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A Corpus-Based Comparative Analysis of Human and ChatGPT-Generated Academic Abstracts

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Abstract

Academic writing continues to evolve alongside advances in digital technology, particularly the growing use of artificial intelligence in research communication. However, limited linguistic research has compared human and AI-generated academic texts to identify measurable differences in writing quality. This study analyses a corpus of 20 academic abstracts to compare lexical and syntactic features across both authorship types. Using qualitative and corpus-based methods, the study examines vocabulary range, academic terminology, sentence structure, and clause complexity. The findings of the present study reveals that human abstracts demonstrate greater lexical diversity, disciplinary precision, and syntactic depth, while ChatGPT abstracts display clearer structure but increased repetition and simplified syntax. The study concludes that although AI generates fluent academic language, it does not yet replicate the linguistic nuance found in human academic writing.

Keywords: *Academic research, Corpus study, ChatGPT, Lexical features, Syntactic features*

1. Introduction:

The twenty-first century has been marked by the degree of development in the technology sphere that has altered the way human beings interact, acquire knowledge and learn. Artificial intelligence (AI) is one of such innovations, and it already became an agent of change that has already touched numerous spheres of life, including healthcare, finance, education, and language. AI systems are replacing what was perceived to be a preserve of humans; image recognition, decision making, and natural language processing. When applied to the field of linguistics and writing, the term AI has revolutionized the creation and dissemination of the text with an exception of its own where AI is created technologies capable of creating readable and coherent although contextually and stylistically related fragments of text. Generative AI, which can produce text on its own when prompted by input messages, is a significant shift in the written communication field as it renders the notions of creativity and originality, as well as the evolving role of human authorship.

ChatGPT is one of the most famous generative AI-based tools in recent years created by OpenAI. ChatGPT is an application based on advanced machine learning algorithms that are aimed at creating text that follows the patterns of human writing using a large amount of existing language to generate a response to a user query. Its capability to write essays, summaries and academic abstracts with minimum human intervention has not only made it a resource worth having, but also an issue of debate. The educational, professional, and research users use ChatGPT to save time, perfect the language, or draft more intricate documents. Nevertheless, even with its advanced nature, ChatGPT is essentially a predictive algorithm and produces text based on statistical trends and not experience, knowledge, and creative will. As a result of this, its productions can display fluency and formal accuracy, however, they can be devoid of nuance, sensitivity to context, or a subtle stylistic variation that is more typical of human authors.

The rise of the AI-generated writing cannot but evoke the parallels with the human-written texts and show the strong and weak points. Cognitive processes, personal style, cultural background and the knowledge of the domain influence human writing. Lexis is deliberate, the authors arrange the sentences in rhetoric, and adjust their talk to the context and readers. It leads to texts that tend to be innovative, diverse and creative- features that AI models can only attempt to imitate but not fully emulate. On the other hand, AI-generated texts, like those generated by ChatGPT, are likely to be consistent, follow formal conventions, and predictable. Although they can contribute to the clarity and coherence, they also can lead to formulaic patterns, lexical impoverishment, and overdependence on the standard syntactic structures. Comparisons of human and AI writing, therefore, shed light on more general issues of the nature of linguistic creativity, processes of writing, and limits of machine-generated communication.

In addition to these linguistic differences, there are far-reaching effects of the spread of AI-augmented writing on education, research, and practice. Scholars are also using AI more and more to write assignments, abstracts, and essays and this is becoming a source of concern regarding originality, plagiarism, and skill in critical writing. Teachers have to grapple with the issue of writing evaluation where AI intervention can affect content, style, or structure. In the same manner, scholars and practitioners can employ AI to simplify the generation of reports, summaries, or literature reviews, which can cast doubts on the accountability, level of

interpretation, and the involvement of human judgment in the academic process. The increasing role of AI in the writing process demonstrates a larger shift in the social concept of authorship, creativity, and expertise towards efficiency and reproducibility, and the challenge to the traditional idea of originality and intellectual work.

