

# A Model for Teaching Paragraph Endings to L2 Students

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## ABSTRACT

Paragraph structure has been identified as consisting of three distinct parts, which are the topic sentence, supporting sentences, and a paragraph ending sentence. Although topic sentences have been widely researched, similar consideration for paragraph endings has been less forthcoming. This discrepancy may be problematic as research suggests that instruction on textual endings can positively impact students' writing. With this issue in mind, the current study establishes a model for paragraph endings and discusses pedagogical and computational implications. The model stems from the categorization of the varieties of paragraph endings observed in a corpus of papers written by advanced ESL college-students in the Arabian Peninsula. We identified the varieties of paragraph endings to form a multi-dimensional model featuring the categories of 'goal,' 'type,' and 'cue.' 'Goal' refers to the function of the sentence (e.g., summarizing). 'Type' refers to whether the sentence is a claim or a support statement. 'Cue' refers to explicit language indicating the goal. The model was assessed quantitatively through inter-rater-reliability of expert-judge evaluations. Qualitative analysis was also incorporated to assess possible subjective differences. Quantitative analysis provided validation of the model. Specifically, even with the most conservative analysis, the findings show that 67.5% of the total assessments agreed, with 75% agreement for goal and 70% agreement for type. The subsequent qualitative analysis also broadly supported the quantitative findings. The study concludes that the validated model has viable implications for pedagogical practices and software development. Thus, the study provides a pathway that may benefit students in the writing of more effective paragraphs.

**Keywords:** Auto-Peer, Paragraph endings, Paragraph structure, Topic closers, Topic sentences.

## INTRODUCTION

Paragraph structure has long been argued to consist of three distinct components (McCarthy et al. 2008; Toulmin 1958). According to McCarthy and Ahmed (2021), these three components can be described as the *topic sentence* (which establishes the topic of the paragraph), *support sentences* (which explain, elaborate, and substantiate the claims of the topic sentence), and a *paragraph ending* (which provide a final remark on the topic). The first of these components, topic sentences have been researched extensively (D'Angelo, 1986; Kongsat, 2020; Liu & Huang, 2021; McCarthy et al., 2008; Popken 1987; Rahayu, 2020), and with good reason. This construct is generally considered an important part of writing, and so it comes as little surprise that it remains a ubiquitous teaching feature of the most recent composition textbooks (Ferris, 2014; Graham, 2018, Johnson-Sheehan & Paine, 2013; Kanar, 2011; Langan, 2011; Lunsford, 2009; McCarthy & Ahmed, 2021; Tütüniş, Ünal & Babanoğlu, 2022). Perhaps curiously then paragraph final sentences have received comparatively little attention. Indeed, most research that mentions paragraph final sentences does so only in relation to overall paragraph structure (Budiharso, 2017; Rass, 2015; Rustipa, 2016; Shahhoseiny, 2015; Wali & Madani, 2020; Yamin, 2019; Kahveci and Şentürk, 2021). That is, little research has focused specifically on the discrete features of this critical paragraph component. This relative lack of focused attention given to paragraph endings would seem to be ill-advised because, presumably, how the paragraph ends is of similar value to how the paragraph begins.

## The Importance of Endings

Research on learning principles from cognitive psychology suggests that a well-written paragraph ending may be important to comprehension. Specifically, cognitive psychologists argue that effective endings (in general) help readers to process the information and integrate that information into the readers' developing mental models (Garnham, 1981; Glenberg, Bradey, Kraus, & Renzaglia, 1983). This importance of endings dates to Deese and Kauffman (1957), who showed that information presented at the end of a textual segment is the most likely to be recalled. This disproportionate impact of endings is attributed to the recency effect, a cognitive bias that has been researched extensively in the field of cognitive psychology (Baddeley & Hitch, 1993; Carlson & Russo, 2001; Duncan & Murdock, 2000; Glenberg et al., 1983; Watkins & Peynircioglu, 1983).

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In addition to the evidence provided by the recency effect, Haberlandt and Graesser (1985) found that sentence-final words take longer to read than sentence-medial words, suggesting that endings are more deeply processed. If we assume that a similar process for sentences occurs for paragraphs, we can suggest that paragraph endings are critical to information retention. As such, there is evidence to hypothesize that paragraph endings serve a vital role in conveying the objectives of a written text.

### Paragraph Endings in Textbooks

Although paragraph ending sentences have received little discussion in journal articles, they have been more often mentioned in composition textbooks. For example, Strauch (2005) describes five strategies that students can adopt to end their paragraphs, namely: to reiterate the topic sentence, to summarize the most important information provided in the paragraph, to refer to a future reference, to refer to a related point, and as a combination of the above-mentioned strategies. In addition, Glynn et al. (2019) argue that the final sentence of a paragraph “helps wrap up ideas and/or transition into the paragraph that follows” (p. 44). Other textbooks that investigate paragraph endings include Boardman and Frydenberg (2008), McCarthy and Ahmed (2021) and Weaver et al. (2016).

