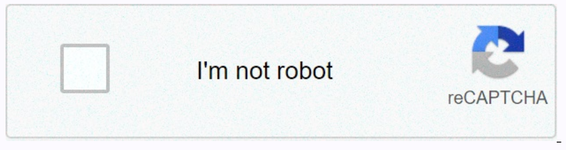
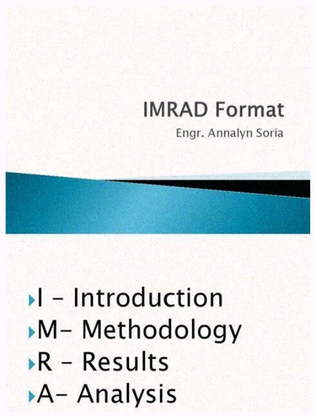


I am not robot!

What is imrad format in research

What is imrad format. What is imrad format of a research paper.

Document format for reporting studies in the scientific literature In scientific writing, IMRAD or IMRaD (/ˈɪmræd/) (Introduction, Methods, Results, and Discussion)[1] is a common organizational structure (a document format). IMRaD is the most prominent norm for the structure of a scientific journal article of the original research type.[2] Overview Fig.1: Wineglass model for IMRaD structure. The above scheme shows how to line up the information in IMRaD writing. It has two characteristics: the first is its top-bottom symmetric shape; the second is its change of width, meaning the top is wide, and it narrows towards the middle, and then widens again as it goes down toward the bottom. The first characteristic, the top-bottom symmetric shape, represents the symmetry of the story development. The second one, the change of width, represents the change in generality of the viewpoint. Original research articles are typically structured in this basic order[3][4][5] Introduction – Why was the study undertaken? What was the research question, the tested hypothesis or the purpose of the research? Methods – When, where, and how was the study done? What materials were used or who was included in the study groups (patients, etc.)? Results – What answer was found to the research question; what did the study find? Was the tested hypothesis true? Discussion – What might the answer imply and why does it matter? How does it fit in with what other researchers have found? What are the perspectives for future research? fejozoyava The plot and the flow of the story of the IMRaD style of writing are explained by a 'wine glass model'[4] or hourglass model.[3] Writing, compliant with IMRaD format (IMRaD writing) typically first presents "(a) the subject that positions the study from the wide perspective", "(b) outline of the study", develops through "(c) study method", and "(d) the results", and concludes with "(e) outline and conclusion of the fruit of each topics", and "(f) the meaning of the study from the wide and general point of view".[4] Here, (a) and (b) are mentioned in the section of the "Introduction", (c) and (d) are mentioned in the section of the "Method" and "Result" respectively, and (e) and (f) are mentioned in the section of the "Discussion" or "Conclusion". In this sense, to explain how to line up the information in IMRaD writing, the 'wine glass model' (see the pattern diagram shown in Fig.1) will be helpful (see pp 2–3 of the Hilary Glasman-deal [4]). As mentioned in abovementioned textbook,[4] the scheme of 'wine glass model' has two characteristics. The first one is "top-bottom symmetric shape", and the second one is "changing width" i.e. "the top is wide and it narrows towards the middle, and then widens again as it goes down toward the bottom". The First one, "top-bottom symmetric shape", represents the symmetry of the story development. Note the shape of the top trapezoid (representing the structure of Introduction) and the shape of the trapezoid at the bottom are reversed. This is expressing that the same subject introduced in Introduction will be taken up again in suitable formation for the section of Discussion/Conclusion in these section in the reversed order. (See the relationship between abovementioned (a), (b) and (e), (f).) The Second one, "the change of the width" of the schema shown in Fig.1, represents the change of generality of the view point. As along the flow of the story development, when the viewpoints are more general, the width of the diagram is expressed wider, and when they are more specialized and focused, the width is expressed narrower.
As the standard format of academic journals The IMRAD format has been adopted by a steadily increasing number of academic journals since the first half of the 20th century. The IMRAD structure has come to dominate academic writing in the sciences, most notably in empirical biomedicine.[2][6][7] The structure of most public health journal articles reflects this trend.



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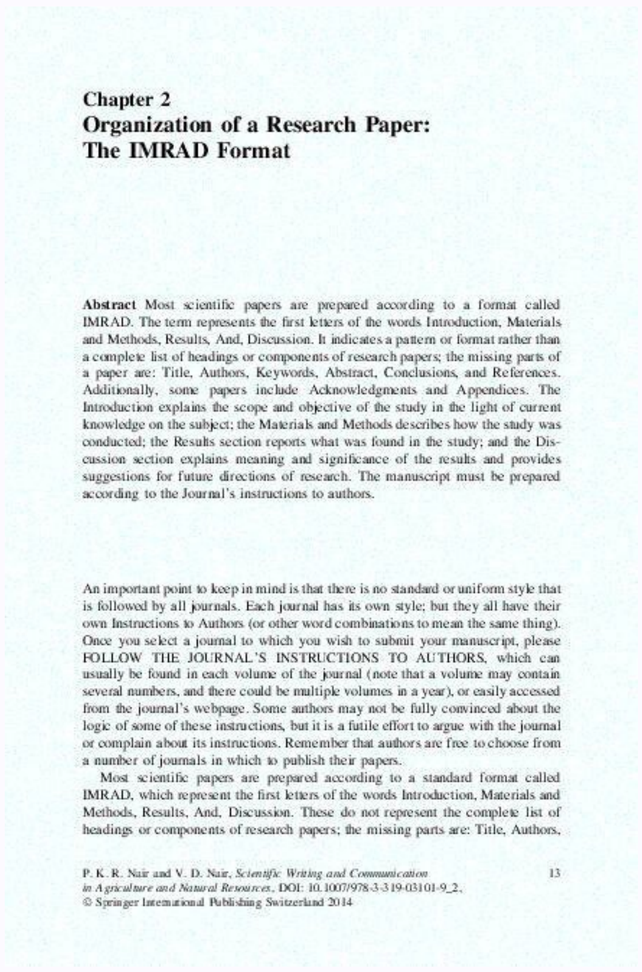

Chapter 2
Organization of a Research Paper: The IMRAD Format

Abstract Most scientific papers are prepared according to a format called IMRAD. The term represents the first letters of the words Introduction, Materials and Methods, Results, And, Discussion. It indicates a pattern or format rather than a complete list of headings or components of research papers; the missing parts of a paper are: Title, Authors, Keywords, Abstract, Conclusions, and References. Additionally, some papers include Acknowledgments and Appendices. The Introduction explains the scope and objective of the study in the light of current knowledge on the subject; the Materials and Methods describes how the study was conducted; the Results section reports what was found in the study; and the Discussion section explains meaning and significance of the results and provides suggestions for future directions of research. The manuscript must be prepared according to the Journal's instructions to authors.