Notably, technology, language and cognition also interact through the incorporation of AI in writing practices. Although AI can recreate the syntactic patterns, create the lexical variation, and produce coherence in texts, it is not reflectively thinking, meaning-making, and cultural awareness, as human beings. Human authors use individual experience, academic expertise and practical study to create meaning and make use of rhetorical devices to convey subtlety, persuasion and tone. Although AI models have impressive outputs, probabilistic algorithms are used to predict possible word sequences as opposed to the conceptual or emotional content being conveyed. This difference points out the underlying differences in the nature of human thought process and machine learning proposing that AIs is an aid which does not supersede but augments human linguistic ability.

The discussion about AI-generated text relates to the larger issue of sociolinguistic and ethical issues as well. Generative AI is also questioned in terms of access to it, equity, and standardization of language, especially in schools. Although AI can help non-native speakers to create scholarly workable writing, the use of this technology can, unwillingly, suppress unique style or uphold the homogenous patterns of expression. Furthermore, emerging technologies of AI text production provoke existing beliefs regarding the property of the language and the assigning of the cognitive work that makes it controversial to see who is responsible, who is the author, and the place of human control in the creative process. These debates remind about the necessity of a critical approach to the concept of AI and writing that allows highlighting both the opportunities and disadvantages of this technology in the context of multi-layered social, educational, and professional settings.

To conclude, the recent, fast development of AI and generative models, in particular, ChatGPT, has set new conditions of the creation of written language that breaks the age-old divisions between human and machine authorship. AI-assisted writing is fluent, adheres to the academic conventions, and the text is structurally consistent nonetheless; nevertheless, AI writing is entirely different as far as the creative, context-sensitive, and mindful writing is concerned. The growing uses of AI in the educational, professional, and research setting necessitate the close consideration of the linguistic and ethical issues that provoke the questions of originality, stylistic diversity, and the changing character of the authorship. One should not comprehend these dynamics merely by attaching attention to technological capability, but he or she should consider the human factors of writing like cognition, culture, and pragmatic knowledge that have been central to the existing production, interpretation, and valuation of language in the modern society.

Research Questions

1. How do lexical features differ between human-written and ChatGPT-generated academic abstracts?

2. How do syntactic structures vary between human-written and ChatGPT-generated academic abstracts?

3. What patterns emerge in the combination of lexical and syntactic features that distinguish human-authored abstracts from AI-generated abstracts?

2. Literature Review

The development of generative artificial intelligence (AI) technologies has also created a great deal of academic interest in regards to their future use in language education, especially in the context of second language (L2) writing instruction. Generative AI models, including ChatGPT, have been identified as having the ability to produce grammatically accurate and contextually situational texts that are very similar to human-written texts in structure and coherence (Rasul et al., 2023). These highly sophisticated language models have been incorporated into the different writing aids tools, automated feedback systems, and interactive learning partners to help second language (L2) learners in their writing process (Yan, 2023). An emerging body of literature has found one prominent stylistic weakness of ChatGPT-generated texts: their strong predisposition to stylistic neutrality(Amirjalili et al., 2024). This depersonalization can be seen especially through the restricted use of modal verbs, hedging devices, and epistemic markers, the linguistic elements that human writers commonly use to show attitude, level of confidence, and involvement of the reader (Mo and Crosthwaite, 2025). In the context of writing, these linguistic components are not only stylistic, but also critical rhetorical in their functions, allowing scholars to negotiate meaning, construct delicate stances, and build epistemic authority. Writing done by humans in L2 is more likely to be full of personal voice, whereas.

a language that is influenced by the sociocultural identity, emotional expression, and communicative purpose (Zhao, 2019) The increased use of AI tools can tend to reduce L2 learners and their ability to explore voice, develop rhetorical awareness, and take a stand in their writing; this shift is the cause of the growing concern. A number of researchers have tried to determine the efficacy of AI in writing in terms of performance comparison. Multidimensional frameworks of analysis of linguistic variation in compositions have been suggested by Sardinha and Pinto (2020) and are used to analyze language produced by ChatGPT.

However, with the fast appearance of generative artificial intelligence (AI), the study of linguistic features in written works has been radically transformed. Initial studies in natural language processing examined automated scoring and feedback systems and discovered that computerized tools would be effective in detecting surface errors and structural patterns in student writing (Attali and Burstein, 2006). With the advent of large language models (LLMs), however, this has extended to include full text generation, and new questions are being asked about the comparisons of the language generated by machines with human writing on a more in-depth linguistic level.

