DOES CHATGPT ARGUE THROUGH STRUCTURE OR STANCE? A METADISCOURSE ANALYSIS OF ENGLISH ARGUMENTATIVE ESSAYS ACROSS TOPICS

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ABSTRACT

This study examines the use of interactive and interactional metadiscourse markers in English argumentative essays generated by ChatGPT across a range of social science topics. Drawing on Hyland's (2005) Interpersonal Model of Metadiscourse, a corpus of seventy-five argumentative essays, comprising fifteen topics with five essays each, was analysed using both qualitative and quantitative methods. The log-likelihood analysis demonstrates a clear preference for interactional markers, particularly hedges, while transitions emerge as the most frequent interactive devices in the overall corpus. These patterns indicate that ChatGPT-generated essays foreground stance-taking and reader engagement rather than explicit structural guidance. At the topic level, interactional markers are especially prominent in essays on sports, gender studies, psychology, and economics, whereas topics such as food and nutrition, and history rely more heavily on interactive resources. Overall, these findings expand the understanding of AI discourse by highlighting both the strengths and limitations of AI-generated writing.

Keywords: Interactive markers, Interactional markers, Metadiscourse, Topic, ChatGPT-produced argumentative essays

ÖZ

Bu çalışma, ChatGPT tarafından üretilen İngilizce tartışmacı denemelerde bilgi odaklı etkileşimli ve alıcı odaklı etkileşimli üstsöylem belirleyicilerinin, farklı sosyal bilimler konuları bağlamındaki kullanımını incelemektedir. Hyland'ın (2005) Kişilerarası Üstsöylem Modeli temel alınarak, her biri beş denemeden oluşan on beş farklı konuya ait toplam yetmiş beş tartışmacı denemeden oluşan bir derlem, nitel ve nicel yöntemler kullanılarak çözümlenmiştir. Log-olabilirlik çözümlemesi, özellikle kaçınmaların öne çıktığı alıcı odaklı etkileşimli üstsöylem belirleyicilerine yönelik belirgin bir tercihi

ortaya koyarken, bağlayıcıların ise derlemin genelinde en sık kullanılan bilgi odaklı etkileşimli araçlar olduğunu göstermektedir. Bu örüntüler, ChatGPT tarafından üretilen denemelerin açık yapısal yönlendirmeden ziyade duruş kurma ve okurla etkileşimi ön plana çıkardığını göstermektedir. Konu düzeyinde bakıldığında, spor, toplumsal cinsiyet çalışmaları, psikoloji ve ekonomi alanlarındaki denemelerde alıcı odaklı etkileşimli belirleyicilerin özellikle baskın olduğu; buna karşılık beslenme ve gıda ile tarih gibi konularda bilgi odaklı etkileşimli kaynakların daha yoğun biçimde kullanıldığı görülmektedir. Genel olarak bu bulgular, yapay zekâ tarafından üretilen yazının hem güçlü hem de sınırlı yönlerini ortaya koyarak yapay zekâ söylemine ilişkin anlayışımızı genişletmektedir.

Anahtar sözcükler: Bilgi odaklı etkileşimli belirleyiciler, Alıcı odaklı etkileşimsel belirleyiciler, Üstsöylem, Konu, ChatGPT tarafından üretilen tartışmacı denemeler

1. Introduction

Artificial Intelligence (AI) has, in a remarkably short span, become part of education and academic writing, offering students, teachers, and researchers tools that deliver structure and clarity with remarkable ease. As an everyday reality in classrooms and research settings, students frequently turn to these tools for guidance, teachers use them to support lesson design, and researchers incorporate them into their academic routines as part of their experiments. This sudden shift has brought both excitement, due to the speed and accessibility AI provides, and hesitation, as questions of originality, authorship, and academic value remain very much open.

Among these tools, ChatGPT, created by OpenAI, has received particular attention. Part of its appeal lies in its versatility: it can generate essays, summaries, and arguments on a broad range of topics. Besides being attractive, it also raises questions about the quality of the academic prose it produces: What kind of writing does ChatGPT actually produce? And how closely do its texts resemble the rhetorical and stylistic qualities that characterize academic prose? One effective way to address such questions is to examine metadiscourse markers.

Metadiscourse markers (MDMs) are the rhetorical devices writers use to organize their arguments and to establish a relationship with their readers in their academic writing. According to Hyland (2005), interactive metadiscourse markers such as transitions, frame markers, endophoric markers, evidentials, code-glosses help the writers organize the text and guide the reader through the text by signaling structure and connections while interactional metadiscourse markers such as hedges, boosters, attitude markers, self-mentions, engagement markers allow writers to show their stance and involve the reader more directly in the discussion. The effective deployment of both categories is central to argumentative writing, where persuasiveness depends not only on logical reasoning but also on how writers signal credibility, involvement, and consideration of the reader's perspective. In addition, a large body of research confirms that

proficient writers rely on a balance of both interactive and interactional categories to produce texts that are coherent, dialogic, and persuasive (Ädel, 2006; Hyland, 2019; Hyland & Tse, 2004).

The growing presence of AI-generated writing has increased interest in how these systems employ metadiscourse. Scholars have begun to compare AI-generated texts with those written by humans, and the results so far reveal both overlaps and distinct gaps. Amirjalili et al. (2024), for example, noted that ChatGPT often falls back on formulaic coherence devices, while Shalevska (2024) emphasized its limited ability to capture more subtle rhetorical strategies. Similarly, Alshalan and Alyousef (2024) reported that AI-generated essays often lack a genuine authorial voice, particularly in their use of self-mentions and boosters. Dynel (2023) showed that ChatGPT prompts metadiscursive awareness in playful human–AI interactions, but fails to replicate authentic rhetorical presence. Kobzová (2023) further noted that ChatGPT's hedging repertoire is narrower and less varied than in published academic texts. Similarly, Yao and Liu (2025) observed that while GPT-generated book reviews contained more interactional markers than human-authored reviews, the overuse of attitude markers and the lack of hedges led to an unbalanced stance.

