

SREE Spring 2013 Conference Methods Abstract Template

Abstract Title Page
Not included in page count.

Title: Fully Bayesian Estimation of Data from Single Case Designs

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

Description of prior research and its intellectual context.

Single case designs (SCDs) generally consist of a small number of short time series in two or more phases. The analysis of SCDs statistically fits in the framework of a multilevel model, or hierarchical model. The analysis generally is done using iteratively reweighted least squares, or restricted maximum likelihood, which estimates the variance components first, and then the fixed effects conditional on the random effects.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

The usual analysis does not take into account the uncertainty in the estimation of the random effects. This not only has an effect on the estimates of the fixed effects, but also on their standard error. This research investigates this phenomenon on a selected SCD, and compares the results with the analyses of other people on the panel.

Setting:

Description of the research location.

(May not be applicable for Methods submissions)

(not applicable)

Population / Participants / Subjects:

Description of the participants in the study: who, how many, key features, or characteristics.

(May not be applicable for Methods submissions)

(not applicable)

Intervention / Program / Practice:

Description of the intervention, program, or practice, including details of administration and duration.

(May not be applicable for Methods submissions)

(not applicable)

Significance / Novelty of study:

Description of what is missing in previous work and the contribution the study makes.

Previous work involved either separate analysis of each case, or hierarchical analysis using empirical Bayes methods. With few subjects, this leads to standard errors that are too small, and confidence intervals that are too narrow. In addition, estimates of the results for individual cases are better than individual estimates, because each case borrows strength from the others; fully Bayesian estimates are more realistic than empirical Bayes estimates because they do not assume accurate estimates of the variance components.

Statistical, Measurement, or Econometric Model:

Description of the proposed new methods or novel applications of existing methods.

The individual observations are counts out of 10 that the student is disruptive. Thus the binomial model is used. At the individual level, the equations are

$$\text{Eta}[ij] = b0j + b1j \text{ Trt}[ij] + b2j \text{ Phase}[ij] + b3j \text{ Trt}[ij] * \text{Phase}[ij]$$

$$\text{Eta}[ij] = \text{Ln}(\text{pi}[ij]/(1-\text{pi}[ij]))$$

The macro level equations have the form:

$$B[0j] = \text{ga}[00] + \text{ga}[01] \text{ ClassA}[j] + u[0j]$$

$$B[1j] = \text{ga}[10] + \text{ga}[11] \text{ ClassA}[j] + u[1j]$$

$$B[2j] = \text{ga}[20] + \text{ga}[21] \text{ ClassA}[j] + u[2j]$$

$$B[3j] = \text{ga}[30] + \text{ga}[31] \text{ ClassA}[j] + u[3j]$$

Where ClassA is a dummy variable indicating whether the student was in one classroom or the other.

Usefulness / Applicability of Method:

Demonstration of the usefulness of the proposed methods using hypothetical or real data.

(To be demonstrated)

Research Design:

Description of the research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).

(May not be applicable for Methods submissions)

(Not applicable)

Data Collection and Analysis:

Description of the methods for collecting and analyzing data.

(May not be applicable for Methods submissions)

(Not applicable)

Findings / Results:

Description of the main findings with specific details.

(May not be applicable for Methods submissions)

(Not applicable).

Conclusions:

Description of conclusions, recommendations, and limitations based on findings.

We presume the results will show the advantages of fully Bayesian estimates; otherwise we will humbly eat our words.