An important point to keep in mind is that there is no standard or uniform style that is followed by all journals. Each journal has its own style; but they all have their own Instructions to Authors (or other word combinations to mean the same thing). Once you select a journal to which you wish to submit your manuscript, please FOLLOW THE JOURNAL'S INSTRUCTIONS TO AUTHORS, which can usually be found in each volume of the journal (note that a volume may contain several numbers, and there could be multiple volumes in a year), or easily accessed from the journal's webpage. Some authors may not be fully convinced about the logic of some of these instructions, but it is a futile effort to argue with the journal or complain about its instructions. Remember that authors are free to choose from a number of journals in which to publish their papers.

Most scientific papers are prepared according to a standard format called IMRAD, which represent the first letters of the words Introduction, Materials and Methods, Results, And, Discussion. These do not represent the complete list of headings or components of research papers; the missing parts are: Title, Authors,

P. K. R. Nair and V. D. Nair, *Scientific Writing and Communication in Agriculture and Natural Resources*, DOI: 10.1007/978-3-319-03101-9_2.

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Methods – When, where, and how was the study done? What materials were used or who was included in the study groups (patients, etc.)? Results – What answer was found to the research question; what did the study find? Was the tested hypothesis true? Discussion – What might the answer imply and why does it matter? How does it fit in with what other researchers have found?
What are the perspectives for future research? The plot and the flow of the story of the IMRaD style of writing are explained by a 'wine glass model'[4] or hourglass model.[3] Writing, compliant with IMRaD format (IMRaD writing) typically first presents "(a) the subject that positions the study from the wide perspective", "(b) outline of the study", develops through "(c) study method", and "(d) the results", and concludes with "(e) outline and conclusion of the fruit of each topics", and "(f) the meaning of the study from the wide and general point of view".[4] Here, (a) and (b) are mentioned in the section of the "Introduction", (c) and (d) are mentioned in the section of the "Method" and "Result" respectively, and (e) and (f) are mentioned in the section of the "Discussion" or "Conclusion". In this sense, to explain how to line up the information in IMRaD writing, the 'wine glass model' (see the pattern diagram shown in Fig.1) will be helpful (see pp 2–3 of the Hilary Glasman-deal [4]). As mentioned in abovementioned textbook,[4] the scheme of 'wine glass model' has two characteristics. The first one is "top-bottom symmetric shape", and the second one is "changing width" i.e. "the top is wide and it narrows towards the middle, and then widens again as it goes down toward the bottom".
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As the standard format of academic journals The IMRAD format has been adopted by a steadily increasing number of academic journals since the first half of the 20th century. The IMRAD structure has come to dominate academic writing in the sciences, most notably in empirical biomedicine.[2][6][7] The structure of most public health journal articles reflects this trend. zimerabeyi Although the IMRAD structure originates in the empirical sciences, it now also regularly appears in academic journals across a wide range of disciplines. Many scientific journals now not only prefer this structure but also use the IMRAD acronym as an instructional device in the instructions to their authors, recommending the use of the four terms as main headings. For example, it is explicitly recommended in the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" issued by the International Committee of Medical Journal Editors (previously called the Vancouver guidelines): The text of observational and experimental articles is usually (but not necessarily) divided into the following sections: Introduction, Methods, Results, and Discussion. This so-called "IMRAD" structure is not an arbitrary publication format but rather a direct reflection of the process of scientific discovery. Long articles may need subheadings within some sections (especially Results and Discussion) to clarify their content. Other types of articles, such as case reports, reviews, and editorials, probably need to be formatted differently.[8] The IMRAD structure is also recommended for empirical studies in the 6th edition of the publication manual of the American Psychological Association (APA style).[9] The APA publication manual is widely used by journals in the social, educational and behavioral sciences.[10] Benefits The IMRAD structure has proved successful because it facilitates literature review, allowing readers to navigate articles more quickly to locate material relevant to their purpose.[11] But the neat order of IMRAD rarely corresponds to the actual sequence of events or ideas of the research presented; the IMRAD structure effectively supports a reordering that eliminates unnecessary detail, and allows the reader to assess a well-ordered and noise-free presentation of the relevant and significant information. It allows the most relevant information to be presented clearly and logically to the readership, by summarizing the research process in an ideal sequence and without unnecessary detail. Caveats The idealised sequence of the IMRAD structure has on occasion been criticised for being too rigid and simplistic. In a radio talk in 1964 the Nobel laureate Peter Medawar criticised this text structure for not giving a realistic representation of the thought processes of the writing scientist: "… the scientific paper may be a fraud because it misrepresents the processes of thought that accompanied or gave rise to the work that is described in the paper".[12] Medawar's criticism was discussed at the XIXth General Assembly of the World Medical Association in 1965.[13][14] While respondents may argue that it is too much to ask from such a simple instructional device to carry the burden of representing the entire process of scientific discovery, Medawar's caveat expressed his belief that many students and faculty throughout academia treat the structure as a simple panacea. Medawar and others have given testimony both to the importance and to the limitations of the device. Abstract considerations In addition to the scientific article itself a brief abstract is usually required for publication. The abstract should, however, be composed to function as an autonomous text, even if some authors and readers may think of it as an almost integral part of the article. The increasing importance of well-formed autonomous abstracts may well be a consequence of the increasing use of searchable digital abstract archives, where a well-formed abstract will dramatically increase the probability for an article to be found by its optimal readership.[15] Consequently, there is a strong recent trend toward developing formal requirements for abstracts, most often structured on the IMRAD pattern, and often with strict additional specifications of topical content items that should be considered for inclusion in the abstract.[16] Such abstracts are often referred to as "structured abstracts".[17] The growing importance of abstracts in the era of computerized literature search and information overload has led some users to modify the IMRAD acronym to AIMRAD, in order to give due emphasis to the abstract. Heading style variations Usually, the IMRAD article sections use the IMRAD words as headings.
A few variations can occur, as follows: Many journals have a convention of omitting the "Introduction" heading, based on the idea that the reader who begins reading an article does not need to be told that the beginning of the text is the introduction. This print-era proscription is fading since the advent of the Web era, when having an explicit "Introduction" heading helps with navigation via document maps and collapsible/expandable TOC trees. (The same considerations are true regarding the presence or proscription of an explicit "Abstract" heading.) In some journals, the "Methods" heading may vary, being "Methods and materials", "Materials and methods", or similar phrases. Some journals mandate that exactly the same wording for this heading be used for all articles without exception; other journals reasonably accept whatever each submitted manuscript contains, as long as it is one of these sensible variants. The "Discussion" section may subsume any "Summary", "Conclusion", or "Conclusions" section, in which case there may or may not be any explicit "Summary", "Conclusion", or "Conclusions" subheading; or the "Summary"/"Conclusion"/"Conclusions" section may be a separate section, using an explicit heading on the same heading hierarchy level as the "Discussion" heading. Which of these variants to use as the default is a matter of each journal's chosen style, as is the question of whether the default style must be forced onto every article or whether sensible inter-article flexibility will be allowed.