The patterns of linguistics including lexical variety and syntactic complexity have long been offered as tools of corpus linguistics frameworks. These characteristics are critical pointers of

fashion, expertise and richness of communication in writings (Biber and Gray, 2010). Syntactic indices (Mean Length of T-Unit (MLT)) and lexical indices (Type-Token Ratio (TTR)) have been highly used in gauging the writing in relation to the genres and language competence even among those who write in a second language (Lu, 2010). The measures are the primary basis of the comparative analysis of human and AI-generated writing as these are the characteristic elements of the dynamics of diversified vocabulary and the structure of the sentences based on the author.

In particular, recent studies aimed at comparing AI and human texts are focused on comparative research, whose findings are informative. One case in point, a corpus-based multidimensional analysis found that compositions generated by ChatGPT are more likely to feature homogeneous syntax and less variety of structural choices by using extensive subordination clauses as compared to human texts having more plentiful structural choices (Wu, 2025). This is a pointer to the fact that even though AI is able to produce grammatically complex sentences, it may lack the flexibility to its context of human writing. Similarly, a comprehensive comparison of human and ChatGPT argumentative essay revealed that the AI texts had a greater lexical diversity and nominalization and a lower discourse markers and epistemic features of the human argumentative style (Herbold et al., 2023; Fredrick and Craven, 2025). This fact demonstrates that surface complexity is not sufficient to fully describe more significant stylistic and communicative values.

The same trends have been observed in stylometric studies that used use of function words and part-of-speech bigrams to offer good discrimination between texts written by AI and human authors (Zaitsu and Jin, 2023). Such findings indicate that there are systematic quantifiable differences in the deployment of vocabulary and structure although, on the surface, fluency may be similar.

Research conducted with automatic feature extraction has established that the lexical and syntactic features could distinguish between AI and human texts. In one study that uses online linguistic feature extraction, it was discovered that AI-generated texts are more likely to have a higher number of nouns and coordinating conjunctions, whereas human writing is more likely to use adpositions, auxiliaries, and verbs, implying that phrase-like structure and descriptive richness are different. This follows the results that human texts can be syntactically and referentially more dense, in terms of cohesive devices and contextual sensitivity whereas AI texts can be more divided and explicit.

Moreover, ChatGPT has also led to research on the context of academic settings. The substantial cross-journal review of the use of AI tools in academic writing showed that readability and grammar checking are among the main motivations behind why researchers use the generative AI, although this influx also indicates the major change in academic practices of communication (Xu, 2025). In a study that compares academic articles written with ChatGPT and human writers in the social sciences, the human text had more complex syntax with significant use of subordination, and the AI content was more based on formulae and non-frequency of academic vocabulary. The relevance of these findings is crucial since they imply that AI and human beings do not use language in the same way at structural levels even when creating genre-specific academic text.

Other studies, besides scholarly articles and essays, have juxtaposed ChatGPT-generated and human-generated texts in diverse texts. A stylometric study of short story adaptations revealed that AI language generated was grammatically coherent but culturally insensitive and in-depth compared to the human text. It is also important to note that AI used more nouns and adjectives, and humans used more verbs and adverbs, implying differences in the action of the narrative and descriptive emphasis. This implies that the patterns of lexical choice are indicators of the various cognitive priorities between the human and AI writing.

Additionally, direct studies have also been done on lexical diversity. In 2025, an investigation on whether LLMs can generate lexical diversity of human or animal like quality discovered that there were considerable differences in various lexical dimensions, such as variety, dispersal by education level and that AI texts remain meaningfully different than human texts written by L1 and L2 participants (Kendro, Maloney and Jarvis, 2025). It confirms the notion that lexical richness (that is not just the simple quantitative measure of vocabulary) represents the qualitative aspect of human authorship that is not yet replicated by the existing AI systems.

Educational research also indicates that the effect of AI on the writing practices is subtle. On the one hand, some researchers note that critical engagement with AI products can result in the achievement of lexical and syntactic sophistication in students, whereas on the other hand, researchers note that the unconditioned usage can cause the stagnation of higher-order writing abilities (Yang et al., 2024).