Other studies focused on AI writing in various academic genres. Zhang and Zhang (2025a, 2025b) examined research article abstracts, demonstrating that ChatGPT tends to overuse reflexive and text-oriented markers but lacks the disciplinary nuance characteristic of human writing. Hongyan and Saeed (2025) also found that, although AI-generated abstracts heavily utilized stance and engagement markers, they were formulaic in comparison to the subtle variation found in human-authored texts. These concerns align with Flowerdew and Wang's (2023) argument that academic writing in the age of AI faces both opportunities and challenges. In addition to these studies, recent research has also compared student-written essays with those produced by ChatGPT. Jiang and Hyland (2025a, 2025b, 2025c, 2025d) demonstrated that although AI-produced texts are generally coherent and frequently employ interactive markers and lexical bundles, they fall short in utilizing engagement markers, hedging devices, and evaluative expressions. These elements contribute to the persuasiveness of human writing. In a similar vein, Shalevska (2024) found that while ChatGPT regularly used cautious expressions like may, it rarely employed emphatic terms such as clearly or definitely. Yao and Liu's (2025) book review analysis and Amirjalili, Neysani, and Nikbakht's (2024) investigation of authorship and voice further confirmed that AI-generated texts, while contextually relevant, often lack depth, specificity, and authentic authorial presence. These studies consistently show that ChatGPT handles coherence well by relying on interactive markers; however, it has difficulty with stance-taking strategies, such as hedges, boosters, self-mentions, and engagement, which are essential for making academic writing more persuasive.

More recently, however, attention has turned to how metadiscourse patterns differ across disciplines. It has also been shown that topic-shaping metadiscourse practices are present in argumentative writing**.** For example, EFL students demonstrate distinct preferences, often employing fewer hedges but more reader pronouns than native writers (Yoon, 2021). This topic-based perspective reveals that it is not enough to ask whether AI can produce metadiscourse; we must also consider how its rhetorical choices shift in relation to the argument's topic. Nevertheless, existing studies on AI-generated writing and metadiscourse have mainly focused on broad comparisons between human- and machine-produced texts, with limited attention to how these resources vary across academic topics. What remains unexplored, and what this study seeks to address, is whether ChatGPT's argumentative essays shift their metadiscourse practices across topics, and whether stance or structure emerges as their dominant rhetorical strategy, in addition to focusing exclusively on the distribution and use of interactive and interactional metadiscourse markers in AI texts. Accordingly, this research is guided by the following research questions:

1. What are the metadiscourse categories and their frequencies used in ChatGPT-generated argumentative essays?
2. Is there any significant difference between the overall use of interactive metadiscourse markers and interactional metadiscourse markers in ChatGPT-generated argumentative essays?
3. Does the use of interactive and interactional metadiscourse markers vary depending on the topic (e.g., education, technology, health, environment, politics and law, culture, economics, gender studies, psychology, sports, religion, history, arts and aesthetics, food and nutrition, travel and tourism)?

By combining corpus-level analysis with topic-based comparison, this study aims to reveal both the general rhetorical orientation of AI writing and its adaptation to topic-specific contexts. This knowledge is not only theoretically valuable but also practically useful, as it can help educators and students determine the best approach to working with AI-generated texts in settings where developing argumentative skills is crucial.

The paper is structured as follows. Section 2 presents the methodology, including corpus design, data collection, and data analysis procedures with their analytical framework. Section 3 reports and discusses the results of the quantitative and qualitative analyses, pointing to the implications of these findings in relation to existing research. Finally, Section 4 presents the conclusion, providing a summary and outlining directions for future research.

2. Methododology

2.1 Corpus and data collection procedure

The dataset for this study was assembled through a systematic two-step process, with the goal of creating a balanced corpus of argumentative essays that captures a wide range of globally relevant topics while maintaining both topical diversity and textual variation.

In the first step, the following prompt was submitted: "*Identify the most debated and up-to-date fifteen topics in the world*." This request generated fifteen topics that are widely discussed in contemporary global discourse, such as education, technology, health, politics and law, culture, economics, gender studies, psychology, sports, religion, history, arts and aesthetics, food and nutrition, travel and tourism, and environment.

In the second stage, each topic was used as the basis for essay generation with the instruction: *"Write five argumentative essays on ... issue, focusing on its most current and debated aspects."* A total of seventy-five essays were collected, with 15 topics, each comprising five essays in their original form without modification.

Each prompt was submitted independently to capture lexical and rhetorical variation within topics, and the outputs were collected in their original form. The essays were systematically labelled (e.g., Education_1, Education_2, …, Education_5) to enable both quantitative and qualitative analyses. A complete list of the generated essays, including their titles and associated topics, is provided in the Appendix.

The corpus compiled through this collection amounts to 33,801 words. Table 1 provides the word count distribution across the fifteen topics:

Table 1. Distribution of word counts across topics

Topic	Word Count	Topic	Word Count	Topic	Word Count
Education	2,988	Economics	2,790	Arts and Aesthetics	2,025
Technology	2,992	Gender Studies	2,044	Food and Nutrition	2,025
Health	2,369	Psychology	2,000	Travel and Tourism	1,931
Politics and Law	2,239	Sports	2,125	Environment	2,296
Culture	2,096	Religion	1,798	Arts and Aesthetics	2,025

This two-step data collection strategy ensured that the topics were drawn from prompts focusing on widely debated and current global issues, rather than being selected in advance by the researcher. In addition, generating multiple essays for each topic introduced internal variation, which helped strengthen the reliability of the dataset.

2.2 Analytical framework and data analysis procedure

The analysis followed Hyland's (2005) taxonomy of metadiscourse, dividing markers into interactive (e.g., transitions, frame markers, evidentials, code glosses, endophoric markers) and interactional categories (e.g., hedges, boosters, attitude markers, engagement markers, self-mentions). Table 2 illustrates functions and examples of these categories.