Although there are several examples of books that attribute importance to paragraph endings, there are many that ignore this feature. For instance, Bazerman (2015), Inoshita et al. (2019) and King (1991) make no reference to paragraph endings in their composition guides. By contrast, all three of these guides do mention topic sentences. Therefore, it would be reasonable to claim that paragraph endings are not as widely acknowledged or taught as topic sentences.

### Paragraph Endings in Websites

In addition to the information provided by research papers and textbooks, university websites have been rather forthcoming on this topic (“Concluding Remarks,” n.d.; “Concluding Sentence,” n.d.) and therefore merit our attention. Beginning with “Concluding Remarks” (n.d.), the website explains that the function of paragraph endings is to *wrap things up*. This wrapping up can take the form of making a recommendation, posing a question, or predicting an outcome. Meanwhile, “Concluding Sentence” (n.d.) notes that paragraph endings allow the writer to succinctly highlight the most important points raised in the paragraph. The site also claims that paragraph endings (much like a conclusion section) must not contain any new information. Taken as a whole, university websites certainly offer useful information, although their guidance tends to lack the specifics that may guide student-writers to ending their paragraphs most effectively.

### Similar Rhetorical Features

To further understand the role of paragraph endings, we also explored research regarding the related features of ‘topic sentences,’ ‘conclusion sections,’ and ‘warrants.’ Although these features are ultimately different from paragraph endings, they all share functional similarities. For example, the importance of both topic sentences and paragraph endings are directly related to their serial positions. Meanwhile, conclusion sections are obviously longer than paragraph endings, but both features can function as final comments. Finally, warrants occur towards the end of the paragraph and serve as a connection between claims and evidence. Exploring the literature on these three features in academic writing provides insight as to the role of paragraph endings, and so we examine each of them in more detail below.

Beginning with ‘topic sentences,’ this paragraph-initial feature provides a rhetorical claim that is subsequently supported by evidence sentences (McCarthy, Renner, Duncan, Duran, Lightman, & McNamara, 2008). Critical to our study, the importance of topic sentences to text retention and comprehension has been researched extensively, particularly with regard to non-expert readers (Aulls, 1975; Goldman, Graesser, & van der Broek, 1999; Kieras, 1978; McNamara, Kintsch, Songer, & Kintsch, 1996). Topic sentences can be compared with paragraph endings because both make use of the serial position effects of ‘primacy’ and ‘recency’ respectively (Digirolamo & Hintzman, 1997; Korsnes, 1995; Tzeng, 1973). The primacy effect refers to the phenomenon by which information presented at the beginning is more likely to be retained (Bruce & Papay, 1970). The primacy effect can be contrasted with the recency effect, which attributes disproportionate impact to the information presented at the end (Baddeley & Hitch, 1993; Crano, 1977; Watkins & Peynircioglu, 1983). Thus, both topic sentences and paragraph endings help readers process the contents of the paragraph and, subsequently, facilitate readers’ recollection of the information (Aulls, 1975; Kieras, 1978; McCarthy et al., 2008; Mirici, 2019). For instance, Gruber (1987) notes that primacy and recency effects are not only important for recall, but they are also applicable to learning and retention of information. Moreover, both effects may be particularly beneficial when the goal is to persuade (Crano, 1977). As such, taking the time to craft a well-written paragraph ending would seem to be as advantageous as taking the time to write an effective paragraph opening.

The second discourse feature that can be compared to paragraph endings is ‘conclusion sections.’ Conclusions are the final part of the paper, providing emphasis to the author’s argument and allowing the reader to see the argument (Harvey, 2013). Both conclusion sections and paragraph endings have

the similar functions of serving to complete their respective texts and shape the reader's interpretation.

There is certainly evidence to support the overlap between conclusion sections and paragraph endings. For example, Patel (2017) suggests good endings make the text stronger and leave a better impression. In addition, Harvey (2013) posits that good endings make the text feel like a coherent unit, rather than a collection of information, and provide the reader with "a sense of closure combined with a suggestion of new spaces to explore" (p. 83). Endings may also allow writers to emphasize the perspectives that they agree with, thereby guiding the audience to reach the desired conclusion (Brooke, 2015). Endings are indeed a position of strategic importance because it is the part that is most likely to be remembered, being the most recently encoded piece of information (Glenberg et al., 1983). Whether it is the end of the paper, the end of a section, the end of a paragraph, or even the end of a sentence, the most powerful papers recognize the usefulness of strong endings.