Educational paper
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Original (scientific) paper - the IMRAD layout

KEYWORDS: Science; Research; Writing; Publishing; Periodicals

ABSTRACT

Certain rules on how to write original (scientific) papers are pointed out. The importance of all mandatory sections of the paper (i.e. introduction, material and methods, results and discussion), representing the IMRAD layout is described in detail. Apart from the general rules concerning the preparation of these sections, the importance of following precisely the instructions to authors published by journals is also emphasized. It is important to publish results of scientific research for many reasons. Some of the reasons are: (1) giving credibility to the research, informing a broad audience of the achieved scientific results, and (2) enabling the author to gain professional promotion, etc. After all, if scientific results were not published and presented to a wide scientific audience, it would be as if they had never existed. Today, it is regarded that original (scientific) papers are the only acceptable way of publishing scientific results. A scientific paper is a written and published report describing original research results. (3) However, this definition is quite short and should be supplemented by the fact that it has to be the first announcement of scientific results, capable of being repeated. It should also be noted that it has to be written in a certain way and have a certain form. (4) The scientific paper is usually published in professional or scientific journals or other primary publications, which means that it will be accessible to a broad scientific audience. Scientific papers generally follow the IMRAD layout – the acronym that stands for four basic sections of the paper: Introduction (What question was asked?), Material and method (How was it studied?), Results (What was found?) and Discussion (What do the findings mean?). The aim of this paper is to emphasize essential points of these basic sections.

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INTRODUCTION

Introduction should be short and arresting and tell readers why the study has been undertaken (2). This section should be brief rather than expansive and, in most cases, should not require more than 3 or 4 printed paragraphs. The specific aim of the study (1). It means that the first paragraph should be a short story of the current knowledge of the attempted research area (to state "what we know" of the problem that was investigated). This should lead directly into the next paragraph that summarizes what other people have done in that field, what limitations have been encountered to date, and what questions still need to be answered (to speculate "what we don't know"). This will inevitably lead to the last paragraph, which should clearly quote what was done, and why it was done (what the study).

The Introduction of the scientific article should be to supply sufficient background information to allow the reader to understand and evaluate the results of the present study without needing to refer to previous studies on the topic. However, in this section, one wouldn't review all the literature available. One must resist the temptation to impress readers by summarizing everything that has gone before. They will be bored, not impressed, and will probably never make it through the present study (2). Only those references that are essential to understanding the present study should be included. Readers don't like scientifically weak studies and only draw evidence from the most rigorous, most relevant, and most valid studies. It is also important not only to quote references dealing with the problem investigated in the present study and omit to cite the obtained results - the lack of information what was actually found does not help readers to put the present work in the context of what has gone before.

The most essential part of the introduction is the last paragraph, which gives the aim of the undertaken study, i.e. the hypothesis of the research. This is where the sentence that will dictate the content of the remainder of the paper should be found. This sentence sets up the expectations for the rest of the paper (1). Finally, this is also a good place to tell to the readers the type of the study design used to test the hypothesis.