Table 2. Hyland's (2005) interpersonal model of metadiscourse

Category	Function	Examples
Interactive	**Help to guide the reader through the text**	**Resources**
Transitions	Express semantic relation between main clauses	And, in addition, but, consequently
Frame markers	Refer to discourse acts, sequences, or text stages	Finally, to conclude, my purpose is
Endophoric markers	Refer to information in other parts of the text	Noted above, see Fig.,in Section 2
Evidentials	Refer to source of information from other texts	According to X, (Y, 1990), Z states
Code-glosses	Help readers grasp the meanings of ideational material	Namely, e.g., such as, in other words
Interactional	**Involve the reader in the text**	**Resources**
Hedges	Withhold the writer's full commitment to the proposition	Might, perhaps, possible, about
Boosters	Emphasize force or writer's certainty in proposition in fact / definitely / it is clear that	In fact, definitely, it is clear that
Attitude Markers	Express writer's attitude to pro-position	Unfortunately, I agree, surprisingly
Engagement Markers	Explicitly refer to or build a relationship with the reader	Consider, note that, you can see that
Self-Mentions	Explicit reference to author(s)	I, we, my, our

Interactive resources help to organize discourse in ways that guide readers through the text: Transitions (e.g., however, therefore) signal relations between clauses. Frame markers (e.g., in conclusion, first)

indicate stages in discourse organization. Endophoric markers (e.g., as noted above) direct readers to other parts of the text, whereas evidentials (e.g., according to X, research shows) attribute claims to external sources. Code glosses (e.g., namely, in other words) are used to provide clarification or elaboration.

Interactional resources, by contrast, reveal the writer's stance and regulate how the audience is addressed. Hedges (e.g., may, might) introduce tentativeness, whereas boosters (e.g., clearly, in fact) stress conviction. Boosters (e.g., clearly, in fact, it is obvious that) do the opposite, strengthening claims by signalling certainty and authority. Attitude markers (e.g., unfortunately, importantly) express how the writer evaluates or positions an idea or argument. Self-mentions (e.g., I argue, we suggest) foreground the writer's role, and engagement markers (e.g., you can see, note that) directly address the reader.

This framework was adopted because this model is specifically designed for academic writing (Zarei & Mansoori, 2011) and provides a comprehensive model that incorporates previous approaches while addressing their gaps and overlaps (Hyland, 2005). Given its extensive use in metadiscourse research (Hyland & Tse, 2004; Triki, 2019), it provides an effective tool for exploring topic-based variation.

The data analysis process involved three steps, combining quantitative and qualitative approaches to examine both the distribution and the contextual functions of metadiscourse markers.

Initially, the corpus of seventy-five essays was processed within a text analysis environment. Each text was scrutinized to locate metadiscourse markers, which were then classified and coded according to the analytical framework. Ambiguous cases were resolved by checking the operational definitions and examples provided in the literature. Following identification and coding, quantitative analyses were conducted. The raw frequencies of each metadiscourse category were calculated, and figures were normalized to 1,000 words to facilitate cross-topic comparison. The distribution of metadiscourse markers was compared across the fifteen topics, allowing for the identification of both overlapping tendencies and topic-specific distinctions. The analysis was then complemented by a qualitative stage, in which markers were examined within their textual environments, and illustrative excerpts were provided to demonstrate their rhetorical functions. Through this twofold procedure, the research was able to account for both the general distribution of markers and their rhetorical realizations in context.

3. Results and Discussion

This section presents the findings and discusses them in relation to the three research questions. It first outlines the overall distribution of metadiscourse categories in the dataset, then compares interactive and interactional markers across the corpus, and finally examines how these

markers vary across topics. Each stage of the analysis is supported by quantitative evidence and illustrated with tables and figures.

3.1 Distribution of metadiscourse categories in the corpus

The first research question aimed to determine the general distribution of metadiscourse categories across the entire corpus. As shown in Figure 1, all of the interactive categories, such as transitions, frame markers, endophoric markers, evidentials and code-glosses and interactional categories, such as hedges, boosters, attitude markers, self-mentions and engagement markers, were found in English argumentative essays produced by ChatGPT.

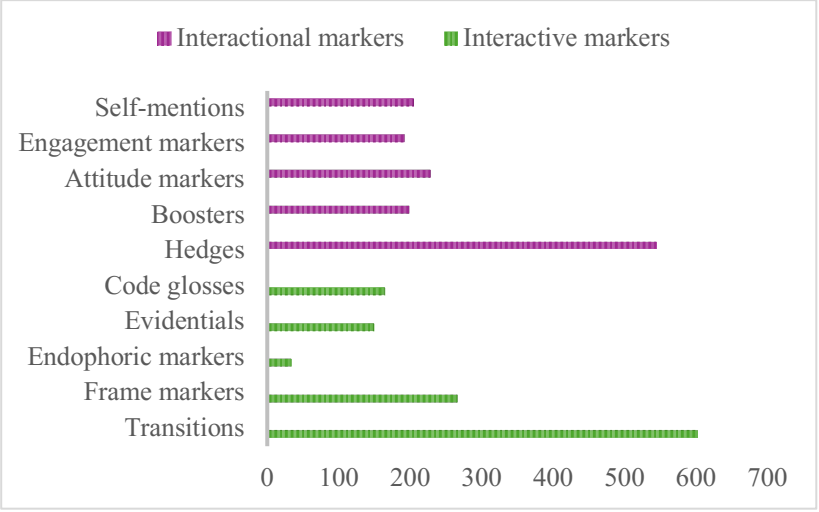

Figure 1. Distribution of metadiscourse categories in the ChatGPT's argumentative essays

Figure 1 demonstrates that both interactive and interactional markers appear frequently in the analyzed ChatGPT's argumentative essays, although their subcategories show marked variation in distribution. Among interactive devices, transitions are the most commonly used, followed by frame markers, code glosses, and evidentials. Endophoric markers are scarcely used in the corpus. Within the interactional group, hedges represent nearly half of all instances, whereas boosters, attitude markers, self-mentions, and engagement markers occur in more even proportions. In a similar vein, Abdi (2002) observed that non-native students make extensive use of hedges to soften claims, a tendency also evident in the present data. The rarity of endophoric references corresponds with Hyland and Tse's (2004) findings, which suggest that explicit cross-referencing is more typical of professional academic prose than of student essays. Below, the frequency of use for each category will be discussed, along with examples extracted from the corpus.