Although conclusion sections and paragraph endings can serve similar purposes, there are clearly some differences to be acknowledged. For example, unlike a paragraph ending, a conclusion section is the author's final opportunity to argue their perspective. More notably, conclusion sections feature multiple purposes including summarizing major points, offering recommendations, acknowledging limitations, and perhaps suggesting future directions. But although paragraph endings are not the same as conclusion sections, many of the benefits of well-written conclusion sections apply to paragraph endings on a smaller scale. In this way, paragraph endings may need to be treated as an independent feature of writing in a similar way to concluding sections.

The third comparative feature is 'warrants.' Warrants are links between a paragraph's claims and its supporting evidence (Kneupper, 1978; Toulmin, 1958). However, if the logical bridge is obvious, then an explicitly worded warrant may not be present in the paragraph. Similarly, as noted by Rustipa (2016), paragraph endings may not always be necessary in every paragraph. For example, explicit endings are not always required at the end of the first of a pair of linked paragraphs. However, in many cases, the presence of a paragraph ending makes the desirable conclusion clearer and, therefore, beneficial to the reader.

Topic sentences, conclusion sections, and warrants represent features of writing that are similar to paragraph endings. That is, both paragraph endings and topic sentences rely on the serial position effect. Both paragraph endings and conclusion sections act as the author's final say on the topic or text under consideration. And both paragraph endings and warrants provide a link between evidence presented and the claim or conclusion to be drawn from the evidence. Thus, these three features provide us with indirect but important

knowledge as to the functions and characteristics of paragraph endings.

### The Purpose of the Current Study

It seems that most discourse scientists would agree that paragraph endings are an important and distinct feature of effective paragraphs. Additionally, research supports the claim that instruction in topics related to paragraph structure including paragraph endings has a positive effect on student writing (Chason, Loyet, Sorenson, & Stroops, 2017). Thus, it is important to develop a specific model that can be replicated and recognized.

Although there is now a growing body of research relating to paragraph endings, few studies have documented attempts to teach students a specific model that they are able to recognize and emulate. Although Strauch (2005) does provide a wider variety of strategies to end paragraphs, these suggestions are not based in empirical research and have not been validated. As such, the current paper categorizes the varieties of paragraph endings seen in a corpus of essays written in the Asian context and presents an analysis of how teachers may be able to understand and subsequently teach this critical feature of writing. This research also validates the developed model. Specifically, our study fills a gap in the research by addressing the following questions: (i) What are the discrete categories that paragraph endings can be divided into? and, (ii) to what extent can teachers be trained to recognize these categories?

## METHOD

### L2 Considerations

When embarking on a study of paragraph endings, and as with the study of any feature of writing, it is important to recognize that both L1 and L2 student writers face very important but contrasting challenges. As such, a consideration of the assumptions of written norms is important because any deviation by L2 writers from the standards set by anglophone instructors may lead to some papers being received poorly. For example, Silva (1993) claims that non-native speakers of English use simpler language in writing. Kharma (1981) reports that Arab EFL writers tend to underuse indefinite articles, and overuse definite articles. Khansir (2008) observes that Indian writers have trouble with the use of auxiliary verbs, passivation, and use of appropriate tenses; and Min and McCarthy (2013) observed that Japanese writers featured more "verb phrases ...higher frequency words, and ... higher syntactical similarity between sentences" (p. 247). Indeed, research has noted that student-writers who are non-native speakers of English have trouble incorporating paragraph endings in their paragraphs (Rass, 2015; Rustipa, 2016; Shahhoseiny, 2015; Yamin, 2019). The differences that arise between the writing and thought

patterns of L1 and L2 speakers of English is further studied by scholars of Intercultural Rhetoric (Connor & Traversa, 2014).

Differences like those outlined above have the potential to make L2 papers less effective, at least from the perspective of a native English speaker. These differences between native and non-native speakers necessitate different kinds of instruction and feedback for the two groups, as was made clear by Braine (1996) who observed that non-native speakers in special ESL writing classes perform better than those in mainstream writing classes. Thus, in order to have their work accepted, non-native speakers may have to alter their writing styles to resemble that of native English speakers (Hinkel, 2002), a task that makes writing more difficult for second language speakers (Reid, 1992). For all these reasons, collecting data from a corpus of papers written by students with a variety of native languages helps cater to a wider international audience.

### The Corpus

With the above considerations in mind, the researchers collected an initial corpus of 54 final drafts written by students in an Advanced Academic Writing course at a university in the Arabian Peninsula. The papers in this corpus were written on numerous topics, including artificial intelligence, education, and a wide variety of social and political issues. As most students in the course had previously received varying levels of instruction on academic writing in prerequisite writing courses, they can be considered to be upper-intermediate to advanced level writers. In addition, it should be noted that the papers in this corpus follow the ‘process writing’ approach, and are therefore the result of multiple rounds of revision based on instructor feedback.