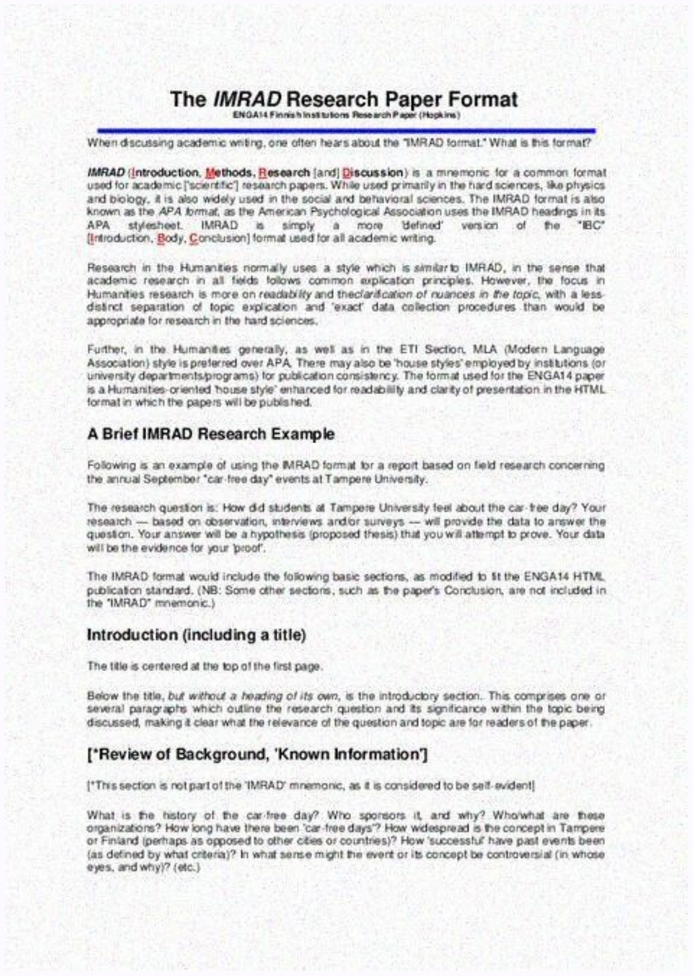
To summarize, one must know his audience to write an effective introduction, keep it short, tell readers why he has done the study and explain why it is important, and try to hook them in the first line (2).

MATERIAL AND METHODS

This section of the paper should describe, in its logical sequence, how the study was designed and carried out, who the participants were, what material and method was used and how the data were analyzed. This should be a simple task when the study is complete. However, if this section has been left until this stage, one may only then recognise flaws in the design that would have been detected sooner if this part had been written in as much detail as possible during the planning stage (2).

The main purpose of this section is to describe precisely the experimental design and, consequently, provide enough detail so that an experiment could be repeated. Actually, this is critically important as the obtained results should be reproducible if they are to be of scientific merit (2). The study design should be clalled up front because each study type has its own strengths and limitations, and usually dictates the type of statistical tests that are appropriate for analysis of the data collected (2). Study types (2) or designs (1) can often be described in a few well chosen words as commonly used types are actually well defined (for example, "randomised controlled trial", "prospective, double-blind, cross-over study", etc). It should always be stated clearly how randomisation was done, since this is a crucial part of many clinical trials. Specific aspects, such as blocked randomisation and stratification, should also be clearly described. This part of the material and method section usually includes information on the sample size and sample characteristics. This information is of paramount significance for testing the hypothesis or fulfilling the study aims. The number of participants in any study should be large

Methods – When, where, and how was the study done? What materials were used or who was included in the study groups (patients, etc.)? Results – What answer was found to the research question; what did the study find? Was the tested hypothesis true? Discussion – What might the answer imply and why does it matter? How does it fit in with what other researchers have found?



The *IMRAD* Research Paper Format

ENGA14 Finnish Institutions Research Paper (Hopkins)

When discussing academic writing, one often hears about the "IMRAD format." What is this format?

IMRAD (**I**ntroduction, **M**ethods, **R**esearch [and] **D**iscussion) is a mnemonic for a common format used for academic ["scientific"] research papers. While used primarily in the hard sciences, like physics and biology, it is also widely used in the social and behavioral sciences. The IMRAD format is also known as the *APA format*, as the American Psychological Association uses the IMRAD headings in its APA stylesheet. IMRAD is simply a more 'defined' version of the "IBC" [Introduction, Body, Conclusion] format used for all academic writing.

Research in the Humanities normally uses a style which is *similar* to IMRAD, in the sense that academic research in all fields follows common explication principles. However, the focus in Humanities research is more on *readability* and the *clarification of nuances in the topic*, with a less-distinct separation of topic explication and 'exact' data collection procedures than would be appropriate for research in the hard sciences.

Further, in the Humanities generally, as well as in the ETI Section, MLA (Modern Language Association) style is preferred over APA. There may also be 'house styles' employed by institutions (or university departments/programs) for publication consistency. The format used for the ENGA14 paper is a Humanities-oriented 'house style' enhanced for readability and clarity of presentation in the HTML format in which the papers will be published.

A Brief IMRAD Research Example

Following is an example of using the IMRAD format for a report based on field research concerning the annual September "car-free day" events at Tampere University.

The research question is: How did students at Tampere University feel about the car-free day? Your research — based on observation, interviews and/or surveys — will provide the data to answer the question. Your answer will be a hypothesis (proposed thesis) that you will attempt to prove. Your data will be the evidence for your 'proof'.

The IMRAD format would include the following basic sections, as modified to fit the ENGA14 HTML publication standard. (NB: Some other sections, such as the paper's Conclusion, are not included in the "IMRAD" mnemonic.)

Introduction (including a title)

The title is centered at the top of the first page.

