

Lab Reports and Projects in Sport and Exercise Science

A Guide for Students

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PEARSON

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2.9 Aims, objectives and hypotheses

At the end of the introduction or literature review you will need to state the aim(s) of your experiment. Your aims should follow on smoothly from your literature review and be based on logical reasoning (Thomas and Nelson, 2001). If you have written a clear and informative literature review the reader should have a good idea of what you intend to study or at least where the gaps in the literature exist. Your aim may further be considered to be something that is achievable or a 'resolvable question' (Hopkins *et al.*, 2009). The aim is often expected to be followed by your scientific hypotheses; this is especially true for undergraduate and postgraduate theses. In many cases the aim will be very similar to your title as this reflects what you are investigating. The objectives of a study are often required for final-year projects and essentially relate to what you will do to achieve your aims.

The hypothesis relates to what you think will happen in your study. This should be based upon the information present in your introduction or literature review and therefore previous knowledge. There are two key hypotheses usually presented: the null hypothesis, which states there is no difference between conditions; and the alternate or experimental hypothesis, which states the change in direction or magnitudes of change you expect to find. The null hypothesis is what we are testing statistically. Hence, you may read that researchers have 'rejected their null hypothesis' when a statistically significant result is obtained. A common error is to state that there will be a difference between your conditions but not stating the direction in which you think it may occur. Another common error is stating hypotheses which are not consistent with or that contradict what you have stated in the introduction or literature review.

Many students write their aim and hypotheses of their study quite quickly without much thought for their importance. However, never underestimate how important they are as they underpin everything that you do. Each section of your dissertation has an important link to your aims and hypotheses. For your methods, consider what you are actually testing. Does your study design reflect the question you are actually trying to answer? Do the variables measured reflect the responses in question? For your results, does your analysis examine the appropriate differences or relationships postulated? Within your discussion, are you actually explaining your results with your aims in mind? If not, then you may be off topic. It seems obvious that you would discuss your data in relation to your key research question but this is seldom the case in many first drafts of theses. Table 2.8 gives examples of aims, objectives and hypotheses for the three lab class examples used throughout this text.

Exercise 2.8: Writing aims and hypotheses

Based on the examples given in Table 2.8, write the aims and hypotheses for your lab report or dissertation. Are they consistent with title of your report?

Title:

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Aims:

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Objectives:

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Null Hypothesis:

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Alternative Hypothesis:

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Table 2.8 Examples of aims, objectives and hypotheses for the three lab class examples used throughout this book

<i>Lab class</i>	<i>Aim</i>	<i>Objectives</i>	<i>Null hypothesis</i>	<i>Alternative hypothesis</i>
Maximal oxygen uptake	To determine maximal oxygen uptake in running, cycling and arm ergometry.	To measure maximal oxygen uptake during treadmill running, cycling and arm ergometry.	There will be no differences in maximal oxygen uptake between exercise modes.	Maximal oxygen uptake will be greatest during treadmill running and lowest during arm ergometry.
Ground reaction forces	To determine ground reaction forces during walking and running.	To measure ground reaction forces using a force plate. To measure walking and running speed using timing gates.	There will be no differences between ground reaction forces between walking and running.	Ground reaction forces during running will be greater than those during walking.
Anxiety on performance	To determine the effects of anxiety on basketball shooting performance.	To measure basketball shooting performance. To produce high and low anxiety conditions. To measure heart rate in low and high anxiety conditions.	There will be no differences in basketball shooting performance in high and low anxiety conditions.	Basketball shooting performance will be worse in high anxiety conditions.