



Grammatical Cohesion Devices and the Construction of Textual Coherence in Cross-Disciplinary Academic Journal Articles: A Halliday and Hasan Perspective

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Article Info	Abstract
Received: 2026-08-07 Revised: 2026-08-20 Accepted: 2026-09-04 Keywords: Grammatical Cohesion; Textual Coherence; Academic Writing; Cross-Disciplinary Analysis; Halliday and Hasan Framework DOI: 10.24256/ideas.v14i2.12197 Corresponding Author: Anisa Tri Cahyani Anisatric1999@gmail.com Pendidikan Bahasa Inggris, Universitas Negeri Semarang, Jawa Tengah	<i>Although grammatical cohesion has been studied extensively as a marker of textual connectivity, comparatively little research has examined when the presence of a cohesive device actually supports coherent interpretation, particularly in student academic writing that spans multiple disciplines. This study investigates how grammatical cohesion contributes to textual coherence in 26 cross-disciplinary student journal articles published in the Unnes Scientific Journal, applying Halliday and Hasan's (1976) framework of reference, substitution, ellipsis, and conjunction through a qualitative interpretive design supported by hybrid thematic analysis. Because the corpus spans eleven academic disciplines, it provides a naturalistic basis for distinguishing cohesive practices that are general to academic writing from those shaped by disciplinary convention. Cohesive devices were coded for their textual form and then interpreted for their contribution to referential continuity, logical relationships, topic development, and evidence–claim connections. Reference and conjunction were the dominant resources, while substitution and ellipsis occurred more sparingly, reflecting a preference for explicitness. However, the presence of a cohesive device did not guarantee coherence: ambiguous references, weak transitions, incomplete logical connections, redundant repetition, and abrupt topic shifts recurred across disciplines, most often when a device was used without a sufficiently clear or contextually appropriate relationship. These findings show that cohesion and coherence, although related, are distinct dimensions of textual organization, and that cohesive devices support coherence only when they establish relationships that readers can reliably interpret. By extending Halliday and Hasan's framework beyond the identification of linguistic</i>

devices toward the functional and contextual conditions of coherence, the study offers academic writing instructors a more precise basis for teaching students not merely to use cohesive devices, but to use them appropriately for their disciplinary context.

1. Introduction

Academic writing requires more than grammatical accuracy and the presentation of relevant information: writers must organize propositions so that readers can follow the development of ideas and construct a coherent interpretation of the text. Cohesion and coherence are central to this organization, yet the two concepts are not interchangeable. Cohesion refers to the linguistic resources that mark relationships across a text, whereas coherence refers to the meaningful relationships that allow individual propositions to be interpreted as unified discourse. A text may therefore contain cohesive devices without being coherent, because cohesion marks a relationship grammatically without guaranteeing that the relationship is clear or contextually appropriate. This distinction, and the conditions under which it breaks down in student academic writing, motivates the present study.

Halliday and Hasan (1976) define cohesion as a semantic relationship in which the interpretation of one textual element depends on another, and they distinguish grammatical cohesion, realized through reference, substitution, ellipsis, and conjunction, from lexical cohesion, realized through repetition, synonymy, and collocation. Although the two systems frequently work together in naturally occurring text, this study focuses specifically on grammatical cohesion because it operates through closed grammatical classes whose interpretation can typically be traced to a textual antecedent or an explicit logical relation, which makes it a more tractable entry point for examining how coherence is constructed than the comparatively open-ended lexical system. In academic writing, these grammatical resources are particularly consequential because writers must organize relationships among claims, evidence, explanations, findings, and interpretations across long stretches of discourse, often while introducing readers from outside their immediate specialization to unfamiliar procedures and terminology.

Empirical research on cohesive devices in second- and foreign-language academic writing converges on two recurring observations. First, studies consistently report that writers rely disproportionately on a narrow subset of devices: Sanosi (2024) found that EFL writers over-rely on additive conjunctions in academic prose, a pattern that echoes Khalil's (1989) earlier finding that Arab ESL writers over-used reiteration relative to other cohesive resources, while Prasetya (2024) found that writers publishing in Scopus-indexed journals favored demonstrative reference over personal reference and extension over enhancement in their use of conjunction. Second, misuse is not confined to omission but frequently involves the inappropriate or ambiguous deployment of an otherwise well-formed device: Ong (2011) documented that Chinese EFL learners produced referential errors, including unnecessary or misused definite articles and unclear pronominal reference, while Zhang and Zhang (2023) showed that global cohesion patterns vary considerably across individual writers even within the same proficiency band. Taken together, these studies establish that cohesive-device frequency alone is an unreliable

indicator of writing quality, since a device can be present yet used in a way that does not support the reader's interpretation.

