

## Column: Tips on Research and publication

### WRITING THE INTRODUCTION SECTION IN A MANUSCRIPT

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As per the widely followed IMRAD structure, the introduction is the first section in a research manuscript. The section is a straightforward statement of why your research was needed in the first place. It is best organized into three parts, without any subheadings: begin with what is known in the field, then bring out the existing gaps in knowledge in that area, and then unveil your plan of attack, i.e., the study objectives.

The introduction section is best written after writing most other sections of the manuscript. One recommended order of writing a manuscript is tables and figures, results, methods, introduction, discussion, and abstract (the acronym TReMIDA may be useful to remember this).

In terms of the breadth in which the material is covered, the shape of the final manuscript is like an ‘hour-glass.’ The introduction starts in a broad manner, starting with information about your topic that is more general than what is covered in your study. Then the focus is gradually narrowed down to your actual topic. The methods and results sections maintain that narrow focus, and in the end, the discussion section gradually broadens again when you discuss the implications of your findings, generalizability, etc.

#### Organization of introduction section

Swales suggested the “Create a Research Space (CARS)” model of writing the introduction section. It involves three “moves”: a) Establishing a territory (setting the context of the research); b) Establishing a

Niche (identifying the knowledge gap); and c) Occupying the niche (explaining how you are going to fill the research space you just identified). The following six categories of *elements* go into the introduction section: Leave out any information that does not fit into one of these.

#### 1. Importance and magnitude of the problem

The opening sentence (or paragraph) should briefly assert how significant, relevant, and important your chosen topic is (e.g., “Many women with migraine report an association between migraine attacks and menses,” “Major depression is a common mental disorder with a serious public health impact.”). Such statements usually require no citation. However, statements that include exact rates should be cited, especially if intended for a wide readership who may not be familiar with them (e.g., “Schizophrenia is a severe mental disorder prevalent in 0.8% of the population” may require citation if published in a journal for general practitioners). Phrases that may be useful for highlighting the importance are “Recently there is a surge in interest in ...” or “Discussion on X is relevant as ...”.

#### 2. Background of the research question

Next, introduce the terminology that is specific to your study area. Depending on the target readers of the intended journal, some terms may need to be defined. For example, suppose you are submitting to a general medical journal. In that case, terms such as magical

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thinking or metacognition may need to be defined, which may not be necessary if you are submitting to a psychiatry journal. Likewise, the “historical candidate gene” need not be defined if you are submitting to a genetics journal. Still, the meaning will need an explanation if you are submitting to a general psychiatry journal.

Many inexperienced authors elaborate the terms in their title in individual paragraphs. This is unnecessary. For example, suppose the topic is “Theory of Mind and Executive Functions in Obsessive-Compulsive Disorder.” In that case, there is no need to have one paragraph in which you talk in detail about Theory of Mind, then another paragraph about executive functions, followed by one paragraph on obsessive-compulsive disorder, like that.

Abbreviations should be defined within brackets following the full term to which they apply. Once introduced, use them throughout the paper. For example, “Major depressive disorder (MDD) is a common disorder with implications for psychological, immunological, and metabolic health. Although the psychosocial consequences were known for long, the understanding of metabolic effects of MDD is relatively recent.”

### 3. *Previous research in the area*

Cite the “seminal articles” in the field, sometimes even mentioning the first author by name. If there is a recent (and thorough) review article, that is also worth citing. If several studies need to be included, use a summary table. If a recent systematic review is available in that area, use its findings to provide a summary of the existing literature. Any studies done after the data collection date of the systematic review can then be included separately.

You may have reviewed the literature while preparing your protocol months or even years ago. Now that you have completed the study and are preparing it for publication, don’t forget to update your previous review – many more studies may have got published in the meantime, and you should not leave it to the journal editors or peer reviewers to point them out to you.

