



## Abstracts in Scientific Research Papers (IMRaD)

IMRaD refers to reports with the structure Introduction-Method-Results-Discussion used in empirical research in natural and social sciences. Please refer to the Writing Center quick guide “Writing an IMRaD Report” for more explanations.

An effective abstract in an IMRaD\* report provides the reader with a **concise, informative summary of the entire paper**. An IMRaD abstract should stand on its own; it is *not* a part of the introduction. The abstract should clearly preview the paper’s content, allowing the reader to decide if the information is relevant to them and whether they should read the whole report. Abstracts should contain keywords and phrases that allow for easy searching online.

An IMRaD abstract is typically a single paragraph of 150-300 words. However, abstract conventions can vary by discipline or publication venue (e.g., journal). Because the IMRaD abstract is a concise summary of the whole paper, writers draft their abstracts after they have written a full draft of their IMRaD report.

### Common Moves in Abstracts

An abstract contains elements of all sections of the IMRaD report: Introduction, Method, Results, and Discussion. The table below explains

Move	Functions	Questions to Ask
<b>Establishing the context</b> (this move is optional; if it is included, writers use one or more of the functions from the next column)	Providing background information about the context of research;  Pointing out the importance of the current study; Identifying gaps in previous research.	What has been known about the field/topic of research? Why is it important to look at this specific topic from the angle you chose? What has not been investigated previously?

<b>Stating the purpose</b>	Indicating the purpose of the current study or what this study does	What is the purpose of the study?
<b>Describing methodology</b>	Describing the materials, subjects, variables, procedures	How was the research done?
<b>Presenting the results</b>	Reporting the main results/findings of the research	What did the research find?
<b>Discussing the findings</b> (this move is optional; if it is included, writers use one or more of the functions from the next column)	Interpreting the results; Proving recommendations; Discussing implications or applications.	What do the results mean? What recommendations can be made based on the study results? What implications or applications do the findings lead to?

This table is adapted from Doro, K. (2013). The rhetoric structure of research article abstracts in English studies journals. *Prague Journal of English Studies*, 2(1), 125-26.

<https://core.ac.uk/download/pdf/80769215.pdf> and Samraj, B. (2005). An exploration of a genre set: Research article abstracts and introduction in two disciplines. *English for Specific Purposes*, 24, 141-56.

### Sample Abstracts

- *Simple text* = Establishing the context
- *Italics* = Stating the purpose/introducing the study
- Underlined = Describing methodology
- **Bold** = Presenting the results
- ***Bolded Italics*** = Discussing the findings

### Abstract 1

Teachers' social support and classroom management are related to secondary students' achievement, domain-specific interest, and self-concept. However, little is known about whether social support and classroom management shape secondary students' general school adjustment beyond these domain-specific outcomes. To investigate this question, we drew on data from a large longitudinal research project (N = 5,607 secondary students, N = 227 classes). We applied student and teacher ratings of social support and classroom management to investigate their perspective-specific validities for predicting student outcomes. To measure students' school adjustment, we assessed achievement as a domain-specific indicator and school satisfaction, truancy, and self-esteem as more general aspects. **Multilevel confirmatory factor analyses showed that both teachers and students distinguished between social support and classroom management. Teacher and student ratings of classroom**

management largely converged, whereas their perceptions of social support were not statistically significantly associated with one another. In multilevel structural equation modeling, both perspectives uniquely predicted students' school adjustment: Student-rated social support was linked to all outcomes at the student level and to school satisfaction and self-esteem at the class level. Classroom management showed only weak associations with outcomes at the student level, but at the class level, student-rated classroom management was related to truancy and teacher-rated classroom management was linked to school satisfaction and student achievement. *These findings highlight the important role of teachers in students' general school adjustment and show the benefit of considering different perspectives and levels of analyses.* (PsycINFO Database Record (c) 2018 APA, all rights reserved).

From Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Social support and classroom management are related to secondary students' general school adjustment: A multilevel structural equation model using student and teacher ratings. *Journal of Educational Psychology, 110*(8), 1066–1083.

## Abstract 2

*We present an algorithm for simultaneous face detection, landmarks localization, pose estimation and gender recognition using deep convolutional neural networks (CNN). The proposed method called, HyperFace, fuses the intermediate layers of a deep CNN using a separate CNN followed by a multi-task learning algorithm that operates on the fused features. It exploits the synergy among the tasks which boosts up their individual performances. Additionally, we propose two variants of HyperFace: (1) HyperFace-ResNet that builds on the ResNet-101 model and achieves significant improvement in performance, and (2) Fast-HyperFace that uses a high recall fast face detector for generating region proposals to improve the speed of the algorithm. Extensive experiments show that the proposed models are able to capture both global and local information in faces and performs significantly better than many competitive algorithms for each of these four tasks.*

From Ranjan, R., Patel, V. M., and Chellappa, R. (2019). Hyperface: a deep multi-task learning framework for face detection, landmark localization, pose estimation, and gender recognition. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 41*(1), 121-135.

As can be seen from the two examples above, different disciplines and journals use introduction moves differently. Therefore, before writing an abstract for your study, you should read published IMRaD abstracts from your field to familiarize yourself with the conventions and expectations of your discipline.

## Common Problems to Avoid in IMRaD Abstracts

1. The abstract provides a statement of what the paper will ask or explore rather than what it found:

X This report examines the causes of oversleeping. (What did it find out about these causes?)

√ Individuals oversleep because they go to bed too late, forget to set their alarms, and keep their rooms dark.

2. The abstract provides general categories rather than specific details in the findings:

X The study draws conclusions about which variables are most important in choosing a movie theater. (What, specifically, are these variables?)

√ The study concludes that the most important variables in choosing a movie theater are comfortable seats and high-quality popcorn.

### Activity to Help You Prepare for Writing an IMRaD Abstract

To prepare for writing IMRaD abstracts, find several IMRaD articles from journals in your discipline, and use the following questions to analyze the abstracts:

- How many paragraphs do the abstracts consist of? How many words do they contain?
- Which moves are present in these abstracts? Which are absent?
- Do the authors include citations in the abstracts? If they do, in which moves and for which purposes?
- Which verb tenses are used in each move?
- Do the authors include numbers and statistics? If they do, in which moves?
- How many keywords are included at the end of the abstract? How do you think the authors decided which keyword to include?

### References:

- Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Social support and classroom management are related to secondary students' general school adjustment: A multilevel structural equation model using student and teacher ratings. *Journal of Educational Psychology, 110*(8), 1066–1083.
- Ranjan, R., Patel, V. M., & Chellappa, R. (2019). Hyperface: a deep multi-task learning framework for face detection, landmark localization, pose estimation, and gender recognition. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 41*(1), 121-135.