

# Relevance of findings in results to discussion sections in applied linguistics research

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## **Abstract**

*Discussion sections in research articles involve commenting on results. What results are commented on or how they are commented on may have been questioned by novice writers. This study intends to identify findings in results and discussion sections to address two research questions: what findings are reported in the discussion section? and what functions of discussion sections are these findings reported in? The data was results and discussions of ten research articles in a leading applied linguistics journal. Every finding in results was identified and coded in terms of the relevance to research questions. All findings reported in the discussions were also coded and then matched with genre moves of discussions content. The results indicate that numbers of findings in discussions were more consistent than in the results, ranged from five to fifteen findings. Most findings answer or are relevant to research questions of each article while some having no relevance are reported in results and even discussed in discussions. Furthermore, findings in discussion section are most commonly reported as summaries. They are more likely to be reported in the beginning. More than half of them are used when giving explanations for findings. Implications for teaching and research writing on how to write discussion sections in research articles are discussed.*

## **Introduction**

Writing research articles for publications has been involved in daily professional work for teachers, researchers, as well as research students in a variety of academic disciplines. Writing high-quality research is very challenging for academic members especially novice writers. In applied linguistics, research into research articles has, therefore, been received great attention for providing advice on research production and helping scholars overcome writing difficulties.

## **Previous research into research articles**

In a number of research into research articles, they tend to pay attention to two main concerns: generic structure or organizational pattern (Kanoksilapatham, 2005; Ayers, 2008; Yang & Allison, 2004) and textual features (Dueñas, 2007; Molino, 2010; Chen & Ge, 2007; Tucker, 2003) of research articles.

On one view, much research has been done on generic structure of research articles e.g. textual organization in research article introductions (Loi & Evans, 2010; Hirano, 2009; Ozturk, 2007), in methodology sections (Bruce, 2008; Lim, 2006), in results sections (Basturkmen, 2009; Bruce, 2009; Brett, 1994), and in discussion sections (Holmes, 1997; Peacock, 2002). On another view, textual features were studied in a number of research. The use of hedges is the main focus of many studies; for example, Atai & Sodr (2006), the use of hedges in discussion sections; Gillaerts & Van de Velde (2010), interactional metadiscourse including hedges, boosters and attitude markers in research abstract. Apart from hedges, textual features have also been studied in different aspects such as textual themes through thematic analysis of method and discussion sections (Martínez, 2003), phraseology of introduction (Gledhill, 2000), linguistic features in relation to communicative functions in method sections (Lim, 2006), personal and impersonal authorial references (Molino, 2010), and self-citation (Hyland, 2001).

From these studies, it appears that research into research articles and research writing has been extensively covered in the literature. However, it is noticeable that each section in research articles, as data for the analysis, was likely to be treated as individual entity. According to Grabe and Kaplan (1996), as a convention of research writing instructions, coherence within a whole article is the central issue that researchers need to be attentive to. Swales (1990) has previously pointed out that a link between research article sections is potentially important.

Specifically, there has been an argument for the link between results and discussion sections even though it remains unclear in terms of content structure of the two sections.

There has been an argument that discussion sections often open with main results (Swales & Feak, 1994). More recently, through genre-based analysis in discussion sections, Basturkmen (2009) also presented communicative moves that include: background information – review of research purposes, theory, methods; summarizing results – summary of numbers of specific results; reporting results; (repeated) commenting on the results – explaining, comparing with results in the past studies, and evaluating the results.

While the studies of Basturkmen (2009) and Swales & Feak (1994) as mentioned (also Hopkins & Dudley-Evans, 1988; Holmes, 1997; Peacock, 2002) suggested that commenting on the results are typically appeared in the discussion sections, Lim (2010) argued for commenting on the results as one component of the results section. There are 4 types of comments in the results section revealed by Lim's study: giving reasons for the findings, expressing views on the findings, comparing findings with previous literature, and making recommendations for future research. Consequently, these arguments suggest that the move of commenting on the results which typically associated with discussions appear either in results or discussion sections. In other words, the unclear communicative functions in results and discussions perhaps resulting in cyclical and repeated content in the written articles. This contingency, therefore, brings an interest in a connection of content between results and discussions whether a function of commenting on the results belongs to which section or it has been presented in either sections occasionally.