Read the full text of all relevant articles, not just the abstracts. To make their abstracts more attractive, the authors of those articles may have presented a highly

selective or distorted version of their findings. By blindly believing and reproducing the interpretations served in the abstracts, you would be misleading your own readers. Besides, the reviewers would have read the full articles and may give a verdict against you for misrepresenting the existing literature.

Rarely is it necessary to list more than ten articles in the introduction. Leave detailed descriptions, speculations, and criticisms of specific studies for the discussion section.

Consider citing studies in chronologic order, beginning with the oldest one (e.g., Praharaaj et al. 2006; Ameen et al. 2014; Praharaaj and Ameen 2018). While citing previous research, the authors’ names can be part of the sentence, i.e., integral citation (e.g., “Praharaaj et al. reported that ...”), or can appear in parentheses only, i.e., nonintegral citation [e.g., “Several studies have suggested that .... (Praharaaj et al. 2010; Ameen et al. 2017)].

### 4. *Problems with available research*

Next, bring out the shortcomings of the previous research you just listed. Common mistakes in published research you should be able to identify easily include wrong study design leading to inappropriate conclusions, limited generalizability because of the selected sample, problems in arriving at a correct diagnosis, use of imperfect measurement instruments, very short follow-up period, inappropriate statistical analysis, etc. Other ways to identify the gaps in the knowledge would be to bring out questions raised in previous research or extending a previous work (e.g., “Praharaaj et al. have demonstrated X ...., which raises several questions including ...” or “Study by Ameen et al. suggested X. Further work is needed to establish Y”).

However, the following principles should be kept in mind: a) Don’t criticize an aspect of a study unless your work represents an improvement (e.g., criticizing a previous study of being cross-sectional in design when your study too has the same design); b) Don’t be hypercritical or overly detailed in your criticism. That is unprofessional. Besides, the possibility also exists that the researchers you are criticizing may be selected as your manuscript’s peer reviewers. This is very likely because editors assign research manuscripts to

researchers who have worked on the area or are cited in the article; c) Avoid antagonistic phrases (e.g. 'failed to,' 'made the mistake of,' 'used invalid techniques,' etc.); d) Avoid singling out a specific author for blame; instead, describe the general category of the problem (e.g., "It is difficult to infer causality in cross-sectional design").

Some techniques are useful in criticizing previous literature in a manner that does not put you in a bad light or cause the criticized researchers to feel animosity towards you. One way is to cite another author who has criticized the study in an editorial, review, or letter to the editor (e.g., "Some have suggested that the results of this study can be interpreted as showing..."). Also, the use of the passive voice (e.g., "The results of that study have been questioned because...") makes your criticism appear milder.

If nothing is wrong with previous research, you can substantiate the need for your study by highlighting the inconsistencies (e.g. "Of the four previous studies, two found that treatment X was effective, one did not show any benefit, whereas yet another one revealed a worsening of the symptoms"). Another technique you can use here is to refer to gaps in current knowledge (e.g., "However, it is still unknown whether the high rate of internet addiction in adolescents is related to...").

#### 5. *What you did to fix those problems*

After summarizing the drawbacks in the previous research on the topic, position your study as a solution to at least some of those problems. That way, the editors, reviewers, and readers will recognize that your study makes a significant contribution to the field.

You can achieve this by highlighting the innovative features of your design, sample, or measurement methods. Explain how these measures will overcome the deficiencies in previous research and fill the gap in the knowledge you have identified. For example, if the cross-sectional design was not appropriate to answer the question, you can highlight that yours, being a longitudinal study, overcomes that limitation. Another example could be that your study has a longer follow up period, as shorter follow-ups in previous studies were not adequate to examine the persistence of some effects. You can also point out that your sampling was better and hence has better generalizability (e.g., random sampling over convenient sampling, community-based

sample over hospital sample). The selection of controls could be more representative of the population of interest (e.g., use of 'neighbourhood' sample from the same catchment area as that of the cases, rather than the hospital staff, as controls). Or, the measurement instruments you used may be culturally valid and, thus, more appropriate for the local population.