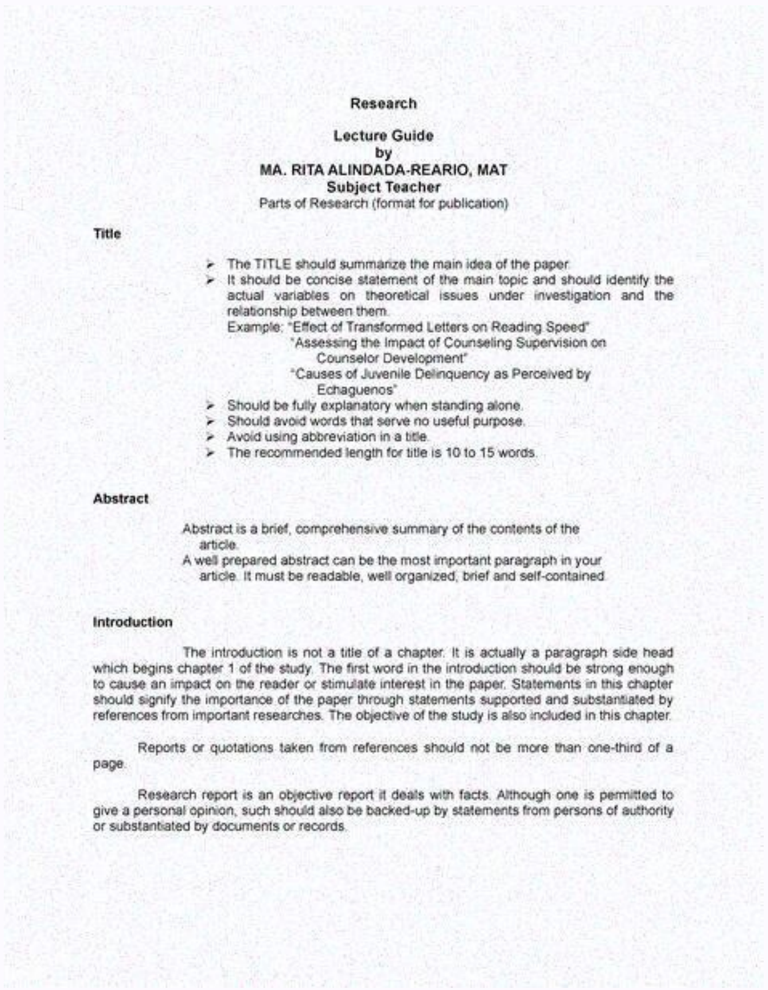
Below the title, *but without a heading of its own*, is the introductory section. This comprises one or several paragraphs which outline the research question and its significance within the topic being discussed, making it clear what the relevance of the question and topic are for readers of the paper.

[*Review of Background, 'Known Information']

[*This section is not part of the 'IMRAD' mnemonic, as it is considered to be self-evident]

What is the history of the car-free day? Who sponsors it, and why? Who/what are these organizations? How long have there been 'car-free days'? How widespread is the concept in Tampere or Finland (perhaps as opposed to other cities or countries)? How 'successful' have past events been (as defined by what criteria)? In what sense might the event or its concept be controversial (in whose eyes, and why)? (etc.)

What materials were used or who was included in the study groups (patients, etc.)? Results – What answer was found to the research question; what did the study find?



Research

Lecture Guide
by
MA. RITA ALINDADA-REARIO, MAT
Subject Teacher
Parts of Research (format for publication)

Title

- The TITLE should summarize the main idea of the paper.
- It should be concise statement of the main topic and should identify the actual variables on theoretical issues under investigation and the relationship between them.
  Example: "Effect of Transformed Letters on Reading Speed"
  "Assessing the Impact of Counseling Supervision on Counselor Development"
  "Causes of Juvenile Delinquency as Perceived by Echaguenos"
- Should be fully explanatory when standing alone.
- Should avoid words that serve no useful purpose.
- Avoid using abbreviation in a title.
- The recommended length for title is 10 to 15 words.

Abstract

Abstract is a brief, comprehensive summary of the contents of the article.
A well prepared abstract can be the most important paragraph in your article. It must be readable, well organized, brief and self-contained.

Introduction

The introduction is not a title of a chapter. It is actually a paragraph side head which begins chapter 1 of the study. The first word in the introduction should be strong enough to cause an impact on the reader or stimulate interest in the paper. Statements in this chapter should signify the importance of the paper through statements supported and substantiated by references from important researches. The objective of the study is also included in this chapter.

Reports or quotations taken from references should not be more than one-third of a page.

Research report is an objective report it deals with facts. Although one is permitted to give a personal opinion, such should also be backed-up by statements from persons of authority or substantiated by documents or records.