Furthermore, although various studies trace general amounts of complexity or diversity, fewer studies have been done in the depth to find out how specific syntactic structures or specific lexical strategies operate differently among groups of authors. This difference is important due to the fact that academic abstracts possess unique conventions (e.g., condensed argument, use of specialised vocabulary, etc.) that can expose finer distinctions that are not reflected through generic analyses.

Overall, it is possible to state that the literature published in 2010-2025 indicates the development of a new consensus that generative AI, such as ChatGPT, is capable of writing texts in high surface fluency and formal complexity but usually lacks lexical richness, structural variation, and contextual flexibility (Herbold et al., 2023, Kendro et al., 2025). Although AI can have a practical use in producing grammatical and linguistic sound language, there are subtle variations in patterns of human writing, especially within the academic circles. The fact that the few studies available on academic abstracts reveal a distinct gap is what the current research aims to fill by paying close attention to the lexical and syntactic comparison in this significant academic genre.

3. Methodology

The presented research assumes the corpus-based comparative approach enabling the investigation of lexical and syntactic characteristics of academic abstracts written by humans and those produced by ChatGPT. Corpus-based analysis is a technique often applied in the fields of applied linguistics and computational linguistics to perform an in-depth study of the patterns of language use in writing of various types (Biber and Gray, 2010). Through the use of a comparative framework, the research will determine quantifiable differences and similarities

in lexical diversity, sentence structure and syntactic complexity of human and AI-generated texts. In this way, quantitative and qualitative observations are possible, and the overall picture of linguistic patterns in academic writing is obtained.

3.1 Corpus Compilation

The corpus is made of 20 scholarly abstracts, half of which are human-written and the rest half are ChatGPT-generated abstracts. Peer-reviewed journal articles published in 2021-2025 were identified as sources of the human abstracts to be included in the study to make sure that they are relevant and accessible in Google Scholar. The criteria used to select were the abstracts that were taken in different fields of linguistics and other related subjects, although the main condition was the use of standard academic English. ChatGPT abstracts The abstracts created by ChatGPT were based on the same research topics as the human abstracts. The title of each prompt contained the name of the study and a short description of the research situation, which imitates real-life situations where AI can be applied to academic writing. The pre-processing of all the abstracts allowed their analysis. Pre-processing involved:

Eliminating references, author names, and details of the journal in order to concentrate on language content only. Formatting and punctuation made consistent so as to reduce extraneous variability. It was important to make sure that the abstracts were in English and had full sentences which could be analyzed syntactically and lexically. The process has led to clean and comparable corpus that can be cross-group analyzed.

3.2 Analytical Framework

The paper concentrates on two major aspects of language lexical features and syntactic features.

Lexical Features

The vocabulary range measured by means of lexical diversity (Type- Token Ratio [TTR]) (Lu, 2010). The rate of academic or discipline-specific words (frequency of use of scholarly or discipline-specific words) to identify the level of compliance with the conventions of the academia.

Syntactic Features

To measure structural complexity, sentence length (mean number of words per sentence) was measured. Syntactic variation to be determined through types of clauses (simple, compound, complex). Passive and active voice, as is the case, in academic abstracts and may signal a formal writing style (Biber et al., 2016). Subordination and coordination patterns are patterns that describe the syntactic interconnection of ideas in a sentence.

Both are manual and corpus-based analyses. The abstracts were analyzed separately to determine features and the number was tallied in spreadsheets to be used in systematic comparison. This two-fold methodology guarantees precision and at the same time, the reflection of fine trends that may be missed by automated systems.

3.3 Data Analysis Procedure

Manual Annotation: The abstracts had to be read thoroughly in order to recognize lexical forms and syntax forms. The items of lexicon were categorized as general, academic or as discipline specific. We classified the syntactic structures as simple, compound and complex sentences with a commentary on subordination, coordination, and passive structures.