The high frequency of transitions (1.78 per 100 words) indicates that cohesion and the logical sequencing of ideas played a central role in the essays. This is exemplified below:

(1) *"**Moreover**, compulsory voting can promote political equality by ensuring that all citizens participate in elections."* Here, the metadiscourse marker "moreover" creates a cumulative effect that strengthens the flow of reasoning. (2) *"**However**, globalization can also result in economic inequality despite its many benefits."* The transition marker "however" establishes contrast and balance. (3) *"**Additionally**, the relevance of beauty pageants has been questioned in recent years due to shifting cultural norms."* As an additive transition marker, "additionally" signals the extension of argument. These instances confirm that the discourse is heavily reliant on transitions to achieve textual flow, a pattern consistent with Triki's (2019) finding that student essays prioritise connectors to guide readers. In addition to the transitional devices given in (1), (2) and (3), the dataset also contains a range of transition markers such as: *and, but, while, furthermore, although, as, by, in addition, conversely, when, if, because, as a result, especially, instead, therefore, since, on the other hand, in contrast.*

Within the interactive categories, frame markers rank second after transitions, with a normalized frequency of 0.79 per 100 words. The essays employed these devices to signal sequencing and conclusions:

(4) *"**In conclusion**, therapy can be highly effective in reducing stress among patients."* The marker "in conclusion" closes the argument explicitly. (5) *"**First**, it is necessary to acknowledge the economic consequences of raising the minimum wage."* The marker "first" orients the reader to a staged argument. (6) *"**Overall**, feminism continues to shape contemporary discussions of equality."* Here, "overall" generalizes the argument. Such uses support Hyland and Tse's (2004) claim that frame markers help structure complex reasoning, though their relatively modest presence suggests that the essays often relied on implicit structuring rather than explicit staging. Other frame markers occurring frequently in the corpus are listed as follows: *in conclusion, one of the primary reasons, one of the strongest/primary concerns, first, second, furthermore, overall, the question of whether, the issue of, the debate surrounding, first and foremost, another issue/benefit, another criticism, ultimately arguing, in recent years.*

When compared to the transitions and frame markers, code glosses were moderately used (0.49 per 100 words), mainly to clarify or exemplify claims.

(7) *"Globalization creates cultural homogenization, **for example**, the spread of fast-food chains across the globe."* (8) *"Beauty pageants promote unhealthy ideals, **such as** unrealistic body expectations."* (9) *"Voting reforms can ensure fairness, **that is**, they can prevent manipulation and fraud."* The markers "for example", "such as", "that is" show that clarification was strategically used to make arguments accessible. This confirms Abdi's (2002) suggestion that code glosses help writers anticipate reader needs by offering additional explanation. Several different code-glosses appeared with notable

frequency, for example: *for example, for instance, such as, that is, namely, including, particularly, in other words.*

The fourth most frequently used interactive category is evidentials, with the frequency of 0.44 per 100 words, showing limited engagement with external sources in ChatGPT's argumentative essays. The few instances illustrate general references rather than disciplinary grounding:

(10) *"**Studies have shown that** therapy reduces symptoms of depression."* The marker "studies have shown that" invokes authority but in a broad, unsourced manner. (11) *"**Evidence from** countries with compulsory voting indicates higher turnout rates."* The marker "evidence from" suggests research, yet it is generic. (12) *"**Research from** the Alaska Permanent Fund **shows that** basic income schemes can work in practice."* The marker "research from… shows that" again signals authority but without detailed citation. Compared with research writing in hard sciences, where evidentials dominate (Hyland & Jiang, 2017), this underuse demonstrates that the essays lack intertextual depth and remain closer to opinion pieces. Further examples of evidentials that appeared frequently in the dataset are as: *studies have shown, research suggests, research indicates, evidence suggests, evidence from, history has shown, history shows, according to, critics argue, proponents contend, opponents may argue, many argue, often cite, historians risk.*

Endophoric markers were relatively rare in the dataset, appearing only in a few instances (0.10 per 100 words), where the essays referred to other parts of the text. For example, (13) "***As noted above***, the evidence strongly supports this claim" employs as noted above to direct the reader backward in the text. In (14) "***The following section*** will further illustrate this point," the phrase the following section signals a forward reference, preparing the reader for upcoming discussion. Similarly, (15) "See the argument ***mentioned earlier*** in this essay" uses mentioned earlier to maintain internal cohesion. The overall low frequency of such devices indicates that students relied more on linear progression rather than explicit cross-referencing, a finding consistent with Hyland and Tse's (2004) observation that endophoric markers are more typical of advanced academic texts than of short student essays. Some of the endophoric markers detected in the dataset are as follows: *as mentioned above, as noted earlier, as outlined next, as will be demonstrated.*