Most of this research, however, quantifies cohesive devices without examining in a sustained, contextualized way when and why their presence fails to produce coherent text — a gap the present study addresses by treating coherence, rather than frequency, as its analytic target. Recent scholarship in applied linguistics reinforces the need for this contextualized approach: analyzing the rhetorical sections of applied-linguistics research articles, Golparvar, Crosthwaite, and Ziaeeian (2023) found that cohesive patterning is closely tied to the communicative purpose of each section rather than uniform across a text, suggesting that cohesion should be examined in relation to the discourse function it serves rather than treated as a fixed feature of a genre.

Most existing studies examine cohesion within a single discipline or genre, which leaves open the question of whether cohesive practice reflects general academic writing conventions or is shaped by discipline-specific ways of constructing knowledge. Cross-disciplinary comparison is therefore theoretically meaningful: disciplines differ in how they organize argumentation, evidence, and procedure — laboratory sciences and engineering, for example, typically emphasize procedural and causal sequencing, whereas the humanities and social sciences typically emphasize interpretive and comparative argumentation — and these differences plausibly shape which grammatical cohesive resources writers rely on and how effectively those resources support coherence. Examining a corpus that spans multiple disciplines makes it possible to distinguish cohesive patterns that are general to academic writing from those that are discipline-specific, a distinction with direct implications for how academic writing is taught across faculties rather than through a single generic curriculum.

This study analyzes the grammatical cohesive devices used in 26 student academic articles published in the Unnes Scientific Journal, examining grammatical cohesion and its contribution to textual coherence across disciplines. The analysis draws on Halliday and Hasan's (1976) framework of grammatical cohesion, applying a qualitative interpretive approach supported by hybrid thematic analysis. The study addresses three research questions:

1. How do students utilize grammatical cohesive devices, and how do these devices contribute to overall textual coherence?
2. What patterns or tendencies characterize the use of grammatical cohesive devices across academic disciplines?
3. How do grammatical cohesive devices support the organization and logical connection of ideas in student academic writing?

By addressing these questions, the study extends research on cohesion beyond the identification and counting of linguistic devices toward an interpretive account of when and how those devices support coherent meaning-making. Its contribution lies in distinguishing the presence of a cohesive relationship from its coherence-building function, and in examining this distinction across disciplinary contexts rather than within a single field. In doing so, the study addresses a gap in the literature concerning the conditions under which grammatical cohesion succeeds, or fails, to produce coherent academic text, and offers a theoretical basis, grounded in Halliday and Hasan (1976), for understanding coherence as an emergent property of contextually appropriate cohesive choices rather than of cohesive form alone.

2. Method

This study employed a qualitative interpretive research design to examine grammatical cohesion and its contribution to textual coherence in cross-disciplinary academic writing. A hybrid thematic analysis approach was adopted, combining deductive coding informed by theory with categories that emerged inductively from the data. The deductive component was guided by Halliday and Hasan's (1976) framework of grammatical cohesion, comprising reference, substitution, conjunction, and ellipsis. The inductive component identified recurring patterns concerning the coherence-building functions of cohesive devices, the coherence problems associated with their use, and the ways cohesion contributed to meaning-making. This hybrid approach allowed the analysis to move beyond identifying cohesive devices toward interpreting their contribution to the development of ideas.

The corpus consisted of 26 student academic articles published in the Unnes Scientific Journal, drawn from eleven disciplinary categories: Arts Education, Biology, Education, Electrical Engineering, English Education, History, Informatics, Law, Management, Physical Education/Health and Sport, and Science Education. Two articles were purposively selected from each disciplinary category available in the journal's recent issues, following a maximum-variation sampling logic intended to capture a broad range of disciplinary writing conventions rather than to achieve statistical generalizability.

This is consistent with qualitative interpretive designs, in which the sufficiency of a sample is evaluated by the range and depth of the patterns it captures rather than by sample size alone: coding across the eleven disciplines continued to surface new discourse functions and coherence patterns until the later articles within each discipline began to reproduce patterns already identified in the earlier ones. Each article was identified and categorized by discipline and article number, and the unit of analysis was a textual segment containing a grammatical cohesive device.

Data were collected through document analysis. The articles were obtained from the Unnes Scientific Journal and imported into NVivo 15, which was used as a qualitative data management tool to support systematic coding across the corpus. Reference, substitution, ellipsis, and conjunction were identified through iterative coding passes and interpreted contextually, according to their function within the surrounding discourse rather than their form alone.

Coded segments were then evaluated for their contribution to textual coherence. This stage considered whether a device maintained continuity of topics and participants, established a logical relationship, connected evidence with claims, supported the progression of an argument, or facilitated the organization of ideas. Additional interpretive codes were developed inductively from recurring patterns in the data, including coherence-maintenance functions and coherence problems such as ambiguous reference, weak transitions, incomplete logical connections, redundant repetition, and abrupt topic shifts. The analysis therefore distinguished systematically between the presence of a cohesive device and its effectiveness in establishing a meaningful textual relationship, rather than treating the two as equivalent.