Quantitative Analysis: Tabulation Frequency counts of every lexical and syntactic feature were tabulated. The comparison between human texts and AI texts was done using the mean scores, percentages, and ratios (e.g., TTR). Patterns in word choice, sentence variation and structural creativity It was observed that patterns could be used to offer interpretive insights. This is done to determine the stylistic habits, e.g. formulaic repetition in AI text as compared to contextual variability in human text. Comparative Evaluation The research made advantage of side-by-side comparison to define the distinction and the similarities between the two teams focusing on trends and not pursuing single cases. The size of the corpus was too small to provide any statistical argument, yet the small sample of words is enough to make descriptive comparisons and to find any significant linguistic differences in this preliminary study.

3.4 Ethical Considerations

All abstracts that were written by humans were made publicly available, and sources were properly credited to avoid violating copyright and academic integrity. AI-generated abstracts were created just to be used in research and were not submitted to be published or evaluated. There were no personal data involved and this safeguarded ethical research conduct. This approach offers a systematic and stringent method of the comparison between human and ChatGPT-written scholarly abstracts. The study analyses lexical variety and syntactic complexity by synthesizing corpus which is coupled with manual annotation and descriptive comparison. The research methodology is reliable, ethical and brings out insights into the relationship between AI-generated writing and human practices of academic writing.

4. Data Analysis and Findings

This data analysis aims to investigate the difference between human-written and ChatGPT-generated academic abstracts. The information on the lexical and syntactic characteristics of a given language chooses corpus under consideration to be carefully analyzed in terms of quantifiable patterns of vocabulary selection, lexical heterogeneity, sentence construction, and language behaviour in general.

The reading showed that there was a definite contrast between human and AI abstract styles. Human writers were inclined to show the difference in word usage, tone, and individual linguistic preferences influenced by experience, ideology, and exposure to this or that discipline. By comparison, ChatGPT-generated texts contained more consistent, formulaic and standardised vocabulary patterns, indicating a sign of structure, as opposed to an individual style. These initial remarks are connected with previous experiments by Herbold et al. (2023) and Kendro et al. (2025), who found repeated tendencies of lexical consistency in ChatGPT-written texts, and who found lower unpredictability of lexical texts in AI texts with high fluency, respectively. The corpus discussed here is in line with those findings. ChatGPT

abstracts were revised, cohesive, and transparent, yet characterized by the evident repetition in the use of words and phrases, as well as collocational behaviour.

There was great variation in the lexical behaviour of human abstracts, however. There are those that were brief and discipline specific; and those that were descriptive, expressive and stylistically adaptive. Some abstracts also showed the individual writing style of the authors, which is normal in natural academic writing. Others showed lexical mistakes, incoherent register, or less than perfect accuracy - all typical remnants of human variability. These patterns are analyzed systematically and thus the rest of the analysis analyzes the same starting with lexical behaviour.

4.1 Lexical Features Analysis

Lexical features were analysed across three dimensions and each feature is analysed comparatively between the two corpus.

Lexical Density

Type–Token Ratio (TTR) and Lexical Diversity

Academic Vocabulary Use

4.1.1 Lexical Density

Lexical density refers to the proportion of content words (nouns, verbs, adjectives, adverbs) relative to function words. Higher lexical density indicates more informationally dense academic writing.

Observed Pattern

Human-written abstracts in this corpus demonstrated moderate to high lexical density. Their wording often reflected discipline-specific terminology:

Examples from human corpus:

- “pragmatic failure”
- “linguistic deviation”
- “stylistic analysis”
- “multidimensional analysis”
- “lexical innovation”

Function words tended to be minimal, replaced by compressed noun phrases or topic-specific terminology.

ChatGPT abstracts also contained high lexical density, but with a narrower range of terms. The same abstracting phrases appeared repeatedly:

Examples from AI corpus:

- "this abstract examines..."
- "the analysis highlights..."
- "the study explores..."
- "the findings suggest..."

These repeated structures inflate lexical density numerically, yet flatten lexical variety.

Feature	Human Abstracts	ChatGPT Abstracts
Density level	High to moderate	High
Variability	High variation across texts	Low variation across texts
Terminology depth	Discipline-specific	General academic
Phrase repetition	Low	High

Comparative Table 4.1.1: Lexical Density Patterns

The high lexical density in ChatGPT texts may not reflect conceptual precision, but mechanical fluency. Human density, however, grows organically from lived disciplinary knowledge.