The student-writers for our corpus comprise native speakers of a wide range of languages. This variation is the result of the cultural and linguistic diversity of the university, being home to students from various Arab, South Asian, and African countries (American University of Sharjah, n.d.). American citizens make up 3% of the total student population while students from other anglophone countries are a small enough minority that they fall into the “other” category, which amounts to 19% of the total. As such, it is a reasonable assumption that the vast majority of students are speakers of English as a Second/ Other Language. However, all of these students are also fluent in English, given that prospective students require an IELTS score of 6.5 or above in order to gain admission to this university. The diverse group of students from whom our corpus was sourced allows us to account for linguistic variations between native speakers of different languages.

From the initial corpus, one of the authors of the current study created a sub-corpus that contained only the final sentences of body paragraphs. The decision to exclude other sections (i.e., introduction and conclusion) was made in order

to ensure that the corpus met with the goals of the study. That is, the function, structure, and purpose of introduction and conclusion sections do not necessarily require the claims and evidence that make topic sentences and paragraph endings necessary. As such, the focus was on the paragraphs that more commonly appear in the largest section of a paper: the body.

When considering a study of paragraph endings, a major consideration is where the paragraph ending begins. After all, it is possible for the ending to constitute more than one sentence. Braddock (1974) faced similar concerns when categorizing topic sentences; however, Braddock’s model eventually acknowledged that the prototypical topic sentence occurs as a single sentence in the paragraph initial position. This prototypicality for topic sentences was also observed in McCarthy et al. (2008). Therefore, in this study, we consider a paragraph’s final sentence to be the ‘paragraph ending sentence.’ Such a decision is a reasonable point of departure; however, we acknowledge that some paragraph endings may be more complex (e.g., formed over two or more sentences) than those we examine here.

### The Paragraph Endings Model

Having determined that paragraph final sentences would be appropriate, a random sample of 300 such sentences were extracted from the corpus. Such a sample size for our final corpus follows the recommendation of McNamara, Graesser, McCarthy, & Cai, (2012). The same author that formed the initial sub-corpus then used these 300 sentences to form a paragraph ending model. As a basis for creating the model, the topic sentence model of Braddock (1974) was followed. Braddock observed that there were at least four categories of topic sentences, each having a slightly different appearance, and each performing a slightly different function. Braddock’s approach was then combined with advice presented in “Concluding Remarks” (n.d.), which provides initial terminology for paragraph endings (i.e., recommendation remark, suggestion remark, reflective remark, futuristic remark, quizzical remark, rhetorical question, and explanatory remark). However, although this initial terminology was accompanied by a short definition, neither detailed explanations nor examples were provided. A further problem was that certain terminologies appeared highly similar; for example, recommendation remark and suggestion remark seem to perform the same function.

While guidance from Braddock (1974), “Concluding Remarks” (n.d.) and Strauch (2005) served as a reasonable point of departure, further analysis of the data was required in order to create a comprehensive categorization model. Thus, during the analysis, where and when the terminology from the initial model appeared ill-suited, modifications were made to the naming convention. Ultimately, this procedure resulted in a comprehensive model that features three categorization dimensions for paragraph endings. The three dimensions of



Table 1: Examples of ‘goal,’ ‘type,’ and ‘cue’

Dimension	Categories	Examples
Goal	Summarizing	<i>Fossil fuels, petroleum, and burning of charcoal are some of the energy sources that have directly influenced the pollution of the environment.</i>
	Concluding	<i>Therefore, countries should work towards political stability and create peaceful alliances.</i>
	Predicting	<i>These techniques of nuclear energy <u>will</u> greatly aid in the maximization of crop yields.</i>
	Adding	<i>In addition to the actions done under the Iraq Liberation Act, the US illegally invaded Iraq in 2003 under the claim that it is engaging in a “war on terror.”</i>
Type	Claim	<i>This is the futuristic approach regarding pest control through the use of nuclear energy for the maximization of crop yields.</i>
	Support	<i>A study shows that for old people, who are aged over 65 and have some cardiovascular and respiratory had an increase in their death rate because of the high levels of noise in the place where they were living (Tobías, Recio, Díaz, &amp; Linares, 2015).</i>
Cue	Explicitly worded	Overall, In addition, In the future, Therefore

the final model were labelled as ‘goal,’ ‘type,’ and ‘cue’ (See Table 1 for examples of each). The dimension of ‘goal’ refers to the intended function of the sentence (i.e., ‘summarizing,’ ‘predicting,’ ‘concluding,’ and ‘adding’). ‘Type’ refers to whether the sentence is a ‘claim’ or a ‘support’ statement. Finally, ‘cue’ refers to the presence or absence in the sentence of explicit language that supplements the intended goal or type.