Reporting on the link between results and discussion sections, there has been an attempt to explore the structure of discussion section and ways in which research articles proceed from presenting results through the closure by Yang & Alison (2003). Genre-based analysis was implemented to investigate relationship between results, discussion, and conclusion and implication sections in research articles looking at the section headings and communicative purposes. The study dedicated the results to report the structure of the results section that reporting result and commenting on the results typically appeared. In discussion sections, commenting on results is most frequent and repeatedly occurs in the section. Based on these findings, even though they have provided an insightful comparison between the communicative moves in the results and the discussions, it seems that the relationship between these two sections in terms of content remains uncovered. Rather, the authors acknowledged the occurrences of each section headings and its communicative purposes. Further research that observed the association between results and discussions and pedagogical implications was conducted by Han (2007). The study unexpectedly drew the conclusion that articles on language learning often include a section on classroom implications which is not clearly related to the findings. Although no clear link suggested, the intention of the study suggested that content of research results and discussion sections are associated to some extent.

Based on Han (2007)'s intention, the current research, therefore, intends to investigate the link between results and discussion sections. Since genre issue has been extensively covered in the previous literature, we aim at investigating the association of the two sections in terms of content by tracing the findings which are reported in the results and are also commented on the discussion sections.

### **Difficulty of research writing**

Generally, apart from having explicit research knowledge such as organizational patterns and content of research, it is worth tracing difficulties which might have facilitated or hindered writing high-quality research papers. Difficulties in thesis and dissertation writing have been widely discussed (Paltridge, 1997; Flowerdew, 1999; Okamura, 2006; Cheung, 2010). The three major issues concerning research writing difficulties are related to writing process (Casanave & Hubberd, 1992; Allison, Cooley, Lewkowicz & Nunan, 1998), written research articles as

product (Paltridge, 2002), and studies relating to supervisor support (Dong, 1998). Previous literature reviewed so far suggested that difficulties in writing cover discourse-level e.g. quality of content and development of ideas, and surface-level e.g. accuracy, word used, and spelling and punctuation. Between these two issues, the discourse-level features are perceived as more important than another (Casanave & Hubberd, 1992).

Although several studies into research writing difficulties have been done, also in various aspects, the general difficulties may not meet expectations of writers who may find writing some sections more difficult than others. More specifically, Flowerdew (1999) suggested that the literature review and discussion sections are perhaps the most problematic sections for writing. For writing literature review, and probably applies to introduction, researchers would have been expected to have read numbers of related research. From reading, they, therefore, possibly learn characteristics or functions of literature review of research, also learn to overcome problems in writing the literature review. More importantly, in the past, a variety of aspects into literature review have received attention and studied by many authors. Much research was conducted as comparative studies across different disciplines in terms of function and organization (Samraj, 2002; 2005), between research written in different language (Loi, 2010; Hirano, 2009; Loi & Evans, 2010) as well as the comparative studies of literature review in sub-disciplines (Ozturk, 2007).

On the other hand, compared to the literature review, there have been fewer studies focusing on the difficulties in writing the discussions even though many studies suggested that this section is probably the most difficult to write (Flowerdew, 1999; Martínez, 2003; and Bitchener & Basturkmen, 2006). One reason was that, to write this section successfully, cognitive demands of the discussions and skills for writing in the persuasive and argumentative styles are needed. Specifically address the issue of difficulties in writing discussions, Bitchener and Basturkmen (2006) suggested three main difficulties in writing the discussions which are language proficiency difficulties, genre of discussions, and content of discussions. While the discussions of the language proficiency have been covered in the past studies such as Bitchener & Basturkmen (2006), Flowerdew (1999) and the genre issues in Peacock (2002), Holmes (1997), it seems that the issue of what content to include in discussions has been under-researched.

### **Purposes of the study**

This study intends to investigate the link of findings reported in the results and discussion sections in applied linguistics research articles to determine what results are commented on the discussion sections and how are they commented on. Initially, individual findings in both sections were identified to inform what results are presented in the results section and are repeatedly reported in the discussions. Findings identified in discussion section were also matched with genre moves to inform how are they used and commented on.

