

METHODS



PRINCIPLES OF METHODS SECTION

- When to write?
 - **often the first place to begin**
- Where to put?
 - **usually after the Introduction / also in the appendix**
- What to address?

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 - **condensed / intermediate / extended**

H o w - - - - - W h y
←-----→
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IS IT IMPORTANT?

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“If an abstract is of interest, the editor next looks at the methods section of the manuscript before deciding whether to reject the paper or pass it on to the screening editor on duty for that day. The screening editor decides whether the manuscript should be sent for external review.”

IS IT IMPORTANT?

➤ the raison d'être of your advisor

STRUCTURES OF METHODS SECTION

Method (differently titled)

- Approach

 - Technique

 - Experiments

 - The Model

 - Model Specification

STRUCTURES OF METHODS SECTION

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➤ Approach

Technique

Experiments

The Model

Model Specification

Subsections (often needed)

STRUCTURES OF METHODS SECTION

Method (differently titled)

Approach

“The Combination of Forecasts”

Technique

I. Choice of Method for Determining Weights

Experiments

II. Desirable Properties of Methods

The Model

III. Performance of Different Methods

Model Specification

IV. Minor Modifications to Methods

Subsections (often needed)

OVERALL SHAPE OF METHODS SECTION

Overview:

Research aims, questions, hypotheses:

Subjects / Materials:

Location:

Procedure:

Limitations:

Data Analysis:

(pp. 291-2)

Although Methods sections have been somewhat under-researched compared to other parts of RPs, especially Introductions, some interesting disciplinary differences have been highlighted in recent research. For instance, Peacock (2011) examined 288 RP Methods sections in published, data-driven papers from the fields of Biology, Chemistry, Physics, Environmental Science, Business, Language and Linguistics, Law, and Public and Social Administration (36 papers from each field). He proposed the existence of seven “moves” in Methods sections. Simply put, a *move* is a stretch of text with a specific communicative function. Moves are a matter of rhetoric. This concept is addressed in more detail in Unit Eight.

Move

Overview	a short summary of the research method, at or near the beginning of the Methods section
Research aims, questions, or hypotheses	a description of the research goals, the questions to be answered, or the hypotheses
Subjects and/or materials	in Business, Language and Linguistics, Law, and Public and Social Administration, a description of the people (groups of people) in the study; and in the sciences, a description of the materials, equipment, and so on
Location	a description of where the research took place and possibly why
Procedure	a discussion of the process used to obtain the data that was collected
Limitations	a focus on a shortcoming of the method, possibly accompanied by an explanation
Data Analysis	a description of how the data was analyzed

Adapted from Peacock, 2011.

It is important to keep in mind that the moves do not necessarily appear in the order given. In fact, some cycling of moves, particularly materials and procedure, is common in the science fields investigated. In the remaining fields, the move cycle structure may be much more complex and variable. We can see the frequency of the moves in Table 19.

TABLE 19. Frequency of Appearance of Individual Moves: Interdisciplinary Differences (% in which the moves appear)

Moves	Biology	Chemistry	Physics	Environ- mental Science	Business	Language and Linguistics	Law	Public and Social Administration
Subjects or materials	97	100	75	31	92	94	86	86
Location	36	8	0	67	47	58	58	75
Procedure	100	100	100	100	100	100	100	100
Data analysis	86	100	67	78	72	67	56	50
Limitations	6	0	0	69	44	19	28	6
Research aims or questions/hypotheses	3	0	6	11	36	22	58	67
Overview	3	0	0	50	25	19	42	54

Based on Peacock, 2011.

OVERVIEW

Multiple instruments were deployed to continuously measure the aerosol chemical compositions, PM concentrations with different sizes, gases, and meteorological parameters. An overview of online instruments is listed in Table S1 in the supporting information, and the details are presented in the following sections.

CONDENSED vs. EXTENDED

- **Little elaboration or justification**
 - well-established and standardized procedures
- **A clear rationale presented**
 - adopting a relatively new approach to an issue
- **To include steps needed to replicate your work.**

cognitive, volitional verb

On occasion, we may also find cognitive verbs (e.g., *believe*) and/or volitional verbs (e.g., *wanted to*) used in a Methods section to explain or justify more of the thinking behind the procedures, as in this somewhat extreme example (italics added):

The corpus for this study was constructed *with a number of aims in mind*. Given the preliminary nature of the topic, *we wanted to* cover a fairly wide range of fields (or disciplines) in order to gauge the extent of the phenomenon. *We also felt it prudent* to include among the fields those which we guessed would have some use of imperatives, such as statistics . . . geology . . . *We eventually settled on* the following: . . .