To support the trustworthiness of this interpretive judgment, a sample of coded segments was independently re-checked, and instances of disagreement were resolved through discussion and, where necessary, refinement of the coding definitions before the remaining data were coded.

Inductively developed codes were validated by cross-checking each proposed pattern against additional segments in the corpus beyond those from which it was first identified, and by revising or merging codes that did not hold consistently across articles or disciplines. This constant-comparison step ensured that the coherence-maintenance and

coherence-problem categories reported in Section 4 reflect recurring patterns in the corpus rather than isolated instances.

Because the analysis relied exclusively on previously published, publicly accessible journal articles rather than on data collected directly from human participants, additional ethical clearance beyond standard scholarly attribution was not required. Nonetheless, the textual examples cited in the Results are identified by discipline and article number rather than by author name, so that the coherence problems illustrated in this study are not attributed to identifiable individual writers.

The final stage of analysis involved thematic interpretation of the coded data. Related codes were reviewed and grouped into broader patterns to address the research questions. A cohesive device was interpreted as contributing to coherence when it allowed the reader to follow a clear relationship between propositions and the organization of ideas; conversely, it was interpreted as contributing to a coherence problem when its reference, logical relationship, or textual function was unclear or inappropriate in context. Comparisons were also made across the disciplines represented in the corpus to identify recurring and distinctive patterns in the use and function of grammatical cohesion. Figure 1 summarizes this workflow.

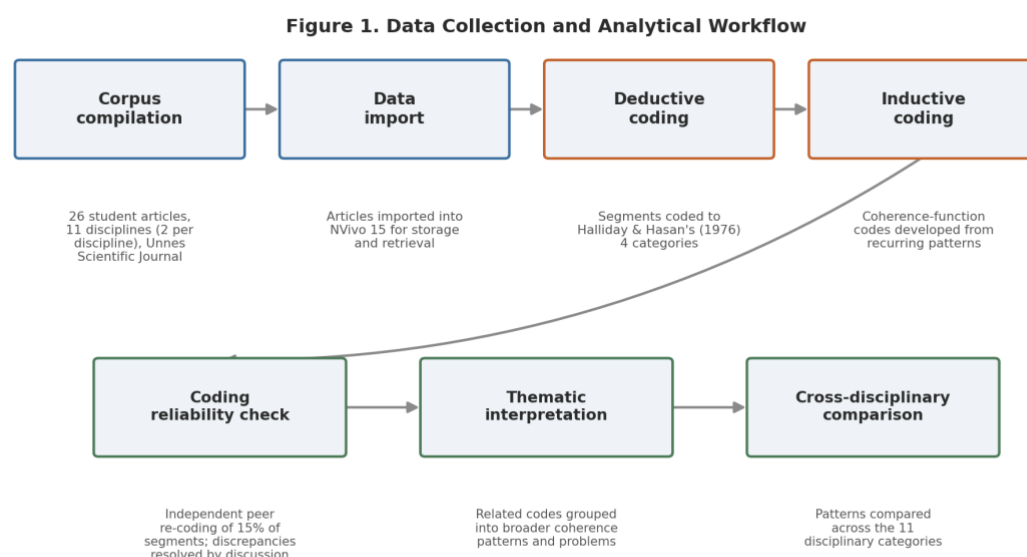


Figure 1. Data collection and analytical workflow.

3. Result

Patterns of Grammatical Cohesion

The analysis identified four categories of grammatical cohesion proposed by Halliday and Hasan (1976): reference, substitution, ellipsis, and conjunction. The data were coded and organized using NVivo 15 to identify recurring patterns in the use of these resources and their functions within the texts, with each segment interpreted in context to determine how it contributed to the continuity and development of ideas. Table 1 and Figure 2 summarize the distribution of the 705 grammatical cohesive devices coded across the corpus. Conjunction accounted for most of the coded instances (513 of 705, 72.8%), while reference accounted for the remainder (192 of 705, 27.2%); substitution and ellipsis were analyzed qualitatively (Section 4.4) but occurred too infrequently to be tabulated as a

separate coded category in the corpus. Within conjunction, additive (24.7%) and adversative (24.0%) relationships were the most frequent, followed by causal (19.1%) and temporal (5.0%) relationships.

Within reference, demonstrative reference (14.2%) was more frequent than personal (10.1%) and comparative (3.0%) reference. These figures indicate that the student writers relied more heavily on explicitly signaling logical relationships between propositions than on tracking participants and concepts through reference, a pattern examined further in Section 4.7. The findings also confirm that grammatical cohesion is not, on its own, a guarantee of effective textual coherence: its presence was pervasive, yet, as Sections 4.2, 4.3, and 4.6 show, not always sufficient.

