Reviewer’s report

Title: Confidence Regions for Repeated Measures ANOVA Power Curves Based on Estimated Covariance

Version: 1 Date: 10 November 2012

Reviewer: Warren Comulada

Reviewer’s report:

As a researcher who frequently conducts power calculations for longitudinal studies, the central issue this article addresses is quite an important one. Since the repeated measures ANOVA design is still used in a number of fields as pointed out by the authors, the proposed methods in this article are an important addition to advance power calculation methods. The proposed methods in this article are well presented and the available software routines make them especially attractive.

I only have a few comments:

Minor Essential Revisions

Figure 1 - There are two plots that appear to be duplicates. I am assuming there should only be one plot. Maybe this only occurred in PDF sent to reviewers. Good to check.

The up-down arrow in front of probability “Pr” in (17) to (19) on page 7. The arrow notation may not be obvious to readers. I suggest definition in text, perhaps in sentence before (16), "calculated using the following (up-down arrow = ...)”.

In regards to discussion of rank of X in section on simulations and elsewhere, I would give an example of study designs, e.g. rank = 1 for power with one-group repeated measures, = 2 for two-group comparison, etc. You give examples in C.2 and C.3, but would like to see a short blurb sooner. Researchers from fields outside of imaging may be more familiar with the hierarchical set up for repeated study designs and a quick blurb when you first discuss rank will help orient them.

Discretionary Revisions

In the introduction, 2nd paragraph after the first sentence, you mention that using data from a previous study to estimate power makes the power value a random variable. While true, what is the practical consequence in non-statistical terms. As a suggested citation, see Kraemer et al. (2006), Arch Gen Psychiatry, Caution regarding the use of pilot studies to guide power calculations for study proposals. In summary, they note that if pilot studies (estimation studies) are overly favorable (e.g., small variance estimate), power will be over-estimated for the main study. Conversely, if pilot studies are too conservative, power will be under-estimated, and in turn, the main study may not get funded.
Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.