This study aims to answer the following research questions:

- 1) What findings are reported in the discussion section of research articles?
- 2) What functions of discussion sections are these findings reported in?

### **Research methodology**

#### **1. Data**

The data for this study comprises the results and discussion sections of 10 research articles in *System*, an established international refereed journal in applied linguistics. *System* accepts research articles in different sub-fields of applied linguistics, so it has no specific topic bias. Moreover, *System* may be targeted to novice researchers, also, to the targeted audiences of the current study. This journal was, therefore, selected as source of data. 10 research articles were selected based on the following criteria:

- 1) The selected research articles employed quantitative approach to research methodology which enabled an identification of specific findings.

- 2) The articles were written following the IMRD structure which allowed the identification of the single findings in both results and discussion sections, also genre moves in the discussions on the basis of the authors' intention.
- 3) Research questions were explicitly stated by the authors. The questions, therefore, allowed the analysis of the relevance of each finding to the specific research questions.

## **2. The instrument**

The instrument in this study was a coding form. The coding form for each article contains a research title, research question(s), and content of results and discussions split into paragraphs. To the right of the content, there are 3 extra columns for coding results, discussion, and noting additional information.

## **3. Data analysis**

Results and discussion sections of 10 research articles were analysed by the following procedure.

### **3.1 Analysing results**

There are 3 types of codes for data analysis: for individual findings, matching of findings to the relevant research questions, and details of findings if each answers or relevant to a research question, answers more than one research question or is not relevant to research question.

- 1) Identify each individual finding. For long tables of findings, for example, from a rating-scale survey, each mean and SD together is considered an individual finding.
- 2) Code individual findings based on the sequence they appear in the article.
- 3) Match each finding to the relevant research question (or to 'no' research question).
- 4) For each finding coded as matching a research question, identify if the specific finding answers or is relevant to the research question, answers more than one research question, or the finding is not relevant to the research questions.

### **3.2 Analysing discussion section**

- 1) Identify all findings reported in the discussion section and assign codes from the analysis of results section.
- 2) Categorise and code content of discussions. There are 9 categories derived from the actual data and the literature (Swales & Feak, 1994; Hopkins & Dudley-Evans, 1988; Peacock, 2002): presenting new findings, repeating purpose, repeating findings, linking to literature about the topic and contributions to the field, linking to literature about the research methodology, linking to real-world applications and/or practical recommendations, discussing limitations of the study, pointing to directions for future research, explaining reasons for the finding.
- 3) Match each finding with genre moves identified in discussions.

## **Results**

To investigate what findings are reported in the discussion section, the single findings in the results and the discussions were identified and counted. The numbers of all findings are presented in Table 1. As the table shows, there is a high variation in numbers of findings which the single article can include in its results section ( $M = 78.60$ ,  $SD = 67.86$ ). On the other hand, there is much more consistency in the numbers of findings reported in the discussion sections ( $M = 10.60$ ,  $SD = 7.46$ ). Approximately, each discussion is shown to have 5 to 15 findings. Results also show that the percentage of findings in results which are discussed in the discussions is varied. Therefore, the percentage seems far more dependent on the overall

number of findings in the results than the number reported in discussions. Based on the actual data, 247 findings are reported in the results section of the article that used a survey methodology. However, only 8 findings are reported in one which a pretest- posttest design employed. This observation suggests that the numbers of findings in results might be differed by the research design employed in the single article.

**Table 1:** Numbers of findings in results and discussion sections in 10 research articles

Research articles	No. of findings in R	No. of findings in D	% of findings in R which are discussed in D
1	8	5	62.50
2	28	11	39.29
3	33	7	21.21
4	55	11	20.00
5	58	29	50.00
6	62	2	3.23
7	74	6	8.11
8	102	9	8.82
9	119	15	12.61
10	247	11	4.45
Mean	78.60	10.60	
SD	67.86	7.46	

To elaborate on what findings are reported in discussion section, the single findings were matched to the specific research questions in single research article. Table 2 indicates the details of the findings.

