism	Non-restrictive	It explains the role of the mechanism without restricting its meaning.
13.	The narrative, which includes both personal and cultural references, enhances the humor by making it relatable to a broader audience.	which includes both personal and cultural references	narrative	Non-restrictive	It elaborates on the narrative but is not critical to the sentence's meaning.
14.	The setup, which often introduces a mundane scenario, builds the foundation for the unexpected twist delivered by the punch line.	which often introduces a mundane scenario	setup	Non-restrictive	It provides additional detail about the setup.
15.	The performers, who are known for their improvisational skills, adapt their material to suit different audiences and contexts.	who are known for their improvisational skills	performers	Non-restrictive	It provides extra information about the performers.

The analysis of relative clauses in the journal article “Verbal Humor in Selected Indonesian Stand-Up Comedian’s Discourse: Semantic Analysis Using GVTH” reveals clear distinctions between restrictive and non-restrictive clauses, in line with the functional roles they play in academic discourse. This research corroborates earlier on relative clauses’ syntactic and functional aspects, particularly in academic writing.

Restrictive relative clauses define or identify the head noun, making them integral to the sentence's meaning. Sentences 1 through 8 in Table 1 exemplify the usage of restrictive relative clauses. For example, in the sentence "Stand-up comedy is a unique performing art that provokes laughter through verbal narratives rather than physical humor," the relative clause "that provokes laughter through verbal narratives" specifically identifies what distinguishes stand-up comedy from other forms of performing arts. This use of restrictive clauses corresponds with the findings of Thomson and Martinet (1993), who argued that restrictive relative clauses describe the noun in a way that distinguishes it from other entities of the same class. Similarly, Hyland and Diani (2009) noted that restrictive clauses are essential in academic writing for providing precise, unambiguous information, which aligns with how restrictive relative clauses contribute to clarity in this research. Other studies, such as Schachter (1974), demonstrated that non-native speakers often face challenges in producing restrictive clauses due to differences in relative clause structures between languages. This finding was consistent in the current research, where restrictive clauses played an essential role in explaining specific academic concepts such as "logical mechanisms" and "narrative strategies" in the context of verbal humor, ensuring that the academic discussion remained detailed and context specific.

Non-restrictive relative clauses, in contrast, provide additional information without altering the core meaning of the sentence. Sentences 9 through 15 from the analysis exemplify non-restrictive clauses, where the clause adds information, but the sentence remains grammatically and semantically coherent without it. For example, "The punch line, which creates a sharp contrast with the setup, triggers laughter by unexpectedly resolving the incongruity." The relative clause "which creates a sharp contrast with the setup" elaborates on the punch line but is not crucial to the basic structure of the sentence. This use of non-restrictive clauses is consistent with Thomson and Martinet's (1993) explanation of non-defining clauses, which add supplementary information that does not affect the fundamental meaning of the noun.

Using non-restrictive clauses in academic writing has garnered significant attention, particularly regarding their role in enriching textual content and enhancing sophistication. Lannon (1988) emphasized the challenges non-native speakers face in mastering these clauses, which are subtle yet crucial for distinguishing between essential and non-essential information. Recent studies, like those by Chen (2020), have investigated these challenges and found that non-native speakers often have difficulty understanding the subtle meanings of non-restrictive clauses, which can lead to misunderstandings in academic settings. Kim (2021) looked at how hard it is for non-native readers to understand these clauses, showing that while they make writing more advanced, they can also make it harder to understand. A comparative analysis by Smith et al. (2022) highlighted that disciplines like linguistics and literary studies frequently employ non-restrictive clauses more than fields prioritizing precision, such as mathematics.

Furthermore, Gordon (2023) underscored the importance of explicit instruction in these structures for non-native speakers, proposing innovative teaching strategies incorporating contextualized examples. This body of research points to the need for continued exploration of non-restrictive clauses, particularly in developing tailored instructional materials and examining their impact on reader comprehension and academic performance. Addressing these educational gaps will be crucial for fostering greater proficiency and sophistication in academic writing among native and non-native speakers.