Among the interactional metadiscourse categories, hedges were by far the most frequent (1.61 per 100 words), underlining a strong tendency toward caution. This indicates that claims are typically framed as tentative rather than categorical, leaving space for alternative viewpoints and reader interpretation. Such cautious positioning is characteristic of argumentative writing in soft disciplines, where persuasion often relies on moderation rather than assertive certainty. At the same time, the heavy reliance on hedging suggests that epistemic caution sometimes compensates for limited evidential support in the essays. The essays frequently included modal verbs and tentative expressions to soften their claims. For instance, (16) *"Mandatory voting **may** enhance democratic participation but could also reduce individual freedom."* The hedge "may" acknowledges possibility. (17) *"Feminism **might** still be relevant*

in today's society despite significant progress." The hedge "might" limits the force of the claim. (18) *"Globalization **could** create new opportunities, but it also threatens local cultures."* The hedge "could" positions the statement as probable but not absolute. These examples align with Hyland's (1996) observation that hedging creates a space of negotiation, reflecting an awareness of alternative viewpoints. A variety of hedging devices were frequently used in the dataset, including: *may, might, can, could, often, sometimes, generally, typically, usually, frequently, largely, potentially, arguably, perhaps, tends to, appears to, seems to, is likely to, it is possible that, may not necessarily, in many cases, could arguably, often argued that.*

Attitude markers were also used frequently (0.68 per 100 words), showing that evaluation is an integral part of how the AI-generated essays frame their arguments. For example, (19) *"It is **important** to recognize the role of education in fostering equality."* The marker "important" conveys evaluative emphasis. (20) *"The relevance of beauty pageants is **questionable** in modern societies."* The marker "questionable" signals critical stance. (21) *"Mandatory voting remains a **vital** tool for increasing political participation."* The marker "vital" emphasizes necessity. These choices give the essays a more evaluative and engaged tone, indicating that the AI-generated texts move beyond a purely detached or impersonal style, which echoes Hyland's (2005) observation that attitude markers function to position claims interpersonally. Hyland's (2005) claim that attitude markers shape interpersonal positioning. The analysis revealed frequent use of various attitude markers, including the following: *important, significant, essential, crucial, vital, meaningful, responsible, effective, preferable, desirable, unfortunate, alarming, problematic, promising, remarkable, inevitable, questionable, troubling, inclusive, beneficial, harmful, valuable, worthwhile, pressing, healthier.*

Self-mentions were moderately present (0.61 per 100 words), revealing some authorial visibility. Illustrations include: (22) *"**I argue** that compulsory voting strengthens democracy."* The phrase "I argue" highlights personal stance. (23) *"**We suggest** that parental control should be balanced with children's autonomy."* The phrase "we suggest" signals collective authorial presence. (24) *"**In this essay, we contend** that globalization requires nuanced evaluation."* This explicit self-mention frames the argument as a discursive claim rather than a purely impersonal statement. Their frequency suggests that the essays move between impersonal formulation and explicit authorial presence, producing a rhetorical stance in which self-mention is used selectively rather than extensively, a pattern widely observed in academic discourse (Hyland & Jiang, 2017). The corpus featured several self-mentions occurring regularly, such as: *I, we, my, our, us.*

Boosters, while less frequent (0.59 per 100 words), were nonetheless present, used to reinforce conviction. Illustrations include: (25) *"Research **clearly** demonstrates that education reduces inequality."* The booster "clearly" heightens certainty. (26) *"Movements such as #MeToo have **undoubtedly** demonstrated the persistence of gender inequality."* The booster "undoubtedly" asserts a strong claim. (27) *"Universal basic income is*

certainly *one of the most debated economic policies of our time."* The booster "certainly" projects firm stance. However, the lower frequency of these markers in comparison with hedges points to an orientation toward caution rather than strong assertion, reflecting rhetorical practices typically observed in the soft disciplines (Hyland & Tse, 2004). A diverse set of boosters was observed in the corpus, as in the following: *clearly, in fact, indeed, undoubtedly, of course, always, definitely, certainly, must (emphatic use), will (predictive/strong certainty), it is essential, it is crucial, it is obvious that, there is no doubt that, surely, truly, without doubt, research has shown, overwhelmingly.*

Engagement markers occurred at moderate levels (0.57 per 100 words), inviting the reader into the discussion. For example, (28), "***As we can see****, patients respond positively to therapy*." The phrase, "as we can see", works to create a sense of shared observation. In (29), "*Policymakers* ***must*** *recognize the implications of globalization,*" the modal "must" is a direct call to the reader's sense of duty. Example (30), "***Let us consider*** *the potential drawbacks of universal basic income*," uses "let us consider" to bring readers into the reasoning process. Such uses illustrate Hyland's (2001) observation that engagement markers foster a dialogic relationship by shaping how readers respond to the text. The analysis further identified the following engagement markers as commonly used: *you, we, our, us, should, must, let us consider, note that, as we will see, remember that, it is worth noting, one might argue, governments should, citizens must, we need to, we contend, we propose, let's, consider, it is essential to recognize, need to, opponents may argue*.

Overall, the findings suggest that argumentative essays rest on two key features: cohesion and caution. Cohesion comes mainly from transition markers, while caution is expressed through hedging. The two-work hand in hand to create a persuasive style of writing, one that opens space for negotiation rather than pressing claims with absolute certainty. There is also a weakness worth noting. Evidentials are seldom used, and endophoric connections are almost absent. They reduce the essays' connection to broader scholarship and weaken their authority. The writing therefore risks sounding like academic prose in form but not in substance, a pattern reminiscent of disciplines that lean more on stance than on evidence. As Hyland (2005) and Abdi (2002) remind us, this reflects the traditions of fields in which knowledge is treated not as fixed truth but as something open to debate, contestation, and reinterpretation.

When compared with earlier research on AI-generated texts, the present findings reveal both points of overlap and areas of difference. One striking similarity is the dominance of hedges, a pattern also noted in previous studies (Liu & Deng, 2023; Yuan, 2024). This pattern is also genre-sensitive: in academic book reviews, ChatGPT has been shown to overuse interactional resources overall, especially attitude markers, while underusing hedges and self-mentions compared with human reviewers (Yao & Liu, 2025).The frequent use of expressions such as *may, might, could,* and *seems* suggests that ChatGPT prefers to frame its claims cautiously rather than with certainty. In

the same way, the relative absence of evidentials confirms what others have observed; rather than anchoring arguments in external sources, the texts often rely on general reasoning. Accordingly, these tendencies place AI writing closer to the rhetorical style of soft disciplines, where persuasion rests on positioning and interpretation rather than on evidential authority (Hyland, 2005).