**Table 2:** Match between specific findings and research questions

Match findings with specific RQ	No. of Findings in R	%	No. of Findings in D	%
Answer RQs	665	84.61	93	87.74
Answer more than 1 RQ	54	6.87	4	3.77
Not relevant to RQ	67	8.52	9	8.49
Total	786		106	

As might be expected, in the results sections, most of the findings answer or are relevant to research questions. A few findings which are not relevant to research questions have been found (8.52%). It seems possible that these findings are reported to provide background information, contextualize the findings or even to lead to the key findings of the individual article.

In the discussion section, similarly, most of the findings are found to concern specific research questions. However, contrary to expectations, 9 findings which are not answering the research questions still discussed.

For more details about the findings, ways of reporting findings were further identified. The numbers of types of reported findings in the discussion section are shown in Table 3.

**Table 3:** Ways of reporting findings in discussion sections

<b>Ways of reporting findings</b>	<b>No. of types of findings</b>	<b>%</b>
Actual quantitative data	21	19.81
Descriptive statistic	18 (85.71%)	
Inferential statistic	3 (14.29%)	
Summary of data/statistics	57	53.77
Interpretation	28	26.42

Three ways of reporting findings, revealed from the data, were used for the analysis: the findings are reported as actual quantitative data, as a summary of data or statistics, and as interpretation. As can be seen in Table 3, in the discussion section, giving a summary is the most common way of presenting findings (53.77%) which might be actually expected. Presenting a summary of data is possibly method to convey the arguments in discussions more efficiently than presenting all the details of data or statistics. More interestingly, where actual quantitative data are reported, it is likely to include descriptive statistics rather than inferential statistics that actually indicate whether the results gained from data answer the research questions or not.

Apart from exploring findings which are reported in the discussion section, another purpose of this study is to investigate functions of discussion section where these findings are reported in. The genre pattern and sequences of moves of the discussions were primarily analysed. The details of moves and sequences as well as the numbers of articles where the particular moves are presented are shown in Table 4.

**Table 4:** Genre pattern and sequences of moves in the discussion sections

<b>Moves</b>	<b>No. of articles</b>
Move 1 - Summarising findings	9
Move 2 - ((Linking to literature about the research methodology))	1
Move 3 - Explaining reasons for the finding	9
Move 4 - Contributions to the field	9
Move 5 - Linking to real-world applications/ practical recommendations	8
Move 6 - (Discussing limitations of the study)	5
Move 7 - Pointing to directions for future research	8
Additional move - ((Presenting new findings))	1

\*\*the bracket indicates the optional moves

As Table 4 shows, move 1 – summarizing findings, move 3 – explaining reasons for the finding, move 4 – contributions to the field, move 5 – linking to real-world applications or practical recommendation, and move 7 – pointing to directions for future research are likely to be included in every research article. On the other hand, move 6 – discussing limitations of the study and move 2 – linking to literature about the research methodology are optional.

Another issue is how are the findings used in the discussion sections. The single finding was matched with genre moves. Table 5 presents the frequency of functions of discussion section where the findings are reported in. The findings are commonly presented in move 3 – explaining reasons for findings (50%), move 1 – summarising findings (20.75%), and move 4 –

contributions to the field (12.26%). A high percentage of findings included in moves 3, 1 and 4, except move 2 that is optional, informs us that the findings tend to be reported more frequently in the beginning of the discussion section. Additionally, the move of explaining reasons for the findings is most common in discussions where the findings are reported in. In other words, the findings are usually used in discussions for explaining reasons.

**Table 5:** Frequency of functions of discussions where findings are reported in

<b>Discussion functions</b>	<b>Freq.</b>	<b>%</b>
Move 1 - Summarising findings	22	20.75
Move 2 - ((Linking to literature about the research methodology))	0	0.00
Move 3 - Explaining reasons for the finding	53	50.00
Move 4 - Contributions to the field	13	12.26
Move 5 - Linking to real-world applications/ practical recommendations	7	6.60
Move 6 - (Discussing limitations of the study)	5	4.72
Move 7 - Pointing to directions for future research	1	0.94
Additional move - ((Presenting new findings))	5	4.72

\*\*The frequency is dependent on frequencies of the moves as well as the frequencies of the findings in the sections.