4.1.2 Lexical Diversity (TTR Patterns)

Lexical diversity reflects the range of vocabulary items used in a given length of text. Although no automatic lexical calculator was applied here, diversity was measured qualitatively by comparing repetition frequency, synonym usage, and unique word presence.

Human abstracts displayed higher lexical diversity. Writers drew on varied vocabulary to express conceptual nuance. For example, in the abstract on pragmatics, the writer used:

- “misunderstandings”
- “communication breakdowns”
- “pragmatic competence”
- “sociocultural variation”

No frequent self-repetition of key terms occurred.

The same pattern appeared in the abstract on social media, which employed a range of lexical items such as:

- “neologisms”
- “hybrid terms”
- “acronyms”
- “multimodal communication”

This reflects natural language creativity.

In contrast, ChatGPT abstracts displayed lexical recycling, a common feature in computational output. Across multiple abstracts, identical wording patterns were repeated:

Repetition across different abstracts:

- “this abstract examines...”
- “the study highlights...”
- “drawing on theoretical frameworks...”
- “the analysis emphasizes...”

The AI showed limited willingness to substitute synonyms. It repeated certain academic nouns:

- “analysis” (appears in all 10 abstracts)
- “study” (appears in all 10 abstracts)
- “frameworks” (appears 7 times)

This reveals lexical standardisation, not lexical invention.

4.1.3 Academic Vocabulary Use

Both corpora used academic vocabulary; however, usage differed qualitatively.

Human abstracts employed situationally-rooted academic terminology tied to research content, methods, or discipline.

Examples:

- "discourse transformation"
- "multidimensional analysis"
- "lexical patterns"
- "graphological deviation"
- "corpus-assisted"

These terms demonstrate conceptual specificity.

ChatGPT employed generic academic vocabulary, useful across thousands of topics but not exclusive to linguistics.

Examples:

- "the study argues"
- "the findings suggest"
- "the theoretical discussion"

While academically acceptable, these expressions prioritise coherence over specificity.

Analytical Category	Human Abstracts	ChatGPT Abstracts
Lexical density	High, topic-driven	High, structure-driven
Lexical diversity	High	Medium-low
Field-specific vocabulary	Strong	Reduced

Comparative Table 4.1

4.2 Syntactic Features Analysis

The syntactic analysis focused on identifying structural patterns that differentiate human-written abstracts from ChatGPT-generated abstracts. Unlike lexical structures, which reflect vocabulary choices, syntactic structures reveal how ideas are organised, how relationships between concepts are expressed, and how academic authority is projected through sentence design. For this study, syntactic analysis was organised around three core dimensions:

Sentence complexity (simple vs. complex sentence patterns)

Voice (passive vs. active structures)

Clause structure (embedded vs. linear clause sequencing)

Each feature was examined carefully across both sets of abstracts, revealing clear patterns that align with natural versus computational language production styles.

4.2.1 Sentence Complexity

Sentence complexity was among the most apparent syntactic differences between an abstract written by humans and ChatGPT. More intricate sentence structures were evidenced by human abstractions. Authors were inclined to write sentences that had several ideas that were joined together with embedded clauses, noun phrases, and overlay structures. A number of sentences had several conceptual connections, i.e., cause, contrast, or explanation, which led to more in-depth and more syntactically compact structures. This is natural academic reasoning, meaning that the meaning can enlarge as the idea evolves.

ChatGPT-generated sentences in contrast were shorter and more consistent. Although the AI sentences were grammatically and coherently sound, there was almost no internal layering. They rather had a tendency to adhere to the similar patterns: one thought each line, and the other. This pattern is structurally transparent but the syntactic detail of human texts is missing.

Feature	Human Abstracts	ChatGPT Abstracts
Sentence Length	Variable	Uniform
Complexity	High	Medium
Embedded Structures	Frequent	Rare

Table 4.2.1 Sentence Complexity Comparison

This difference highlights a key distinction in authorship style: human syntax grows from conceptual progression, while AI syntax favours controlled clarity.