#### 6. *Aims and hypothesis*

End the introduction with a one-sentence overview of your study. Some readers may regard a "tested-the-hypothesis" statement as pedantic, artificial, and not in the clinical idiom. Better pose the research purpose as a question. Mention only the central question, even if you have examined several other variables (e.g., "We conducted a cross-sectional study to determine whether condition X is associated with risk factor Y"). Mentioning the hypothesis conveys clarity of thought to the readers. For example, say "We hypothesized that there is a positive association between X and Y," rather than an awkward statement such as "This is an attempt to find whether there is an association between X and Y." It is not always necessary to write a null hypothesis (e.g. "There is no association between X and Y"), and an alternate hypothesis is acceptable if it is backed by theory.

#### **Language is important**

##### *Style of writing*

Many authors use the *pedantic style* to summarize previous research. Here, all the individual studies are described. (e.g., "There have been six previous studies in this area. Varma et al., in a study of 83 patients from Chandigarh, found... Mathew and Nair, studying 46 patients in Vellore, showed... Kumar et al. followed 79 patients and found..."). This style of writing can be boring for the readers. In contrast, the *synthetic style* is better appreciated. Here, as the name implies, you write a synthesis of the findings of the previous studies (e.g., "Previous studies in this area have had conflicting results, some suggesting that..., whereas others found that...")

##### *Tense*

Use present simple tense when the research findings have the status of a fact (e.g., "Major depression is a common mental disorder with a serious public health impact"). When citing single reports, use the simple

past tense (e.g., “Praharaj and Ameen reported that ...”). When summarizing the findings as in the synthetic style mentioned above, use the present perfect tense (e.g., “Other investigators have shown that...” or “Several studies have reported....”). The present perfect tense is to be also preferred when the statement is considered more relevant to the current situation (e.g., “In the available literature, insufficient attention has been paid to the...”).

#### *Choose the verbs with care*

The verbs you use while citing previous research should inform the readers about the nature of the observation – i.e., whether that was an opinion, a research finding, etc. While referring to findings of actual research, use verbs such as associated, compared, demonstrated, examined, observed, showed, etc. (e.g., “Praharaj et al. observed that .....”). On the other hand, if you are talking about what the previous researchers said about their work, in their discussion or conclusion section for example, use verbs such as hypothesized, noted, proposed, or stated (e.g., Ameen et al. hypothesized .....”). Also, if you are talking not about research findings but the opinions or general personal observations of those authors, use verbs such as noted, postulated, stated, opined, etc. (e.g., “Ameen and Praharaj opined that...”).

#### **How long should the section be?**

This should be the leanest section in the manuscript. However, in reality, in most submitted manuscripts, this

section is 30 to 40% of the overall space. A good manuscript should have an introduction section that doesn't take more than 10% space. One reason why this happens is that while preparing the journal paper, authors copy paste lots of text from the literature review section of their theses or dissertations. In contrast to dissertations, not all literature, but only the relevant ones, need to be cited in the introduction. The literature review is a part of the introduction and is not written under a separate heading.

#### **All is well that begins well!**

A good introduction will bind the reader to the manuscript. It brings clarity to the whole manuscript. This section may require several revisions before a crisp introduction is ready. Spend a little more time in writing this, revise, and take opinions from friends and experienced researchers before finalizing this section.

#### **Suggested readings**

1. Cargill M, O'Connor P. Writing Scientific Research Articles - Strategy and Steps. John Wiley & Sons: Chichester, UK. 2009.
2. John M. Swales's Genre Analysis: English in Academic and Research Settings. Cambridge University Press: Cambridge, UK. 1990.
3. Katz MJ. From Research to Manuscript - A Guide to Scientific Writing, 2e. Springer Science: Cleveland. 2009.