To better understand the sub-category of ‘goal,’ definitions for each were added. Thus, summaries succinctly rephrase the information provided in the paragraph. The most important feature of a summary sentence is that it only restates information; it does not extrapolate from the given information. By contrast, conclusions are sentences that incorporate reference information provided in the paragraph so that a clear inference can be drawn. The most important feature of conclusion sentences is that they do not repeat the information provided in the paragraph. Meanwhile, prediction sentences also make reference to the information provided in the paragraph; however, with this category, the most important feature is that they make a projection about the future based on the information presented in the paragraph. Finally, addition sentences add new information to the paragraph, either in terms of evidence or a new claim. The most important feature of addition sentences is that they provide information that has not been previously presented in the paragraph. Addition sentences are somewhat different from sentences in the other three categories. Specifically, they work on the understanding that the paragraph reaches an implicit conclusion, and the adding of information is all that is required for this conclusion to be sufficiently clear to the reader. Thus, implicit paragraph endings are similar to implicit warrants as observed by Toulmin (1958) and Kneupper (1978).

It is important to note that the above-described four sub-categories of the ‘goal’ dimension were not fully exhaustive of the data. For example, there were also occasional topic closers

that could be best described as ‘rhetorical questions’ and ‘recommendations.’ Ultimately, these categories were excluded because their frequency was exceptionally low: both rhetorical questions and recommendations totaled just 1.3% of the corpus. In addition to these two goal categories, sentences that were a combination of support type with the goal of concluding and predicting were excluded. These examples made up just 0.6% and 1% of the total corpus respectively. Thus, 4.2% of the total corpus was excluded as outliers.

Turning to the second dimension of ‘type,’ the definitions are as follows. A sentence can be either a ‘claim’ or ‘support.’ The former refers to assertions based on some kind of evidence provided in the writer’s sentence. In turn, this evidence is the support. ‘Support’ is information from other sources that has been quoted, paraphrased, or summarized. Support sentences generally tend to occur in conjunction with the goal of addition.

The third dimension of the model asserts that topic closers may or may not have ‘cues.’ Cues are words that clarify or signal the goal or type of the sentence. Sentences with cues are categorized as ‘explicitly worded,’ while those without cues are ‘implicitly worded.’ Examples of explicitly worded cues for conclusion sentences are words like *therefore, thus,* and *since*. In addition to these words, the determiners *this* and *these* may indicate that the writer is drawing on previously given information to draw an inference and thus indicate a conclusion sentence. Prediction sentences can be explicitly cued by words that indicate a reference to the future. Modal verbs such as *will* and sentences with *if... then* are usually indicators of prediction sentences. Phrases like *looking to the future* and *in the future* are also indicators of predictions. Cues for summaries have words that indicate rephrasing (e.g., *in other words*) or words that indicate condensing (e.g., *in short*). Finally, cues for addition include words and phrases like *also, in addition,* and *for example*.

## Assessment of Teachability

The paragraph ending model described above is clearly useful; however, to have confidence in the model, it needs to be verified through independent assessment. That is, if independent assessors reach statistically similar results as the model's creator, then we can have some confidence that the model is extendible to others (i.e., that it is a 'teachable' model).

In order to assess the teachability of the paragraph ending model, we adopted an 'expert judge' approach (Duran, McCarthy, Graesser, & McNamara, 2007; Graesser, Chipman, Haynes, & Olney, 2005). In this approach, three judges are first trained to recognize a model and then individually assessed on their judgements of random examples. If the judges' individual agreement is statistically significant, we can assert that their responses are the result of their training, and therefore, that the model is teachable. Two of the three judges in this study were writing professors. The remaining judge was an English graduate student. The variation in judges is helpful because it provides different perspectives and levels of experience on the issue at hand.

For our training, the three judges were provided with explanations of the model as well as prototypical examples of each dimension. The judges were allowed to ask any questions and seek clarifications. The judges were then provided with further examples, which were used for collective training. Once the training was complete, the judges individually assessed a random sample of 20 sentences. For each of these sentences, judges were asked to rate each sentence along the three identified dimensions (i.e., goal, type, and cue). As previously discussed, the dimension of goal has four possible outcomes (concluding, summarizing, predicting, adding), type has two possible outcomes (claim, support), and cue also has two possible outcomes (explicitly worded, implicitly worded). Therefore, each sentence has eight total outcomes, such that 20 sentences produce 160 total evaluations per expert judge.

For the individual assessment stage, judges were allowed to allocate 10 points to each dimension, because no sentence need be exclusively or wholly one aspect. For example, in terms of goal, a judge might deem a sentence to be a 6 for conclusion, a 3 for summary, a 1 for prediction, and a 0 for addition. Similarly, for cue, a sentence may be deemed an 8 for explicitly worded and a 2 for implicitly worded. Such a rating system has advantages for analysis and for computer modeling (see in discussion).

