**When randomness opens new possibilities: Acknowledging the stimulus sampling variability in Experimental Psychology**

Ottavia M. Epifania, Pasquale Anselmi, Egidio Robusto

Experiments with fully-crossed structure are often used in different fields of experimental psychology. In these experiments, each respondent is presented with a set of stimuli representing different categories in two contrasting conditions. To analyze such data, the responses are averaged across the stimuli in each condition, and a standardized difference is obtained for each respondent (i.e., by-participant approach). Although this approach allows for obtaining an easy-to-interpret measure of the bias towards one of the conditions, it overlooks the random variability at the stimulus level, which may raise issues at two levels. The first level entails the statistical consequences of overlooking the stimulus variability (e.g., biased parameter estimates, inflated Type I error probabilities). The second level deals with the repercussion of treating the stimuli as fixed factor for the generalizability of the results at the stimulus level. This contribution presents a possible alternative analysis of fully-crossed data that allows for considering both stimuli and respondents as random factors and obtain a Rasch-like parametrization. The focus is on the categorical responses resulting from the correct vs. incorrect sorting of the stimuli in their respective categories.

Keywords: fully-crossed structure; random effects; Rasch-like parametrization;

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