Category	n	%	Dominant discourse function (from coding)
Personal Reference	71	10.1%	Possessive and pronominal reference to participants
Demonstrative Reference	100	14.2%	Backward-pointing reference to prior propositions/findings
Comparative Reference	21	3.0%	Similarity and comparison with prior content
Additive Conjunction	174	24.7%	Addition and exemplification
Adversative Conjunction	169	24.0%	Contrast, concession, and result
Causal Conjunction	135	19.1%	Reason and result
Temporal Conjunction	35	5.0%	Sequence and simultaneity
Total	705	100%	—

Table 1. Distribution of grammatical cohesive devices in the coded corpus (N = 705).

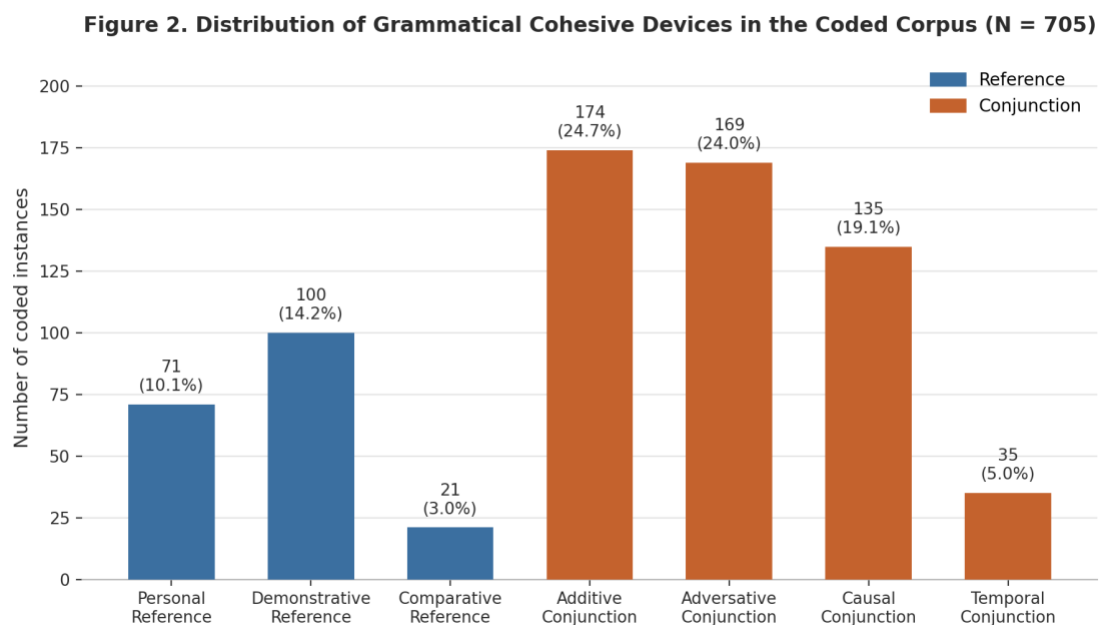


Figure 2. Distribution of grammatical cohesive devices in the coded corpus.

Reference and the Maintenance of Topic Continuity

Reference was frequently employed to maintain continuity of participants, concepts, research findings, and previously established propositions. Personal, demonstrative, and comparative references were identified throughout the articles, with demonstrative references particularly useful for connecting an immediately preceding proposition with subsequent elaboration or interpretation. One article, for example, states:

"This result is supported by the study of Rabena (2011), which showed that the height and root length of plants significantly increased when fertilized with madre de cacao fertilizer."

The expression this result refers back to the finding presented in the preceding discourse, connecting it to the supporting evidence introduced through Rabena (2011). Instead of repeating the entire preceding proposition, the writer uses a demonstrative expression to maintain continuity while moving the discussion toward supporting evidence. A similar function appears in expressions such as this study, these results, this finding, and it, which allow writers to package previously presented information and then develop it further; in this sense, reference contributes to coherence by keeping information introduced earlier active in the developing discourse.

The analysis also identified cases in which referential cohesion was present without sufficiently clear referential continuity: expressions such as it, this, or these sometimes appeared without an immediately identifiable antecedent. Such instances were not classified as cohesion errors merely because the expressions were repeated or grammatically well-formed; they were interpreted as coherence problems only when a reader could not confidently determine which entity, proposition, or finding was being referred to. This distinction is important because it demonstrates that a cohesive relationship does not automatically guarantee coherent interpretation: a reference can be grammatically appropriate while remaining semantically ambiguous within its discourse context.

Conjunction and the Organization of Logical Relationships

Conjunction was another prominent cohesive resource in the corpus. The analysis identified additive, adversative, causal, and temporal relationships, each playing a distinct role in signaling how one proposition should be interpreted in relation to another. Additive conjunctions such as moreover, furthermore, in addition, and as well as were generally used to extend previously presented ideas or arguments, as in:

"In addition to depicting the beauty of the city of Tegal, this song text mentions the beauty of Tegal's position located in the coastal area."