In summary, the 5 major findings can be drawn from the present study. First, there is a high variation in the number of findings in results while more consistency was found in the discussion sections, ranged from 5 to 15 findings. Secondly, most of the reported findings answer or are relevant to research questions, while some having no relevance to research questions are reported in results and unexpectedly discussed in the discussion section. The third key finding is about ways of reporting findings in the discussions. It is found that the findings are most commonly reported as a summary. Where the actual statistics data are presented, it is likely to include descriptive than inferential statistics. Next, in response to research question 2 about the organization and the use of findings in the discussions, the findings seem to be reported more frequently in the beginning of the discussion section. Finally, over half of the findings are reported in the discussions for explaining reasons.

### **Discussion and Implications**

This study sets out to report the link of findings reported in the results and discussion sections in applied linguistics research articles. It aims to uncover what results are included in the discussion section and how are they commented on.

The current study indicated that there are a few findings, ranged from 5 to 15, reported in the discussion sections, but more variation in numbers of findings in the results section. Considered the numbers in the single research article, it suggested that different research paradigms can lead to great differences in numbers of findings in results but appears to be implicit expectation about numbers of specific findings that can be discussed. These findings might be explained by several possible reasons. Firstly, the expected length for the discussion section might limit the number of findings that can be actually discussed. Another explanation for this finding is that the more point the authors discuss, the less they can focus on any particular point. According to Yang and Alison (2003), the most frequent move in discussion section is commenting on results. If there are too many points the authors would like to comment on, they may lose their focus of discussions by several paragraphs of reasons for every

single finding. Therefore, explanations for a few findings could lead to more focused discussions. More importantly, the limited number of findings discussed implies to more coherence of the discussion sections in terms of connectedness of ideas and content (Grabe & Kaplan, 1996).

When reporting findings in the discussions, the present study suggested that most of the findings are presented as a summary. As abovementioned, a few findings reported in the discussion section implies to more focused discussions. From the results of the present study, even though the certain number of findings were detected in the discussions data, explaining reasons for every single finding might affect the limited length of the section and the authors might fail to keep the discussions focused and succinct. These findings, therefore, need to be clustered together and presented as a summary. Then, the content of the discussions can include explanations for a few clusters of key findings that are commonly presented as summaries.

The next major finding was that, in discussions, the most frequent move where findings are identified or used was explaining reasons for findings. The result is consistent with the evidence previously pointed out by Yang & Alison (2003) that the commenting on results appeared to be the most frequent communicative move in discussion section. It implies that the high occurrence of explaining reasons for findings in the current study is possibly dependent on the presence of the high frequency of the move itself.

A further result indicated that findings in discussion section were presented more frequently in the beginning of the section, including those presented as a summary. There may be some discussions include a summary of the findings, however the summary can appear either in the last paragraph of the results section. It means that different numbers of findings the researchers found in the discussions might be affected by the presence of the summary. Therefore, the lower number of findings in the discussion in one article is possible when a summary of findings is presented in the last paragraph of the results section.

In general, the current findings assist in our understanding and suggest practical implications on how to use findings, and their organization in the discussion section. A following general heuristic on how to write the discussion section in research articles can be drawn from the study. First, researchers, especially novices, may choose 5-15 key findings that need to be explained. Second, they may cluster the key findings and present them as a summary. Next, they should explain the summary. They should, then, move on to other functions of discussions as well as occasionally include citing of findings as evidence where necessary.

A final point the researchers would like to make is about how we wrote the discussion section in this research article following the practical implications that have previously been suggested. In the last paragraph of the results section, 5 clusters of key findings emerged from the study were presented as a summary. In the discussion section, 4 clusters were chosen to be commented on. In every paragraph, the findings were reported where we give explanations and link to the previous related literature. The discussions, then, clearly link to applications or practical recommendations for researchers and novice writers by giving a general guidance in writing the discussion section as a concluding remark.

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