At the same time, the analysis also uncovers some differences. While several scholars have argued that ChatGPT frequently produces categorical or overconfident statements (Gao, 2023), the essays in this corpus suggest otherwise. In this context, hedging is far more common than boosting, creating an overall tone of caution rather than certainty. Similarly, although AI writing is sometimes portrayed as impersonal or detached (Li, 2025), the presence of engagement markers such as *we, you,* and *let us consider* indicates that the model does make an effort to involve the reader.

Overall, the results suggest that AI-generated essays cannot be neatly described in one way. They support earlier claims about heavy reliance on hedging, limited use of evidentials, and the preference for interactional markers, but they also complicate this view. The essays show a mixture of caution and reader involvement, shaped not only by the model's probabilistic nature but also by the conventions of argumentative writing. According to Hyland (2005), strong academic argumentation requires writers to combine interactive and interactional resources to both guide readers and establish authority. However, many studies show that L2 students struggle with this balance. According to Abdi (2002), Iranian EFL learners tended to rely heavily on interactional resources, especially attitude markers, while making limited use of evidentials and transitions. Likewise, Hyland and Tse (2004) pointed out that undergraduate essays often showed an "evaluative excess," with stance dominating over textual organization. The findings here suggest that ChatGPT mirrors these same patterns and, in certain instances, pushes them even further.

3.2 Comparison of interactive and interactional categories

This section addresses the second research question and presents the findings concerning the overall use of interactive and interactional metadiscourse markers in ChatGPT-generated argumentative essays. The normalized figures reveal a clear imbalance between the two categories: interactional markers occur at an average rate of approximately 61 per 1,000 words, whereas interactive markers reach only 38 per 1,000 words. A log-likelihood test confirms that this difference is statistically significant (LL = 178.64, $p < .0001$), as reported in Table 3.

Table 3. Log-likelihood results of the distribution of interactive and interactional markers

	Interactive		**Interactional**		**LL Ratio**
	(f)	**(%)**	**(f)**	**(%)**	
Metadiscourse Categories	1969	5.83	1218	3.60	+178.64****

Table 3 demonstrates that ChatGPT-produced argumentative essays show a marked preference for interactional resources associated with stance-taking and reader engagement, rather than for interactive resources that primarily serve organizational functions. This pattern is consistent with earlier findings on student argumentative writing. Hyland and Tse (2004) observed that student writers tend to privilege interactional resources in order to enhance persuasive force, while organizational guidance remains comparatively underdeveloped. Similarly, Hyland (1998) demonstrates that academic argumentative writing extensively uses boosters as stance-related resources to negotiate certainty and strengthen claims, particularly in contexts where persuasion is foregrounded. In this respect, the AI-generated corpus closely mirrors patterns documented in human student writing. However, the imbalance observed here appears more pronounced than that typically reported for expert academic prose. Dahl (2004) noted that in professional writing, interactional and interactive resources are more evenly distributed, with only a slight predominance of interactional markers. Overall, these findings suggest that ChatGPT-generated essays resemble student writing more closely than expert prose, foregrounding a persuasive stance while placing less emphasis on explicit structural scaffolding.

3.3 Topic-based variation in metadiscourse use

Figure 2 illustrates the topic-based distribution of interactive and interactional markers in ChatGPT-generated argumentative essays.

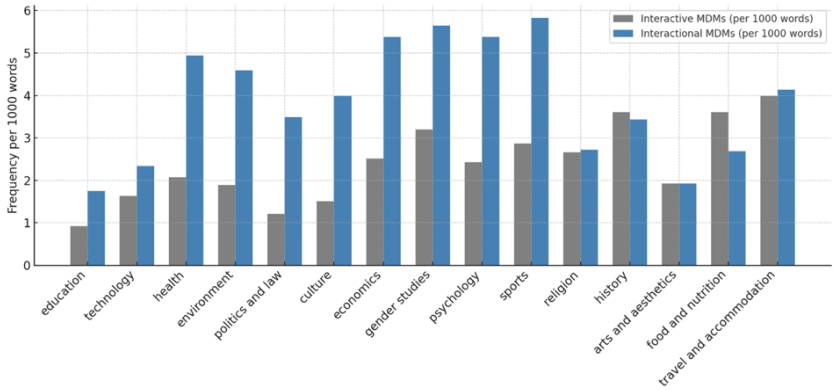

Figure 2. Topic-based distribution of interactive and interactional categories in the corpus of ChatGPT argumentative essays

The largest group of topics is characterized by a clear predominance of interactional resources, indicating a strong emphasis on stance-taking, evaluation, and reader engagement. This group includes education, technology, health, environment, politics and law, culture, economics, gender studies, psychology, and sports. Across these domains, the essays display a marked preference for interpersonal positioning over explicit textual guidance. Rather than foregrounding structural signposting, they rely more on evaluative

expressions, cautious claim formulation, and the consideration of alternative viewpoints. Consequently, the emphasis shifts from formal organizational cues to the way arguments are framed for the reader and how degrees of commitment, distance, or caution are conveyed within the discourse. This tendency is consistent with long-standing findings in metadiscourse research, which indicate that topics involving evaluation, judgement, or ideological positioning typically prompt greater use of interactional resources, as persuasion in such contexts entails heightened interpersonal risk (Hyland, 2005). More recent empirical research on argumentative writing further supports this view, showing that topic exerts a decisive influence on interactional choices, with evaluative prompts eliciting denser use of stance and engagement features irrespective of writers' proficiency level (Yoon, 2021).