## RESULTS

The results of the study were analyzed using both quantitative and qualitative approaches. Quantitatively, the agreements between raters were calculated and tested for significance. Qualitatively, the sentences that had most agreement and the sentences that had the most disagreement were analyzed to determine their distinctive linguistic features.

## Quantitative Analysis

To assess the degree of agreement between the raters, a conservative approach was adopted. Specifically, we determined that any rating of 6 or higher (for any category) would be deemed as a positive identification of a characteristic (e.g. prediction). Similarly, any rating of 4 or lower (for any category) would be deemed as a negative identification. Thus, all ratings of 5 (half the available points) would be deemed as neither positive nor negative. Moreover, to be determined as 'in agreement,' all three raters were required to have the same direction in their assessments.

Using this approach, 108 of the 160 (67.5%) ratings were found to be in agreement (see Table 2). A Fisher's Exact analysis suggests that such an agreement is statistically significant ( $p < .001$ ). In other words, the agreement between raters is unlikely to be the result of chance. To further assess the ratings, we centered on the primary dimension of the model: goal. Here, 60 of the 80 ratings were found to be in agreement (75.0%). A Fisher's Exact analysis suggests that such an agreement is again statistically significant ( $p < .001$ ). A similar result was found for the dimension of type: 28 out of 40, 70.0%, ( $p = .001$ ). However, the dimension of cue was not statistically significant 20 out of 40, (50.0%).

Closer analysis of the dimension of cue shows that agreement among judges was far more consistent than the initial result may suggest. To demonstrate, if we alter the agreement approach to a score of 8 or higher for positive agreement and 2 or lower for negative agreement (a far more conservative approach) but accept that only two of the three experts need such an agreement, then the similarity score is in agreement for 19 of the 20 sentences. Such an analysis points towards a specific sentence in the corpus being a potential issue. The sentence in question reads "Through these dimensions, there is great potential in the rapid innovation in the future and promotion of efficiency in comparison to other sources of energy." The phrase "these dimensions" is explicit and, therefore, the explicitness rating for the sentence should not have been below 6 in terms of ratings. In subsequent consultation with the judges, the error was noted, accepted, and corrected.

## Qualitative Analysis

Although the quantitative analysis above demonstrates the teachability of the model, a qualitative analysis is also

**Table 2:** Agreement Between Raters

	<i>Goals</i>	<i>Type</i>	<i>Cue</i>	<i>Total</i>
Hits	60	28	20	108
Misses	20	12	20	52
Agreement	75% ( $p < .001$ )	70% ( $p = .001$ )	50%	67.5% ( $p < .001$ )

**Table 3** : Examples of Judges' Evaluations for Goal, Type, and Cue

	Goal			Type			Cue		
	Jud 1	Jud 2	Jud 3	Jud 1	Jud 2	Jud 3	Jud 1	Jud 2	Jud 3
1	Con: 7 Sum: 3	Con: 7 Add: 3	Con: 8 Sum: 2	Cla:10	Cla: 10	Cla: 10	Im: 10	Ex: 6 Im: 4	Ex: 2 Im: 8
2	Add: 10	Con: 1 Add: 6 Sum: 3	Con: 2 Add: 6 Sum: 2	Sup: 10	Cla: 2 Sup: 8	Sup: 10	Ex: 10	Ex: 7 Im: 3	Ex: 10
3	Add: 10	Con: 4 Add: 6	Con: 4 Add: 2 Sum: 4	Cla: 10	Cla: 10	Cla: 5 Sup: 5	Im: 10	Im: 10	Ex: 5 Im: 5
4	Con: 8 Sum: 2	Con: 8 Add: 2	Con: 2 Add: 5 Sum: 2 Pred: 1	Cla: 10	Cla: 10	Cla: 7 Sup: 3	Im: 10	Ex: 8 Im: 2	Ex: 2 Im: 8

useful to consider. A qualitative analysis allows us to better understand both the evaluation process as well as some of the inconsistencies that were observed. Accordingly, Table 3 provides four of the sentences used in the experiment: the first two sentences share large agreement whereas that final two sentences show some differing interpretations.

For Sentence 1 (refer to Table 3), “It appears that cyberbullies find females an easier target than males,” all three judges agree that the goal is a conclusion (evaluations: 7, 7, 8) and the type is a claim (evaluations: 10, 10, 10). Judges 1 and 3 also agree that the sentence is implicit (evaluations: 10 and 8). However, Judge 2 does not consider the sentence to be implicit (evaluation: 4). Judge 2’s evaluation is possibly because the phrase “it appears” has been considered a cue. A more common cue in formal writing may be the phrase *this suggests*; had this phrase been used, the evaluations may have been more consistent.

