

Universidade Federal de Alfenas
Programa de Pós-graduação em Estatística Aplicada e Biometria
English Proficiency Exam

Registration number: _____

In this exam we present fragments of a scientific paper and ask questions regarding its interpretation. The reference is:

HOPKINS, W.G.; MARSHALL, S.W.; BATTERHAM, A.M.; HANIN, J. Progressive Statistics for Studies in Sports Medicine and Exercise Science. *Medicine & Science in sports & Exercise*. Vol. 41, No. 1, p. 3-12, 2009.

Read the text carefully and answer the questions. Don't forget, you must answer only in Portuguese! Answers in English will not be considered.

Question 1: How would you translate the title of the paper? _____

Fragment 1

In response to the widespread misuse of statistics in research, several biomedical organizations have published statistical guidelines in their journals, including the International Committee of Medical Journal Editors (www.icmje.org), the American Psychological Association (2), and the American Physiological Society (8). Expert groups have also produced statements about how to publish reports of various kinds of medical research (Table 1). Some medical journals now include links to these statements as part of their instructions to authors.

In this article we provide our view of best practice for the use of statistics in sports medicine and the exercise sciences. The article is similar to those referenced in Table 1 but includes more practical and original material. It should achieve three useful outcomes. First, it should stimulate interest and debate about constructive change in the use of statistics in our disciplines. Secondly, it should help legitimize the innovative or controversial approaches that we and others sometimes have difficulty including in publications. Finally, it should serve as a statistical checklist for researchers, reviewers and editors at the various stages of the research process.

Question 2: Why several biomedical organizations have published statistical guideline in their journals? _____

Question 3: How do some medical journals use statements produced by expert groups?_____

Question 4: What this paper is about?_____

Question 5: What are the outcomes this paper should achieve?_____

Fragment 2

Inferences are evidence-based conclusions about the true nature of something. The traditional approach to inferences in research on samples is an assertion about whether the effect is statistically significant or “real”, based on a *P* value. Specifically, when the range of uncertainty in the true value of an effect represented by the 95% confidence interval does not include the zero or null value, *P* is <0.05 , the effect “can’t be zero”, so the null hypothesis is rejected and the effect is termed significant; otherwise *P* is >0.05 and the effect is non-significant. A fundamental theoretical dilemma with this approach is the fact that the null hypothesis is always false; indeed, with a large enough sample size all effects are statistically significant. On a more practical level, the failure of this approach to deal adequately with the real-world importance of an effect is evident in the frequent misinterpretation of a non-significant effect as a null or trivial effect, even when it is likely to be substantial. A significant effect that is likely to be trivial is also often misinterpreted as substantial.

Question 6: What are inferences?_____

Question 7: Based on *P*, what is a significant effect?_____

Question 8: Explain the theoretical dilemma with this approach._____

Fragment 3

Multiple Inferences. Any conclusive inference about an effect could be wrong, and the more effects you investigate, the greater the chance of making an error. If you test multiple hypotheses, there is inflation of the Type I error rate: an increase in the chance that a null effect will turn up statistically significant. The usual remedy of making the tests more conservative is not appropriate for the most important pre-planned effect, it is seldom applied consistently to all other effects reported in a paper, and it creates problems for meta-analysts and other readers who want to assess effects in isolation. We therefore concur with others (e.g., 23) who advise against adjusting the Type I error rate or confidence level of confidence intervals for multiple effects.

Question 9: What happens if you test multiple hypotheses regarding the Type I error rate?__

Question 10: What could be the problems of making the test more conservative?_____