Within this group, topics such as politics and law, economics, gender studies, psychology, and sports stand out as areas where disagreement and value-based reasoning are hard to avoid. Arguments in these domains rarely unfold in neutral terms; instead, they tend to draw on competing perspectives, moral judgements, and forms of social positioning. This, in turn, creates a stronger need to signal stance and to engage the reader more directly. Health and environment show a comparable tendency, not because they are inherently argumentative, but because they are widely perceived as matters of public concern, where information is often accompanied by evaluation, caution, and a sense of responsibility. Technology and education, by contrast, follow a slightly different path. Although interactional resources remain prominent, engagement here is generally more measured, suggesting that these topics are approached as familiar or semi-technical rather than openly confrontational. Similar patterns have been reported in recent corpus-based studies comparing AI-generated and human-written argumentative essays, which note a pronounced reliance on evaluative language when responding to socially sensitive prompts, alongside more limited forms of dialogic engagement (Jiang & Hyland, 2025; Alghazo et al., 2024).

Similar patterns have been noted in recent work on AI-generated academic and argumentative writing. Studies focusing on ChatGPT and comparable large language models suggest that, when dealing with controversial, opinion-oriented, or socially sensitive prompts, these texts tend to rely more heavily on stance-taking, evaluation, and reader engagement than on neutral or purely descriptive exposition (Cao et al., 2025; Gao et al., 2025). It could be suggested that this preference reflects an attempt to respond to task demands and prevailing discourse expectations in academic contexts. This shows that the dominance of interactional resources in such domains is unlikely to be incidental, but instead points to a systematic sensitivity to topic and rhetorical context in AI-produced discourse. Evidence from genre-focused analyses further indicates that stance serves not only an evaluative function but also contributes to rhetorical visibility and persuasive force, particularly in high-stakes academic genres where positioning and credibility are closely intertwined (Zou & Fan, 2025).

By contrast, food and nutrition and history stand out as the domains in which interactive resources exceed interactional ones. In this regard, the emphasis shifts toward textual organization, coherence, and reader guidance, with essays favouring explanation, sequencing, and informational clarity over overt stance-taking. Rather than persuading readers through evaluation, the texts tend to present information in a structured and accessible way, a pattern that aligns well with the instructional or advisory character of food- and history-related discourses. Previous research has shown that explanatory and informational writing typically privileges interactive metadiscourse resources, since its primary aim is to guide readers through content and maintain coherence rather than to foreground interpersonal positioning (Ädel, 2006). Comparable distributions have been reported in genre-based studies of academic writing more generally, where informational and procedural topics consistently place greater weight on organizational guidance than on stance (Biber et al., 2011). The present findings suggest that AI-generated essays reproduce this familiar functional distinction, adjusting their rhetorical organization in line with genre expectations rather than applying a uniform strategy across topics.

A third pattern emerges in religion, arts and aesthetics, and travel and accommodation, where interactive and interactional resources appear at broadly comparable levels. This relative balance points to a rhetorical orientation in which engagement with the reader is tempered by careful textual organization. In the case of religion, the near parity is associated with a largely expository mode, in which interpersonal positioning remains restrained, arguably as a way of avoiding overt ideological confrontation. Arts and aesthetics tend to adopt an interpretive stance in which evaluation is present but not strongly foregrounded, allowing space for commentary without sustained stance marking. Travel and accommodation occupy a different position again, combining organizational guidance with a moderate level of engagement that reflects the experiential and descriptive nature of the topic, where texts both guide readers and sustain an involved tone. Comparable balanced distributions have also been noted in studies comparing human- and AI-generated texts, particularly in genres which prioritize description and interpretation over overt argumentation (Alghazo et al., 2024).

Overall, Figure 2 highlights that AI-generated essays do not follow a single, uniform metadiscursive pattern across topics. Instead, they exhibit systematic variation in the use of interactional and interactive resources across domains and communicative purposes. It could be argued that this variability mirrors patterns long observed in corpus-based studies of student and academic writing, where stance and organizational choices shift in relation to register, discipline, and rhetorical goals (Biber et al., 2011). This shows that AI-generated texts cannot be reduced to mechanically reproduced templates; rather, they reflect topic-sensitive rhetorical behaviour that aligns with emerging accounts of AI discourse as contextually situated and responsive to discourse expectations (Jiang & Hyland, 2025a; Majdik & Graham, 2024).

4. Conclusion

This study set out to examine how ChatGPT employs interactive and interactional metadiscourse markers in argumentative essays across a range of topics, drawing on Hyland's (2005) Interpersonal Model of Metadiscourse. By combining quantitative and qualitative analyses, it explores the distribution of metadiscourse categories and their use across topics. Thereby, the study offers a clearer picture of the extent to which AI-generated essays reflect the rhetorical practices of academic argumentation.

The analysis shows that ChatGPT-generated argumentative essays draw on both interactive and interactional metadiscourse markers, shaping arguments through textual organization and the positioning of claims for readers. Hedging is particularly noticeable among interactional resources, pointing to a tendency to frame arguments cautiously and leave room for alternative positions rather than making categorical claims. On the interactive side, transitions are especially prominent, highlighting their role in maintaining cohesion and guiding readers through the line of argument. This pattern suggests that persuasion in these essays is achieved largely through careful positioning and textual flow.

The comparison across the corpus pointed to a notable imbalance: interactional markers appeared almost twice as often as interactive ones. Higher use of interactional markers than interactive ones shows that the essays are primarily oriented toward stance construction and interpersonal negotiation rather than toward explicit textual organization. This pattern reflects the rhetorical priorities of argumentative writing, where persuasion depends on evaluating positions, qualifying claims, and anticipating alternative viewpoints. From this perspective, interactional resources play a central role in shaping how arguments are presented to the reader. By contrast, interactive resources, which are more closely associated with structural guidance and source-based organization, appear less salient in a genre that privileges positioning and evaluation over exposition. The observed imbalance therefore points to a genre-driven rhetorical orientation in AI-generated argumentative essays, rather than to limitations related to writing competence or academic expertise.