The above scheme shows how to line up the information in IMRaD writing. It has two characteristics: the first is its top-bottom symmetric shape; the second is its change of width, meaning the top is wide, and it narrows towards the middle, and then widens again as it goes down toward the bottom. The first characteristic, the top-bottom symmetric shape, represents the symmetry of the story development. The second one, the change of width, represents the change in generality of the viewpoint. Original research articles are typically structured in this basic order[3][4][5] Introduction – Why was the study undertaken? What was the research question, the tested hypothesis or the purpose of the research? Methods – When, where, and how was the study done? What materials were used or who was included in the study groups (patients, etc.)? Results – What answer was found to the research question; what did the study find? Was the tested hypothesis true? Discussion – What might the answer imply and why does it matter? How does it fit in with what other researchers have found? What are the perspectives for future research? The plot and the flow of the story of the IMRaD style of writing are explained by a 'wine glass model'[4] or hourglass model.[3] Writing, compliant with IMRaD format (IMRaD writing) typically first presents "(a) the subject that positions the study from the wide perspective", "(b) outline of the study", develops through "(c) study method", and "(d) the results", and concludes with "(e) outline and conclusion of the fruit of each topics", and "(f) the meaning of the study from the wide and general point of view".[4] Here, (a) and (b) are mentioned in the section of the "Introduction", (c) and (d) are mentioned in the section of the "Method" and "Result" respectively, and (e) and (f) are mentioned in the section of the "Discussion" or "Conclusion". In this sense, to explain how to line up the information in IMRaD writing, the 'wine glass model' (see the pattern diagram shown in Fig.1) will be helpful (see pp 2–3 of the Hilary Glasman-deal [4]). As mentioned in abovementioned textbook,[4] the scheme of 'wine glass model' has two characteristics. The first one is "top-bottom symmetric shape", and the second one is "changing width" i.e. "the top is wide and it narrows towards the middle, and then widens again as it goes down toward the bottom". The First one, "top-bottom symmetric shape", represents the symmetry of the story development. Note the shape of the top trapezoid (representing the structure of Introduction) and the shape of the trapezoid at the bottom are reversed. This is expressing that the same subject introduced in Introduction will be taken up again in suitable formation for the section of Discussion/Conclusion in these section in the reversed order. (See the relationship between abovementioned (a), (b) and (e), (f).) The Second one, "the change of the width" of the schema shown in Fig.1, represents the change of generality of the view point. As along the flow of the story development, when the viewpoints are more general, the width of the diagram is expressed wider, and when they are more specialized and focused, the width is expressed narrower. As the standard format of academic journals The IMRAD format has been adopted by a steadily increasing number of academic journals since the first half of the 20th century. The IMRAD structure has come to dominate academic writing in the sciences, most notably in empirical biomedicine.[2][6][7] The structure of most public health journal articles reflects this trend.
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Other types of articles, such as case reports, reviews, and editorials, probably need to be formatted differently.[8] The IMRAD structure is also recommended for empirical studies in the 6th edition of the publication manual of the American Psychological Association (APA style).[9] The APA publication manual is widely used by journals in the social, educational and behavioral sciences.[10] Benefits The IMRAD structure has proved successful because it facilitates literature review, allowing readers to navigate articles more quickly to locate material relevant to their purpose.[11] But the neat order of IMRAD rarely corresponds to the actual sequence of events or ideas of the research presented; the IMRAD structure effectively supports a reordering that eliminates unnecessary detail, and allows the reader to assess a well-ordered and noise-free presentation of the relevant and significant information. It allows the most relevant information to be presented clearly and logically to the readership, by summarizing the research process in an ideal sequence and without unnecessary detail. Caveats The idealised sequence of the IMRAD structure has on occasion been criticised for being too rigid and simplistic. In a radio talk in 1964 the Nobel laureate Peter Medawar criticised this text structure for not giving a realistic representation of the thought processes of the writing scientist: "… the scientific paper may be a fraud because it misrepresents the processes of thought that accompanied or gave rise to the work that is described in the paper".[12] Medawar's criticism was discussed at the XIXth General Assembly of the World Medical Association in 1965.[13][14] While respondents may argue that it is too much to ask from such a simple instructional device to carry the burden of representing the entire process of scientific discovery, Medawar's caveat expressed his belief that many students and faculty throughout academia treat the structure as a simple panacea. Medawar and others have given testimony both to the importance and to the limitations of the device. Abstract considerations In addition to the scientific article itself a brief abstract is usually required for publication. The abstract should, however, be composed to function as an autonomous text, even if some authors and readers may think of it as an almost integral part of the article. The increasing importance of well-formed autonomous abstracts may well be a consequence of the increasing use of searchable digital abstract archives, where a well-formed abstract will dramatically increase the probability for an article to be found by its optimal readership.[15] Consequently, there is a strong recent trend toward developing formal requirements for abstracts, most often structured on the IMRAD pattern, and often with strict additional specifications of topical content items that should be considered for inclusion in the abstract.[16] Such abstracts are often referred to as "structured abstracts".[17] The growing importance of abstracts in the era of computerized literature search and information overload has led some users to modify the IMRAD acronym to AIMRAD, in order to give due emphasis to the abstract. Heading style variations Usually, the IMRAD article sections use the IMRAD words as headings. A few variations can occur, as follows: Many journals have a convention of omitting the "Introduction" heading, based on the idea that the reader who begins reading an article does not need to be told that the beginning of the text is the introduction. This print-era proscription is fading since the advent of the Web era, when having an explicit "Introduction" heading helps with navigation via document maps and collapsible/expandable TOC trees. (The same considerations are true regarding the presence or proscription of an explicit "Abstract" heading.) In some journals, the "Methods" heading may vary, being "Methods and materials", "Materials and methods", or similar phrases. Some journals mandate that exactly the same wording for this heading be used for all articles without exception; other journals reasonably accept whatever each submitted manuscript contains, as long as it is one of these sensible variants. The "Discussion" section may subsume any "Summary", "Conclusion", or "Conclusions" section, in which case there may or may not be any explicit "Summary", "Conclusion", or "Conclusions" subheading; or the "Summary"/"Conclusion"/"Conclusions" section may be a separate section, using an explicit heading on the same heading hierarchy level as the "Discussion" heading. Which of these variants to use as the default is a matter of each journal's chosen style, as is the question of whether the default style must be forced onto every article or whether sensible inter-article flexibility will be allowed. The journals which use the "Conclusion" or "Conclusions" along with a statement about the "Aim" or "Objective" of the study in the "Introduction" is following the newly proposed acronym "IaMRDC" which stands for "Introduction with aim, Materials and Methods, Results, Discussion, and Conclusion."