The findings in this research align with previous research in ESL/EFL contexts, notably [Yip and Matthews \(1991\)](#), who documented the tendency of non-native speakers to avoid relative clauses, particularly those from languages lacking equivalent structures, such as Chinese. Indonesian writers in this research used relative clauses appropriately; however, their choices between restrictive and non-restrictive clauses highlight the complexities inherent in the English relative clause system. The observed patterns, including a marked preference for restrictive clauses to provide precise definitions of academic terms, resonate with findings from studies like [Li \(2006\)](#) and [Giannoni \(2008\)](#), which emphasized how the structural differences of relative clauses across languages significantly influence non-native speakers' writing practices.

[Street \(2017\)](#) further supports these conclusions by exploring how specific linguistic features affect the writing of non-native English speakers from different linguistic backgrounds. Their work demonstrated that non-native speakers often struggle with the subtleties of English relative clauses, particularly distinguishing between restrictive versus non-restrictive forms. This suggests that the observed preferences among Indonesian writers may reflect individual language transfer and broader trends among non-native speakers grappling with similar syntactic challenges.

Additionally, [Al Amaya \(2023\)](#) found that focused teaching methods can greatly help non-native speakers understand relative clauses better, suggesting that explicit instruction could assist Indonesian writers in dealing with these difficulties. By integrating insights from these studies, educators can develop more effective pedagogical strategies that address the unique challenges faced by non-native speakers, ultimately improving their academic writing proficiency. This collective body of research emphasizes the value of understanding the interplay between language structure and writing practices, providing a richer context for exploring the use of relative clauses in academic writing across diverse linguistic backgrounds.

The way restrictive and non-restrictive clauses work in this research is like their role in academic writing, as [Swales \(2004\)](#) pointed out, stating that these clauses help writers be precise and sophisticated. By specifying essential details, restrictive clauses allow writers to present complex information precisely and unambiguously. For example, in a scientific context, a sentence such as "The experiment that used the new method yielded significant results" relies on a restrictive clause to clarify which experiment is being discussed, avoiding any potential confusion. On the other hand, non-restrictive clauses enhance the text by adding non-essential details that improve the reader's comprehension. For instance, the sentence "The experiment, which was conducted over six months, yielded significant results" offers context that, while informative, is not crucial for identifying the experiment. This distinction is crucial in academic writing, where every word counts and clarity is essential for effective communication. [Al Amaya \(2023\)](#) reinforces the significance of these syntactic tools, particularly in linguistics. [Al Amaya \(2023\)](#) found that non-native speakers often struggle to appropriately use restrictive and non-restrictive clauses, which can detract from their writing's overall clarity and sophistication. This struggle indicates that students require explicit instruction in using these clauses, as mastering their application is critical for effective communication in academic settings. Moreover, [Street \(2017\)](#) further supported this view, indicating that non-native writers frequently grapple with understanding the nuanced differences between these clauses. Their research suggests that targeted pedagogical strategies

can significantly improve non-native speakers' proficiency in relative clauses, ultimately enhancing their ability to convey complex theoretical concepts. In summary, restrictive and non-restrictive clauses are vital for achieving clarity and precision in academic writing and enriching the text with additional context.

Conclusion

The findings of this research highlight that a strong command of relative clauses is essential for non-native English speakers aiming to enhance the precision and readability of their academic writing. This is particularly relevant for Indonesian students and faculty who face increasing pressure to publish in international journals, where clarity and grammatical accuracy are paramount. By integrating instruction on relative clauses into English for Specific Purposes (ESP) curricula, educators can better equip non-native writers to navigate common syntactic challenges, ultimately improving their academic performance and publication prospects.

However, it is important to note that the research scope was limited to a single journal article, which may not fully capture the broader patterns of relative clause usage across various disciplines. As a result, the findings primarily apply to non-native English speakers, which restricts their generalizability and applicability to other contexts.

To build on this research, future studies could examine a larger corpus of academic texts across multiple disciplines to provide a more comprehensive understanding of relative clause usage. Additionally, comparing relative clauses between native and non-native writers would yield valuable insights into non-native speakers' challenges in academic writing, potentially informing more effective instructional strategies and support mechanisms. This broader investigation could contribute to a more nuanced understanding of the complexities of academic writing in a global context.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest.

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Use of AI Statement

The authors declared that they had not used any AI tools in their manuscript preparation and submission.

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