Importantly, the topic-based analysis indicates that the relative prominence of these resources varies systematically across topics. Evaluative and socially sensitive domains such as sports, gender studies, psychology, economics, and politics and law showed a strong preference for interactional resources, reflecting the need to manage disagreement, moral judgement, and interpersonal risk. By contrast, food and nutrition and history emerged as the only domains in which interactive resources clearly predominated, indicating an orientation toward explanation, sequencing, and clarity of information. Other topics, including, arts and aesthetics, travel and accommodation, and religion displayed a more balanced distribution, combining measured engagement with careful textual organization. These patterns report that AI-generated

argumentation is responsive to topic-specific rhetorical demands rather than being mechanically uniform.

Overall, the findings suggest that ChatGPT produces argumentative essays that look convincingly academic on the surface and adopt many of the rhetorical features associated with human writing. At the same time, this resemblance appears somewhat intensified, as the texts rely heavily on stance and evaluation. Although the model shows clear awareness of genre conventions and topic expectations, it consistently gives priority to interpersonal positioning. As a result, AI-generated essays often come across as persuasive and dialogic; however, they tend to fall short in structural balance and evidentiary grounding.

From a pedagogical perspective, these findings point to both promise and caution. AI-generated essays can be useful teaching resources for demonstrating how stance, hedging, and reader engagement function in academic argumentation, helping students notice the interpersonal work that writing performs. However, they should not be treated as fully developed models of academic prose. Used uncritically, such texts may encourage an overemphasis on evaluative language at the expense of evidence, structure, and disciplinary grounding. Pedagogical engagement with AI writing therefore needs to be deliberate and reflective, foregrounding balance and critical awareness rather than simple imitation.

At a theoretical level, the study contributes to ongoing debates on metadiscourse, genre, and AI-mediated writing by showing that AI-generated argumentation closely resembles patterns commonly associated with novice writing and soft-disciplinary discourse. By bringing both the strengths and the limitations of AI writing into focus, the study reinforces the importance of genre- and topic-sensitive approaches to academic discourse and highlights the need for continued research into how emerging AI technologies are shaping, and potentially reshaping, academic communication.

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Appendix

Education

1. Should college education be free for everyone?
2. Are standardized tests an accurate measure of student intelligence?
3. Should schools replace textbooks with digital devices?
4. Is homework beneficial to students' learning experience?
5. Should students be allowed to grade their teachers?

Technology

1. Does technology isolate people or bring them closer together?
2. Should artificial intelligence be regulated by governments?
3. Is privacy more important than national security in the age of digital surveillance?
4. Should there be age restrictions on smartphone use for children?
5. Are video games to blame for violent behavior in children?

Health

1. Should vaccinations be mandatory for all citizens?
2. Is universal healthcare a right or a privilege?
3. Should the use of performance-enhancing drugs in sports be allowed?
4. Is the legalization of marijuana beneficial to society?
5. Should fast food companies be held accountable for the obesity epidemic?

Environment

1. Should developed countries be required to do more to combat climate change?
2. Is nuclear energy a safe alternative to fossil fuels?
3. Should animal testing be banned for scientific research?
4. Can renewable energy fully replace fossil fuels?
5. Is overpopulation the greatest threat to the environment?

Politics and Law

1. Should voting be mandatory in democratic countries?
2. Is censorship ever justified in a free society?

3. Should countries have open borders for immigrants?
4. Should lobbying be banned in politics?
5. Is socialism a better system than capitalism?

Culture

1. Is modern pop culture contributing to the decline of morality?
2. Should cultural appropriation be considered a crime?
3. Is it necessary to preserve indigenous languages?
4. Are beauty pageants outdated in modern society?
5. Should parents control what their children watch and read?

Economics

1. Should universal basic income be implemented to address poverty?
2. Is income inequality a serious problem that needs immediate attention?
3. Should the minimum wage be raised to a living wage?
4. Is globalization beneficial or detrimental to local economies?
5. Should governments provide financial assistance to struggling industries?

Gender Studies

1. Is feminism still relevant in today's society?
2. Should gender-neutral bathrooms be mandated in public spaces?
3. Are traditional gender roles harmful to society?
4. Is the representation of women in media improving?
5. Should men face consequences for sexist behavior?

Psychology

1. Is mental illness adequately addressed in today's society?
2. Should therapy be a mandatory part of education for young people?
3. Is social media addiction a real psychological condition?
4. Should parents be held accountable for their children's mental health?
5. Is it ethical to use psychological tactics in marketing?

Sports

1. Should college athletes be paid for their performance?
2. Is the role of sports in society primarily positive?
3. Should performance-enhancing drugs be allowed in professional sports?
4. Are sports fandoms detrimental to mental health?
5. Should violent sports, such as boxing, be banned?

Religion

1. Should religion play a role in government policy?
2. Is religious tolerance essential for global peace?

3. Are atheists discriminated against in modern society?
4. Should religious organizations be taxed?
5. Is faith-based education beneficial or harmful?

History

1. Should controversial historical monuments be removed?
2. Is history best understood through the lens of the victors?
3. Did colonialism have a net positive effect on the world?
4. Should reparations be paid for historical injustices?
5. Is the teaching of history in schools biased?

Art and Aesthetics

1. Is art essential for a well-rounded education?
2. Should public funding be used to support the arts?
3. Is modern art a legitimate form of artistic expression?
4. Should controversial art be censored?
5. Is street art a valid form of artistic expression or vandalism?

Food and Nutrition

1. Should governments regulate fast food companies?
2. Is a vegan diet healthier than a meat-based diet?
3. Should schools provide free meals to all students?
4. Is organic food worth the extra cost?
5. Should the consumption of sugary drinks be taxed?

Travel and Tourism

1. Is tourism harmful to local cultures?
2. Should countries limit the number of tourists they receive?
3. Is eco-tourism a sustainable alternative to traditional tourism?
4. Should travel agencies be required to disclose the carbon footprint of trips?
5. Is it ethical to visit destinations affected by disasters?