[18] Other elements that are typical although not part of the acronym Disclosure statements (see main article at conflicts of interest in academic publishing) Reader's theme that is the point of this element's existence: "Why should I (the reader) trust or believe what you (the author) say? Are you just making money off of saying it?" Appear either in opening footnotes or a section of the article body Subtypes of disclosure: Disclosure of funding (grants to the project) Disclosure of conflict of interest (grants to individuals, jobs/salaries, stock or stock options) Clinical relevance statement Reader's theme that is the point of this element's existence: "Why should I (the reader) spend my time reading what you say? How is it relevant to my clinical practice? Basic research is nice, other people's cases are nice, but my time is triaged, so make your case for 'why bother'" Appear either as a display element (sidebar) or a section of the article body Format: short, a few sentences or bullet points Ethical compliance statement Reader's theme that is the point of this element's existence: "Why should I believe that your study methods were ethical?" "We complied with the Declaration of Helsinki." "We got our study design approved by our local institutional review board before proceeding." "We got our study design approved by our local ethics committee before proceeding." "We treated our animals in accordance with our local Institutional Animal Care and Use Committee." Diversity, equity, and inclusion statement[19] Reader's theme that is the point of this element's existence: "Why should I believe that your study methods consciously included people?" (for example, avoided inadvertently underrepresenting some people—participants or researchers—by race, ethnicity, sex, gender, or other factors) "We worked to ensure that people of color and transgender people were not underrepresented among the study population." "One or more of the authors of this paper self-identifies as living with a disability." "One or more of the authors of this paper self-identifies as transgender." Additional standardization (reporting guidelines) This article's use of external links may not follow Wikipedia's policies or guidelines. Please improve this article by removing excessive or inappropriate external links, and converting useful links where appropriate into footnote references. (March 2022) (Learn how and when to remove this template message) In the late 20th century and early 21st, the scientific communities found that the communicative value of journal articles was still much less than it could be if best practices were developed, promoted, and enforced. Thus reporting guidelines (guidelines for how best to report information) arose. The general theme has been to create templates and checklists with the message to the user being, "your article is not complete until you have done all of these things." In the 1970s, the ICMJE (International Committee of Medical Journal Editors) released the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (Uniform Requirements or URM). Other such standards, mostly developed in the 1990s through 2010s, are listed below. The academic medicine community is working hard on trying to raise compliance with good reporting standards, but there is still much to be done;[20] for example, a 2016 review of instructions for authors in 27 emergency medicine journals found insufficient mention of reporting standards,[21] and a 2018 study found that even when journals' instructions for authors mention reporting standards, there is a difference between a mention or badge and enforcing the requirements that the mention or badge represents.[22] The advent of a need for best practices in data sharing has expanded the scope of these efforts beyond merely the pages of the journal article itself. In fact, from the most rigorous versions of the evidence-based perspective, the distance to go is still quite formidable.[23] FORCE11 is an international coalition that has been developing standards for how to share research data sets properly and most effectively. Most researchers cannot be familiar with all of the many reporting standards that now exist, but it is enough to know which ones must be followed in one's own work, and to know where to look for details when needed. Several organizations provide help with this task of checking one's own compliance with the latest standards: The EQUATOR Network The BioSharing collaboration (biosharing.org) Several important webpages on this topic are: NLM's list at Research Reporting Guidelines and Initiatives: By Organization The EQUATOR Network's list at Reporting guidelines and journals: fact & fiction TRANSPOSE (Transparency in Scholarly Publishing for Open Scholarship Evolution), "a grassroots initiative to build a crowdsourced database of journal policies," allowing faster and easier lookup and comparison, and potentially spurring harmonization Relatedly, SHERPA provides compliance-checking tools, and AllTrials provides a rallying point, for efforts to enforce openness and completeness of clinical trial reporting. These efforts stand against publication bias and against excessive corporate influence on scientific integrity. Reporting standards in the scientific literature Short name Longer name Best link Organization that fostered it Goals/Notes AMSTAR (A Measurement Tool to Assess Systematic Reviews) amstar.ca AMSTAR team Provides a tool to test the quality of systematic reviews ARRIVE (Animal Research: Reporting of In Vivo Experiments) www.nc3rs.org.uk/arrive-guidelines NC3Rs Seeks to improve the reporting of research using animals (maximizing information published and minimizing unnecessary studies) CARE (Consensus-based Clinical Case Reporting Guideline Development) www.equator-network.org/reporting-guidelines/care CARE Group Seeks completeness, transparency, and data analysis in case reports and data from the point of care CHEERS (Consolidated Health Economic Evaluation Reporting Standards) www.ispor.org/Health-Economic-Evaluation-Publication-CHEERS-Guidelines.asp ISPOR Seeks value in health care CONSORT (Consolidated Standards of Reporting Trials) www.consort-statement.org CONSORT Group Provides a minimum set of recommendations for reporting randomized trials COREQ (Consolidated Criteria for Reporting Qualitative Research) www.equator-network.org/reporting-guidelines/coreq/ University of Sydney Seeks quality in reporting of qualitative research by providing a 32-item checklist for interviews and focus groups EASE guidelines (EASE Guidelines for Authors and Translators of Scientific Articles to be Published in English www.ease.org.uk/publications/author-guidelines-authors-and-translators/ EASE Seeks quality reporting of all scientific literature Empirical Standards ACM SIGSOFT Empirical Standards for Software Engineering Research ACM SIGSOFT Provides methodology-specific research and reporting guidelines, checklists and reviewing systems ENTREQ (Enhancing Transparency in Reporting the Synthesis of Qualitative Research) www.equator-network.org/reporting-guidelines/entreq/ Various universities Provides a framework for reporting the synthesis of qualitative health research FAIR (findability, accessibility, interoperability, and reusability) doi.org/10.1038/sdata.2016.18 Various organizations High-level goals, allowing for various ways to achieve them; specifies "what" is wanted and "why", allowing the "how" to be determined by the researcher ICMJE (Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals; formerly known as the Uniform Requirements for Manuscripts Submitted to Biomedical Journals) www.icmje.org/recommendations ICMJE Seeks quality in medical journal articles JARS Journal Article Reporting Standards www.apastyle.org/manual/related/JARS-MARS.pdf American Psychological Association Seeks quality in psychological research reporting; published in the appendix of the APA Publication Manual MARS Meta-Analysis Reporting Standards www.apastyle.org/manual/related/JARS-MARS.pdf American Psychological Association Seeks quality in psychological research reporting; published in the appendix of the APA Publication Manual MI Minimum Information standards biosharing.org Various organizations A family of standards for bioscience reporting, developed by the various relevant specialty organizations and collated by the BioSharing portal (biosharing.org) (formerly collated by the MIBBI portal [Minimum Information about a Biomedical or Biological Investigation]) MOOSE (Meta-analysis Of Observational Studies in Epidemiology) jamanetwork.com/journals/jama/article-abstract/192614 MOOSE group (various organizations) Seeks quality in meta-analysis of observational studies in epidemiology NOS (Newcastle–Ottawa scale) University of Newcastle, Australia and University of Ottawa Assesses quality of nonrandomized studies included in a systematic review and/or meta-analysis PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) www.prisma-statement.org PRSIMA group Seeks quality in systematic reviews and meta-analyses, especially in the medical literature, but applicable to most scientific literature; PRISMA supersedes QUOROM REMARK (Reporting Recommendations for Tumor Marker Prognostic Studies) doi.org/10.1093/jnci/dji237 NCI and EORTC Seeks quality in reporting of tumor marker research RR (registered reports) cos.io/rr Center for Open Science Applies the principles of preregistration with the aim to improve both the quality of science being done and the quality of its reporting in journals. Aims to improve the incentivization of scientists by removing perverse incentives that encourage publication bias and inappropriate/excessive forms of post hoc analysis; it involves two peer review steps: one before results reporting (to review methodology alone) and another after results reporting. SAMPL (Statistical Analyses and Methods in the Published Literature) www.equator-network.org/wp-content/uploads/2013/03/SAMPL-Guidelines-3-13-13.pdf Centre for Statistics in Medicine at Oxford University Seeks quality in statistics in the biomedical literature SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) www.spirit-statement.org SPIRIT Group (various organizations) Seeks quality in clinical trial protocols by defining an evidence-based set of items to address in every protocol SQUIRE (Standards for Quality Improvement Reporting Excellence) www.squire-statement.org SQUIRE team (various organizations) Provides a framework for reporting new knowledge about how to improve healthcare; intended for reports that describe system level work to improve the health care quality, patient safety, and value in health care SRQR (Standards for Reporting Qualitative Research: A Synthesis of Recommendations) doi.org/10.1097/ACM.0000000000000388 Various medical schools Provides standards for reporting qualitative research STAR Structured, Transparent, Accessible Reporting www.cell.com/star-authors-guide Cell Press Improved reporting of methods to aid reproducibility and researcher workflow[24] STARD (Standards for the Reporting of Diagnostic Accuracy Studies) www.stard-statement.org STARD Group (various organizations) Diagnostic accuracy STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) www.strobe-statement.org STROBE Group (various organizations) Seeks quality in reporting of observational studies in epidemiology TOP (Transparency and Openness Promotion) cos.io/top/ (Center for Open Science) Codifies 8 modular standards, for each of which a journal's editorial policy can pledge to meet a certain level of stringency (Disclose, Require, or Verify) TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) www.cdc.gov/trendstatement TREND Group (various organizations) Seeks to improve the reporting standards of nonrandomized evaluations of behavioral and public health interventions TRIPOD (Transparent Reporting of a Multivariable Prediction Model for Individual Prognosis or Diagnosis) doi.org/10.7326/M14-0697 Centre for Statistics in Medicine (Oxford University) and Julius Center for Health Sciences and Primary Care (University Medical Center Utrecht) Provides a set of recommendations for the reporting of studies developing, validating, or updating a prediction model, whether for diagnostic or prognostic purposes URM / ICMJE (Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals; formerly known as the Uniform Requirements for Manuscripts Submitted to Biomedical Journals) www.icmje.org/recommendations ICMJE Seeks quality in medical journal articles See also Case report Case series Eight-legged essay Five paragraph essay IRAC Journal Article Tag Suite (JATS) Literature review Meta-analyses Schaffer paragraph References ^ P. 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doi:10.1016/j.cell.2016.08.021. PMID 27565332. Retrieved from " Academic research papers in STEM disciplines typically follow a well-defined I-M-R-A-D structure: Introduction, Methods, Results And Discussion (Wu, 2011). Although not included in the IMRAD name, these papers often include a Conclusion. Introduction The Introduction typically provides everything your reader needs to know in order to understand the scope and purpose of your research. This section should provide: Context for your research (for example, the nature and scope of your topic) A summary of how relevant scholars have approached your research topic to date, and a description of how your research makes a contribution to the scholarly conversation An argument or hypothesis that relates to the scholarly conversation A brief explanation of your methodological approach and a justification for this approach (in other words, a brief discussion of how you gather your data and why this is an appropriate choice for your contribution) The main conclusions of your paper (or the “so what”) A roadmap, or a brief description of how the rest of your paper proceeds Methods The Methods section describes exactly what you did to gather the data that you use in your paper. This should expand on the brief methodology discussion in the introduction and provide readers with enough detail to, if necessary, reproduce your experiment, design, or method for obtaining data; it should also help readers to anticipate your results. The more specific, the better! These details might include: An overview of the methodology at the beginning of the section A chronological description of what you did in the order you did it Descriptions of the materials used, the time taken, and the precise step-by-step process you followed An explanation of software used for statistical calculations (if necessary) Justifications for any choices or decisions made when designing your methodsBecause the methods section describes what was done to gather data, there are two things to consider when writing. First, this section is usually written in the past tense (for example, we poured 250ml of distilled water into the 1000ml glass beaker).
Second, this section should not be written as a set of instructions or commands but as descriptions of actions taken. This usually involves writing in the active voice (for example, we poured 250ml of distilled water into the 1000ml glass beaker), but some readers prefer the passive voice (for example, 250ml of distilled water was poured into the 1000ml beaker). It’s important to consider the audience when making this choice, so be sure to ask your instructor which they prefer.
Results The Results section outlines the data gathered through the methods described above and explains what the data show. This usually involves a combination of tables and/or figures and prose.
In other words, the results section gives your reader context for interpreting the data. The results section usually includes: A presentation of the data obtained through the means described in the methods section in the form of tables and/or figures Statements that summarize or explain what the data show Highlights of the most important resultsTables should be as succinct as possible, including only vital information (often summarized) and figures should be easy to interpret and be visually engaging.
When adding your written explanation to accompany these visual aids, try to refer your readers to these in such a way that they provide an additional descriptive element, rather than simply telling people to look at them. This can be especially helpful for readers who find it hard to see patterns in data. Discussion The Discussion section explains why the results described in the previous section are meaningful in relation to previous scholarly work and the specific research question your paper explores. This section usually includes: Engagement with sources that are relevant to your work (you should compare and contrast your results to those of similar researchers) An explanation of the results that you found, and why these results are important and/or interestingSome papers have separate Results and Discussion sections, while others combine them into one section, Results and Discussion. There are benefits to both. By presenting these as separate sections, you’re able to discuss all of your results before moving onto the implications. By presenting these as one section, you’re able to discuss specific results and move onto their significance before introducing another set of results. Conclusion The Conclusion section of a paper should include a brief summary of the main ideas or key takeaways of the paper and their implications for future research. This section usually includes: A brief overview of the main claims and/or key ideas put forth in the paper A brief discussion of potential limitations of the study (if relevant) Some suggestions for future research (these should be clearly related to the content of your paper)