Here, in addition to signals that the second proposition adds another aspect to the information previously presented, an additive rather than a contrastive or causal relationship, enabling the writer to expand the description while maintaining the same general topic. Adversative conjunctions such as however, nevertheless, conversely, and despite were used to maintain contrast between propositions, as in:

"This is because organic fertilizer have low nutrient content and a slow processing time, as reported in a study by Kim et al. (2019). Nevertheless, the use of synthetic fertilizers can be a financial burden for small-scale farmers as they tend to be more expensive."

Nevertheless signals a shift from the limitations associated with organic fertilizers to the economic disadvantage associated with synthetic fertilizers, leading readers to interpret the two propositions as contrasting considerations. Causal conjunctions, including because, therefore, as a result, and thus, established explanatory and consequential relationships and were particularly common where writers explained research findings or connected empirical observations with possible causes; temporal conjunctions organized processes, procedures, or sequences of events.

Across all four subtypes, conjunctions contributed most effectively to coherence when the relationship they signaled corresponded to the actual relationship between the propositions; when a conjunction was used without a sufficiently clear logical relationship, it created a coherence problem instead. The analysis therefore considered the contextual appropriateness of each conjunction rather than treating its mere presence as evidence of successful coherence.

Substitution and Ellipsis as Resources for Textual Economy

Substitution and ellipsis were identified less frequently than reference and conjunction, and occurred too rarely across the corpus to be reported as a separate quantified category in Table 1; nevertheless, both resources performed important cohesive functions by reducing unnecessary repetition and enabling writers to maintain textual economy. Substitution occurred when an element was replaced by another linguistic form, allowing the writer to avoid repeating previously expressed material; the analysis identified nominal, verbal, and clausal substitution, although their distribution varied across the articles. Ellipsis similarly allowed writers to omit linguistic elements recoverable from the surrounding context.

The relatively limited use of substitution and ellipsis suggests that the student writers tended to favor explicitness in their academic writing, plausibly because clarity is at a premium when presenting technical information, research procedures, findings, and explanations; in such contexts, explicit repetition may be preferred over grammatical omission to keep the intended meaning accessible. Their contribution to cohesion was nonetheless evident when omitted or substituted elements remained recoverable from the discourse context; when the omitted information was difficult to recover, the textual relationship became less transparent. As with reference and conjunction, then, the effectiveness of substitution and ellipsis depended on the accessibility of the intended meaning rather than on their presence alone.

Grammatical Cohesion and Coherence Maintenance

Beyond the classification of individual devices, the analysis identified four recurring patterns through which grammatical cohesion contributed to coherence. The first was topic continuity: reference expressions enabled writers to maintain previously introduced concepts while adding new information, particularly in discussions of research findings, theoretical concepts, and previously mentioned variables, allowing a continuous discourse topic rather than a sequence of independent statements. The second was logical development: conjunctions enabled writers to signal explicitly whether a subsequent proposition expanded, contrasted with, resulted from, or followed another proposition, transforming individual statements into connected sequences of reasoning. The third involved evidence–claim relationships, in which references and conjunctions such as this result, this finding, therefore, and because connected empirical findings with explanations, interpretations, and supporting studies. The fourth was argument progression, in which cohesive resources helped writers move from background information to problems, from

problems to proposed solutions, and from findings to conclusions. Together, these patterns indicate that grammatical cohesion contributed to coherence not simply by connecting adjacent sentences but by supporting relationships across larger stretches of discourse.

Coherence Problems in Student Academic Writing

Despite the pervasive use of grammatical cohesive devices, the analysis identified five recurring coherence problems: ambiguous referential expressions, weak or inappropriate transitions, incomplete logical connections, redundant repetition, and abrupt shifts between ideas. Ambiguous reference occurred when a cohesive expression had more than one possible antecedent or when the intended antecedent was difficult to identify; although such expressions technically created grammatical cohesion, their ambiguity weakened the reader's ability to establish continuity between propositions. Weak transitions occurred when a conjunction was used without adequately representing the logical relationship between the ideas it connected, for instance an additive conjunction where the second proposition did not actually extend the first, or an adversative conjunction without a sufficiently meaningful contrast.

Incomplete logical connections appeared particularly in explanatory and argumentative passages, where expressions such as *therefore*, *thus*, or *as a result* sometimes introduced conclusions for which the preceding information did not provide a sufficiently clear logical basis; the problem in these cases was not the conjunction itself but the relationship constructed between the propositions. Redundant repetition occurred when repeated expressions added little new information and did not advance the topic — repetition was not automatically treated as a coherence problem, since some repetition strengthens topic continuity, but became problematic when it produced limited progression or unnecessary redundancy. Finally, abrupt shifts occurred when writers moved from one topic or proposition to another without establishing a sufficiently clear connection, interrupting the development of an argument even where individual sentences were grammatically correct.

Table 2 synthesizes Sections 4.2–4.6 by linking each device to its discourse function, its contribution to coherence, and the coherence problem it produces when used inappropriately.