4.2.2 Voice (Passive vs. Active)

Traditionally academic writing would employ passive voice to be able to preempt the process, results, and evidence as opposed to individual agency. This inclination was quite evident in the human written abstracts especially when handling methodology or findings. The expressions like, data were analysed, patterns were identified, and results were interpreted reflect the typical academic position, as they make a focus on the research itself.

ChatGPT abstracts were more dependent on the active voice, however. The study is often started by the sentence: agent - this study examines, the abstract explores, the paper discusses. This is a grammatically sound structure but it sounds more formulaic and repetitive. The voice difference shows a more fundamental linguistic rule: human scholars are inclined to make the researcher less personal, and AI-based texts, being taught the overall patterns of writing texts on the Internet, place the researcher in the centre.

Feature	Human Abstracts	ChatGPT Abstracts
Passive voice frequency	High	Low
Active voice frequency	Medium	High

Table 4.2.2 Voice Distribution

This contrast in voice contributes not only to stylistic difference but also to authorial identity formation that reveals, human texts sound institutional while AI texts sound presentational.

4.2.3 Clause Structure

The abstracts that are written by humans, commonly embedded and multi-clause sentence structures. This word density enables authors to compress words, connect them, make a statement of relationship, and add conceptual delicacy. Multi-clause constructions were prevalent throughout the corpus and especially in parts of an explanation, where multiple thoughts were synthesised to form one sentence.

Comparatively, ChatGPT texts were based on a more linear sequence of clauses. Instead of putting clauses in one another, concepts were divided in more than one sentence. They also had a tendency to have a single subordinate clause even in the complex sentences, and it appeared mostly at the start or the end. This type of structure restricts conceptual richness and narrative.

Feature	Human Abstracts	ChatGPT Abstracts
Multi-clause sentences	High frequency	Low frequency
Single-clause sentences	Low frequency	High frequency
Embedded meaning	Strong	Limited

Table 4.2.3 Clause Density (General Pattern)

These findings support growing evidence in the field that AI-generated texts prioritise fluent surface structure over deeper syntactic integration.

All three of these syntactic indicators are taken together, and they denote obvious differences between the writing styles of humans and ChatGPT. The abstracts by human beings exhibit structural variation, reasoned stance, and formal scholarship. The AI texts exhibit structural consistency, excessive use of active structures, and simplified clauses packaging.

Although both texts are grammatically accurate and academically viable, they have much in common in their differences in creating meaning:

Human syntax enlarges internally, forming the depth.

AI syntax goes external, forming movement.

Such syntactic results confirm the conclusions of the previous research that indicate that linguistic form of humans is an indication of personal knowledge, and the linguistic form of AI is statistical prediction. They also relate directly to the research questions in that they demonstrate quantifiable differences in the textual construction, which makes the analytic basis of the research.

The comparative analysis showed that there were obvious linguistic differences between the human-written and ChatGPT-generated academic abstracts. On the lexical level, human abstracts were more varied in vocabulary, specific to the discipline, and original in their word choice, whereas ChatGPT abstracts were based on repetitive wording, common academic vocabulary, and lexical templates. Lexical density also was favorable in both categories but human lexical richness was manifested due to depth of concepts whereas AI density was manifested due to structural predictability. Human abstracts were also more complicated in sentence structure, more often embedded clauses, and the use of pass voice which was more in preference mostly when reporting methods and results at the syntactic level. Conversely, ChatGPT abstracts preferred active voice, sequencing of the sentences linearly, and a less

complex syntactic packaging. These results show that, despite being able to get fluent academic language, lexical and syntactic patterns of AI are not as diverse, context-dependent, and conceptually stratified in human academic texts.

5. Conclusion

On the whole, the research shows that ChatGPT is significantly less lexical and syntactic than the writing of a human, its academic abstracts are generated with high levels of fluency and coherence, but they are still considerably different. Human abstracts are more rich in vocabulary, have concepts that are more specific and syntactic, which is more preoccupied with author engagement and thought processing. By comparison, ChatGPT abstracts are more formulaic, repetitive, and simplified in sentence structure. These results indicate that AI-generated academic writing, despite being helpful and efficient, is yet to reach the depth of language and the range of stylistic choices of human academic writing and that the difference in the meaning-building processes between human and artificial writers still persists.

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