For Sentence 2, “As an example, the KAEC project model proves the capability of SMEs to be efficient contributors to economic development,” all three judges agree that the goal is addition (evaluations: 10, 6, 6). They also agree that the type of the sentence is support (evaluations: 10, 8, 10), and that it contains a cue (evaluations: 10, 7, 10), making this sentence explicit. The key cue in this sentence is the phrase “as an example,” which indicates supporting evidence will be provided.

Sentence 3 is an example of lower agreement levels. Judges 1 and 2 agree that the sentence is addition (evaluations: 10 and 6), a claim (evaluations: 10 and 10), and that it is implicit (evaluations: 10 and 10). However, Judge 3 offers no clear evaluation for the goal, type, or cue. The sentence in question reads as follows (with errors in the original): “Ionizing radiation generates too much heat that body cannot tolerate.” Judge 3 may have read the phrase “ionizing radiation” as a gerund phrase and may have felt this was sufficient to deem the sentence partially explicit, and partially a summary or a conclusion. However, the evaluations of Judge 1 and Judge 2 would appear more appropriate.

Sentence 4 also shows some levels of disagreement. Judges 1 and 2 agree that the sentence is a conclusion (evaluations: 8 and 8); however, Judge 3 makes no clear assignment of a goal. All three judges are in agreement that the sentence is a claim (evaluations 10, 10, and 7); however, for cue, Judges 1 and 3 agree that the sentence is implicit (evaluations: 10 and 8), while Judge 2 assigns it as explicit. The sentence in question reads “This knowledge further suggests the growing problem that comes with sports that put more emphasis on how athletes should look like, rather than their physical and mental health.” The reason for Judge 3’s choice of explicit may be the word “further.” This term may have been understood as a cue that signals addition, which is one of the minor goals that Judge 2 believes this sentence performs (evaluation: 2). Other judges appear to have interpreted the word “further” as an intensifier.

The qualitative analysis demonstrates that some level of subjectivity is likely to exist in determining the dimensions of topic closers. The differences that this subjectivity creates are important; however, all features of writing are likely to feature some subjective differences, whether it is for topic sentences, thesis clarity, quality of supporting arguments, or virtually any other element of the text. As such, while teachers would be required to invest some amount of time in understanding this model, and although some level of disagreement may occur, such issues would not seem likely to affect the quality or efficacy of the model.

## DISCUSSION

In this study, we categorized the final sentences of body paragraphs from a corpus of papers written by students at a university in the Arabian Peninsula. This categorization was conducted as the modelling of topic closers has been somewhat limited in the literature. Following the modelling procedure, we trained three judges to recognize the identified variations of topic closers. An assessment of the degree to which the judges were able to categorize randomized examples of topic closers provides validation for the model. Establishing the model as

teachable is important because a theoretical but unvalidated model has relatively little pedagogical credibility.

Taken as whole, the results suggest that the paragraph ending model can provide teachable material. The results are particularly compelling given that the sentences under analysis were far from what might be labeled as idealized examples. After all, the students who wrote the papers from which these sentences were extracted received no explicit training in ending their paragraphs. As such, we can conclude that, with limited instruction, the paragraph ending model has notable potential as a teaching intervention.

The results of this study are meant to be a description of the various strategies used by students of Advanced Academic Writing. That is, this model does not seek to prescribe a restrictive set of categories that teachers and students are to follow blindly. Instead, readers of this text are to critically evaluate their paragraphs and decide which if any of the strategies detailed above best serves the purposes of their paragraphs. Ultimately, the purpose of this research is to provide a framework that students and teachers can base their evaluations on.

### Classroom Implications

Even though the paragraph ending model will undoubtedly require future development, the current results have direct implications for the classroom. Specifically, the study presents teachers with a framework to guide students towards more effective paragraph presentation. There is no question that students need and expect explicit instruction on issues that are crucial to effective writing. As such, the paragraph ending model presented here has the potential to provide a valuable resource for students of writing, particularly those for whom English is a second or other language.

### Software Implications

Although the classroom and the teacher are always the primary concern for educational developments, we must also be aware that education today often extends well beyond the traditional teaching environment (McCarthy, Al-Harthy, Buck, Ahmed, Duran, Thomas et al., 2021). That is, hybrid and blended learning environments are an ever-growing feature of education and any developments that concern education in general are well-served if they also consider the role of technology (a claim made all the more evident following the COVID-19 pandemic). As such, a contemporary perspective requires us to also consider the software implications of the paragraph ending model. Accordingly, the current study serves as the basis to develop software algorithms, assessments, and automated feedback that addresses the issue of topic closers.