Cohesive device	Discourse function	Contribution to coherence	Typical coherence problem
Reference (personal, demonstrative, comparative)	Maintains the identity of participants, concepts, and previously established propositions	Keeps prior information active so writers can build on it without repeating it in full	Ambiguous or unrecoverable antecedent when more than one referent is plausible
Additive conjunction	Extends or exemplifies a preceding proposition	Signals that new information elaborates, rather than opposes or follows from, prior content	Weak transition when the following proposition does not actually extend the prior one
Adversative conjunction	Signals contrast, concession, or an unexpected turn	Helps readers anticipate a shift in stance or weigh	Contrast signaled without a clear point of opposition

		competing considerations	
Causal conjunction	Signals reason, result, or purpose	Connects evidence to claims and findings to interpretation	Incomplete logical connection: the conclusion is not adequately supported by what precedes it
Temporal conjunction	Signals sequence, simultaneity, or duration	Organizes procedures and processes	Unclear sequencing when steps are compressed or reordered
Substitution and ellipsis	Replaces or omits an element recoverable from context	Reduces redundancy while preserving textual economy	Coherence weakens when the omitted or substituted element is not easily recoverable

Table 2. Summary of grammatical cohesive devices, their discourse functions, their contribution to coherence, and the coherence problems associated with their inappropriate use.

Cross-Disciplinary Patterns

The comparison of articles across academic disciplines showed both recurring and discipline-sensitive patterns in the use of grammatical cohesion. Reference and conjunction were used across all disciplines to maintain continuity and establish relationships between propositions, indicating that these functions are central to academic writing generally; however, the specific balance between them varied considerably by discipline. Figure 3 shows the share of coded devices contributed by reference versus conjunction within each discipline. Arts Education relied most heavily on reference (57.8% of its coded devices), followed by Biology (42.9%), while Electrical Engineering and Science Education showed no coded reference devices at all, relying entirely on conjunction; Law, Management, Informatics, and Physical Education/Health and Sport also relied on conjunction for at least 90% of their coded devices.

This distribution is consistent with the disciplinary rationale advanced in the Introduction: disciplines whose articles are organized around descriptive or interpretive discussion of a phenomenon (Arts Education, Biology) sustained topic continuity through reference to previously introduced participants and concepts, whereas disciplines whose articles are organized around procedure, causal explanation, or argumentation (Electrical Engineering, Science Education, Law, Management) relied almost exclusively on conjunction to signal addition, contrast, and cause.

This distributional pattern describes reliance on a cohesive resource, not the coherence of the resulting text, since frequency alone cannot establish whether a given instance of reference or conjunction was used appropriately; that judgment required the qualitative coherence-problem coding described in Section 4.6. Consistent with the original coding, ambiguous reference, weak transitions, and incomplete logical relationships occurred across different disciplinary contexts, although their specific forms and textual consequences varied, for example, ambiguous reference was more consequential in reference-heavy disciplines such as Arts Education and Biology, whereas weak or incomplete conjunctive transitions were more consequential in conjunction-heavy disciplines such as Law, History, and Science Education.

This finding suggests that effective cohesion and coherence represent broader challenges in student academic writing rather than problems confined to a single discipline, even though the specific cohesive resource most at risk of misuse differs by discipline.