Swales et al., 1998.

In effect, *condensed* methods state what the researchers did with little elaboration or justification. *Extended* methods present readers with a rationale of why and how researchers did what they did. You can elaborate your Methods by

extended

- providing useful background knowledge (e.g., through definitions and examples).
- using descriptions of procedural steps, rather than citations and/or acronyms.
- including a number of justifications (e.g., *To determine this value, we . . .*).
- using cognitive or volitional verbs (e.g., *We believed; We wanted to*).
- including *by* + *-ing* + verb + *how* statements (*This was done by reversing the order*).
- employing a wide range of linking words and phrases (e.g., time expressions, such as *next* or *prior to*).

condensed

If your methods are fairly standard you may

- assume readers have relevant background knowledge.
- sometimes use citations or acronyms to refer to processes (e.g., *A corpus was designed following Römer (2010)*).
- have few justifications.
- use few or no cognitive or volitional verbs.
- choose to avoid *by* + *-ing* + verb + *how* statements.
- employ few linking phrases.

“due to” IN METHODS SECTION

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- During the experiment, we observe a temperature increase due to the samples' heat dissipation at collector current of $>1 \mu\text{A}$, measured using the dilution-refrigerator thermometry. To reduce the effects of elevated ambient temperature on the validity of measurements, an aggressive (fast) dc sweep is performed up to 1 mA of collector current. This fast sweep allows us to obtain the device characteristics before the ambient temperature is changed by more than 50 mK from its nominal condition.

EXTENDED LANGUAGE IN METHODS SECTION

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METHODS SECTION

- DNA was extracted from tissue and feather samples using the Qiagen DNeasy Extraction kit. An addition of dithiothreitol was used for samples from feathers. Polymerase chain reaction (PCR) was carried out using two primers pairs for cytochrome B (CytB; Sorenson et al., 1999). PCR and sequencing was done following protocols in Mindell et al. (1997).

METHODS SECTION: CONDENSED

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LANGUAGE FOCUS IN METHODS SECTION

- The methods section of an experimental report typically uses the passive voice along with the past tense (Gillett & Weetman, 2006).

METHODS SECTION

- To detect groups among the specimens and extract the variables that best diagnose the groups, we used principal components analysis (PCA). Before conducting the analysis, we standardized all measurements so that each variable would have a mean of 0 and a standard deviation of 1. For the PCA, we included only continuous characters. To avoid weighting characters, we excluded characters that are probably genetically redundant, as revealed by high values for the Pearson correlation coefficient between all possible pairs of characters.

METHODS SECTION: INTERMEDIATE

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METHODS SECTION

- Although there are many different indicators for inequality measurement, the most common one is the Gini coefficient. The Gini coefficient has several merits: it satisfies both the Pigou-Dalton condition and the property of income-zero-homogeneity. The Pigou-Dalton principle suggests that if there is a transfer of income from a rich entity to a poor entity, then it should result in a decline of the inequality indicator so long as the transfer does not reverse the ranking of the two in the overall income distribution. The property of income-zero-homogeneity suggests that the value of the inequality measurement should remain unchanged when there is a scalar change of the whole income distribution.

METHODS SECTION: EXTENDED

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METHODS SECTION

- This section does not attempt to substitute for a detailed discussion of different measures of inequality. Jenkins (1991) provides an overview and a more detailed discussion of these measures as well as a review of the literature. Our main purpose here is to justify our choice of variable—the Gini coefficient complemented by income shares of population quintiles wherever possible—as a way to combine maximum coverage of countries and time periods with an acceptable level of quality.

METHODS SECTION: DON'T OVER-EXPLAIN

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METHODS SECTION

- To study the phenomenon of job-lock, one would like information on individual and family health status, worker mobility, and the health insurance plans of both the firm for which and individual works and to which one could move. Unfortunately, information on health status and health insurance is not widely available in labor force surveys, information on worker mobility is not typically available in health surveys, and information on insurance plans of companies for which an individual could have worked is nonexistent.

METHODS SECTION: LIMITATIONS

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METHODS TO READ IN CLASS

- human subjects / participants
- materials

Q & A