The software that is of primary interest to the current study is Auto-Peer (McCarthy et al., 2021). Auto-Peer is a free-to-download, stand-alone, peer-reviewing application available in both Windows and MAC operating systems. Auto-Peer

assesses student papers for a wide variety of writing issues such as sentence structure, transitional issues, and wandering paragraphs. In the Auto-Peer output, potentially problematic elements of the student paper are displayed along with extensive feedback, which includes explanations and practice. Although Auto-Peer is likely to be useful for both L1 and L2 students, the primary audience of the software is non-native English speakers. As such, Auto-Peer's explanations, examples, and many of its features are designed with sensitivity to students from a wide variety of cultural backgrounds.

The current version of Auto-Peer features a preliminary algorithm for topic closers. Specifically, the algorithm collects all the final sentences of paragraphs and displays them in the output. The Auto-Peer output explains the usefulness of well-constructed topic closers and provides examples of goals, types, and cues that may facilitate the student in modifying the extracted sentences. The primary application of this current output is to assist student-writers in constructing a summary for their papers' conclusion sections. After-all, the final sentences of the paragraphs should provide pertinent information for a concise overview of the body of the paper. This initial paragraph endings algorithm is useful for students; however, based on the current study, future updates to Auto-Peer will assess the degree to which each identified sentence appears to conform to a specific goal (e.g., summarizing, concluding, predicting, or adding). The analysis will also be able to assist with suggesting explicit cues, which may further facilitate student-writers in conveying the function of specific paragraphs and the over-all purpose of their respective papers.

### CONCLUSION

The purpose of this study was not merely to provide a paragraph ending taxonomy akin to the 1970s classification of topic sentences. Rather, the purpose of this study was to create and validate a model that can be readily applied across the broadest range of teaching environments (from the physical classroom to the laptop). However, the goal of the project is to gauge whether students will be able to recognize and recreate the categories of our model. After-all, an intervention that has negligible effects on the target audience is of little academic value. The current study is a positive step in our project, and although significant further research is needed, the model we have presented here provides important findings for the development of materials and interventions that may benefit students in the writing of more effective paragraphs.

### SUGGESTION

Primary among our future work is to consider modifications to the model based on the results presented in this study. For example, analysis suggests that the 'additional' type may be better understood as 'appended.' That is, support type sentences are not always adding: they are often contrasting



(e.g., using words like *however*), or they may be hierarchically organized (e.g., using ordinals or terms such as *more importantly*). The model may also need clarifications for the contrast between explicitly and implicitly cued. For instance, the term ‘signaled’ may indicate a transitional such as *therefore* or *in addition*, whereas noun phrases such as *this issue*, adverbs such as *also*, modals such as *will*, and verbs such as *suggests* may be seen as ‘marked.’ Such a modification would mean that ‘implicit’ type sentences would be neither signaled nor marked. This updated ‘implied’ sentence may better identify sentences of low cohesion value, which are likely to be problematic (see McNamara et al. 2012).

We also acknowledge that one of the primary limitations of the current study is our decision to focus on the most common paragraph ending types: the single sentence variety. Just as Braddock (1974) accepted that some topic sentence forms may be made manifest over multiple sentences, we also note that some paragraph ending types may be realized over multiple sentences or may be alluded to indirectly. A comprehensive teaching model would certainly have to make clear that the provided prototypical examples are by no means exhaustive of the possibilities available to writers.

Following considerations such as those outlined above, future research needs to develop and assess modified teaching material that presents the paragraph ending model. Such material will need to include numerous examples of each of the model’s dimensions: goal, type, and cue. This material can then be used to train students to identify endings, to help students modify endings, and to assess the degree to which students can create endings. More specifically, we plan two parallel courses of material developments. In the first strand, classroom material will be developed, and corresponding experiments undertaken. In the second strand, materials and algorithms will be developed for the Auto-Peer software, and similar experiments will be conducted. Such experiments will provide feedback as to teacher and student satisfaction with the materials, as well as data indicating student ability to develop appropriate writing modifications. Gathering teacher and student feedback on this material will allow us to better assess the model’s degree of effectiveness and, subsequently, to further modify the model as necessary and appropriate.

## LIMITATION

Even a validated model can and should be improved. Indeed, frameworks as diverse as Gardner’s multiple intelligences or Einsteinian classical mechanics have been regularly updated when and where inconsistencies or limitations appear (see McNamara et al., 2012). Thus, while the evidence of validation presented here is a useful initial step, there remains a significant amount of important future work; and as with all frameworks, the future work for our model should be guided by observations and findings.

## Notes

‘Con,’ ‘Add,’ ‘Sum,’ and ‘Pre’ refer to ‘conclusion,’ ‘addition,’ ‘summary,’ and ‘prediction’ respectively. ‘Cla’ and ‘Sup’ refer to ‘claim’ and ‘support.’ ‘Ex’ and ‘Im’ refer to ‘explicit’ and ‘implicit.’ The wording for each sentence is provided in the analysis below.

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