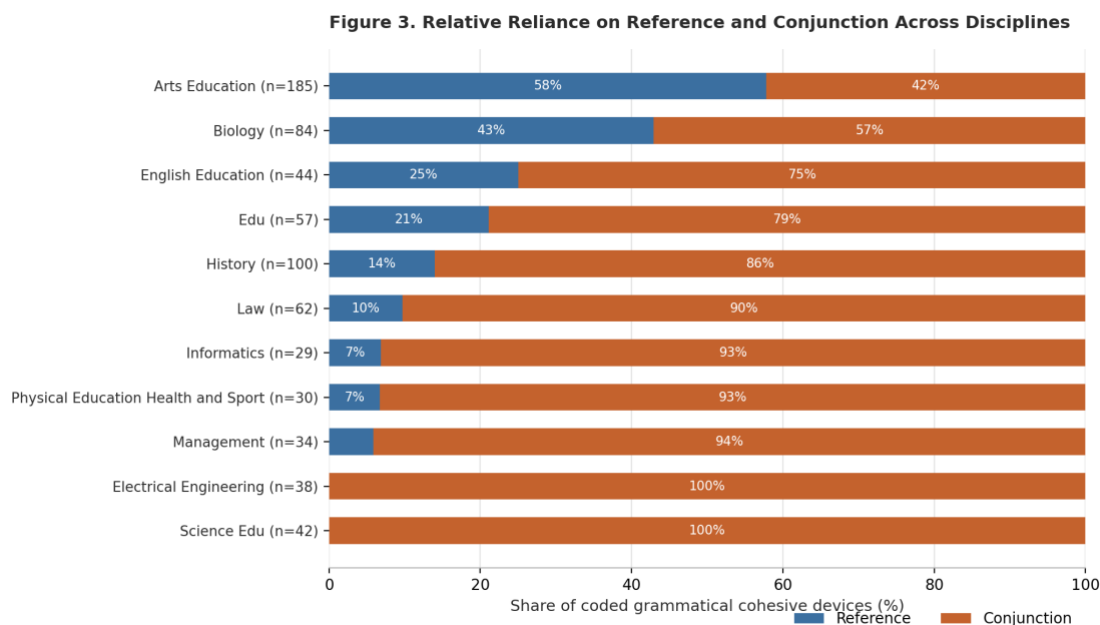


Figure 3. Relative reliance on reference and conjunction across disciplines (share of coded devices).

Overall, the findings demonstrate that grammatical cohesive devices function as resources for constructing textual relationships across the corpus, and that their contribution to coherence depends on the clarity, appropriateness, and contextual relevance of the relationships they establish rather than on their disciplinary frequency. The analysis therefore supports a distinction between cohesive form and coherent function: a text may contain abundant cohesive devices, of whichever type its discipline favors, while still requiring stronger organization and clearer relationships among ideas.

4. Discussion

The findings extend Halliday and Hasan's (1976) framework by showing that grammatical cohesion and textual coherence, although systematically related, are not equivalent constructs. Figure 4 summarizes this relationship as a conceptual model: cohesive devices become coherence-building resources only when they are used with contextual appropriateness — that is, when their antecedent is recoverable, the logical relationship they signal matches the relationship between the propositions they connect, and any omitted material remains inferable from the surrounding discourse. When this condition is not met, a device can be grammatically well-formed while still producing one of the coherence problems identified in Section 4.6.

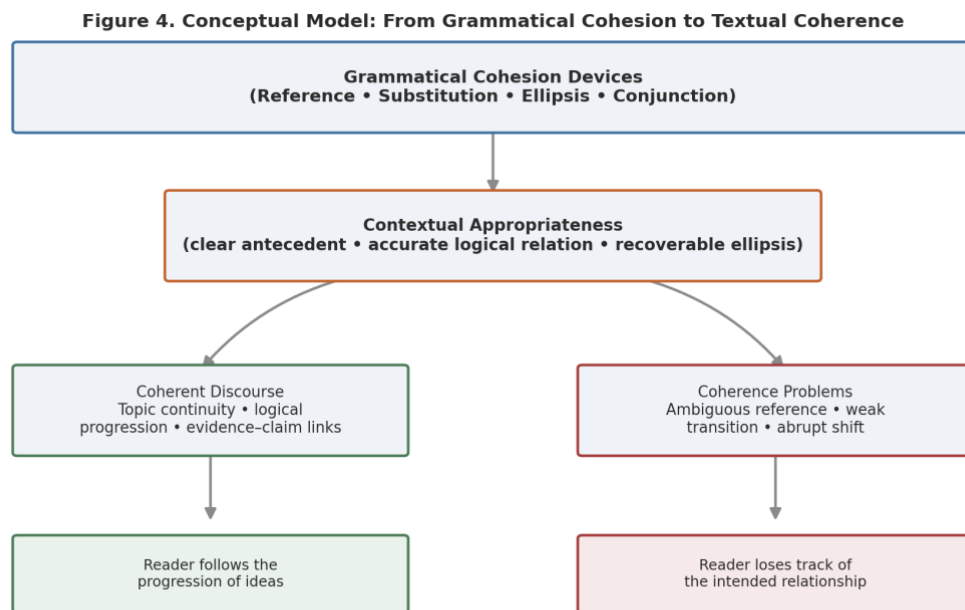


Figure 4. Conceptual model: from grammatical cohesion to textual coherence.

The dominance of conjunction, and in particular additive and adversative conjunction, over reference is consistent with Sanosi's (2024) finding that EFL academic writers over-rely on additive conjunctions, and extends it by showing that adversative conjunction was used almost as frequently in this corpus (24.0% versus 24.7% of all coded devices), suggesting that the students relied heavily on explicit connective marking to guide readers through argumentative moves such as extension, contrast, and concession.

Within reference, the preference for demonstrative over personal reference (14.2% versus 10.1%) echoes Prasetya's (2024) finding among writers publishing in Scopus-indexed journals, and may reflect a stylistic convention in which demonstrative expressions such as *this finding* or *these results* are favored for packaging prior propositions in formal academic prose. The comparative rarity of substitution and ellipsis is consistent with Halliday and Hasan's (1976) original observation that these devices presuppose a shared, easily recoverable structure between the substituted or elided element and its source, a condition more readily satisfied in dialogic or tightly parallel structures than in the discursively dense, evidence-heavy prose characteristic of academic writing. Student writers may also avoid substitution and ellipsis strategically, preferring explicit repetition when presenting technical procedures and findings where ambiguity carries a higher interpretive cost, a pattern broadly consistent with Thompson's (2014) description of written academic register as favouring explicitness over economy when precision is at stake.

These patterns also resonate with broader accounts of academic discourse. Hyland's (2005) model of meta discourse treats connectives, frame markers, and endophoric references as interactional resources that guide the reader through a text, not merely as structural ties; the coherence problems identified in this study, particularly weak transitions and incomplete logical connections, can be reframed within this model as failures of interactional guidance rather than as purely grammatical shortcomings. Similarly, Swales's (1990) account of genre as a set of communicative purposes realized through conventional moves suggests that the cross-disciplinary differences identified in

Section 4.7, for example the near-exclusive reliance on conjunction in procedure-oriented disciplines such as Electrical Engineering and Science Education, reflect the rhetorical moves characteristic of each disciplinary genre, such as reporting a method or justifying a result, rather than arbitrary stylistic variation. Read together with Golparvar, Crosthwaite, and Ziaeeian's (2023) finding that cohesive patterning shifts according to the rhetorical section of a research article, the present findings suggest that grammatical cohesion is best understood as a resource shaped jointly by the textual metafunction described in Systemic Functional Linguistics and by the genre-specific communicative purposes that Swales and Hyland describe, rather than as a fixed set of surface markers to be counted.

For academic writing instruction, these findings suggest that teaching cohesion should move beyond introducing the inventory of reference, substitution, ellipsis, and conjunction devices toward practicing their contextual evaluation: students benefit from exercises that ask them to judge whether a chosen conjunction accurately signals the logical relationship between two propositions, or whether a demonstrative reference has an antecedent that a reader unfamiliar with the writer's intention could reliably identify. Because the cross-disciplinary comparison indicates that disciplines differ systematically in their reliance on reference versus conjunction, writing instruction embedded within disciplinary courses, rather than delivered only through a generic academic writing module, may be better positioned to address the specific coherence challenges of each field.

Instruction for procedure-oriented disciplines such as the natural and applied sciences might prioritize the accurate use of causal and temporal conjunction when reporting methods and results, while instruction for interpretive and descriptive disciplines such as the arts and social sciences might prioritize maintaining clear referential continuity across extended discussion. In both cases, the pedagogical target is the same: helping students recognize that a cohesive device is a promise of a relationship to the reader, one that must be kept in context rather than merely inserted.

5. Conclusion

This study examined the use of grammatical cohesive devices and their contribution to textual coherence in 26 student academic articles published in the UNNES Scientific Journal. The findings demonstrate that reference, substitution, ellipsis, and conjunction function as important linguistic resources for connecting propositions and maintaining the development of academic discourse. Reference was particularly important in maintaining topic continuity, while conjunctions helped writers establish additive, adversative, causal, and temporal relationships between ideas; substitution and ellipsis occurred less frequently but contributed to textual economy by reducing unnecessary repetition when the intended information remained recoverable from context.

As the Discussion section develops, the central contribution of this study is the demonstration that grammatical cohesion and textual coherence are related but not equivalent: the presence of cohesive devices did not always result in effective coherence, since ambiguous references, weak or inappropriate transitions, incomplete logical relationships, redundant repetition, and abrupt shifts between ideas sometimes weakened the development of meaning. Textual coherence therefore emerges not simply from the presence of grammatical cohesive forms but from the meaningful, contextually appropriate organization of the relationships those forms signal, and this relationship varies systematically across academic disciplines rather than holding uniformly across all student academic writing.

The study contributes to the understanding of student academic writing by demonstrating how grammatical cohesion operates as a resource for meaning-making across disciplinary contexts, and it suggests that academic writing instruction should move beyond identifying cohesive devices toward greater emphasis on their contextual and functional use, ideally differentiated by discipline as discussed above.

This study has several limitations. First, the corpus was limited to 26 student academic articles published in one scientific journal, and the findings should not be generalized to all student academic writing. Second, the analysis focused specifically on grammatical cohesion and textual coherence and did not comprehensively examine lexical cohesion, interactional metadiscourse, or other discourse features. Third, although NVivo 15 supported systematic data organization and coding, the interpretation of qualitative data necessarily involved researcher judgment.

Future research could address these limitations by examining larger corpora from multiple journals and institutions and by comparing disciplinary writing more systematically. Further studies could also integrate grammatical cohesion with lexical cohesion, metadiscourse, rhetorical structure, and other discourse features to develop a more comprehensive understanding of how students construct coherence in academic writing.

6. Acknowledgement

The researcher would like to express sincere gratitude to all parties who supported the completion of this study. Special appreciation is extended to the supervisors and academic colleagues who provided valuable guidance, constructive feedback, and suggestions throughout the research and writing process. The researcher also acknowledges the UNNES Scientific Journal as the source of the academic articles analyzed in this study.

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