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Establishing the Direction of Effect in Meta-Analyses with Multiple Treatments

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Abstract:
Establishing the Direction of Effect in Meta-Analyses with Multiple Treatments (and no obvious control condition) In the literature of meta-analysis, a standard comparison of interest is often between a treatment or intervention condition and a no-treatment control condition. In fact, the normal construction of a standardized difference effect size (e.g., Cohen's d) presumes that a positive effect size signals that the treatment has outperformed the control condition and a negative effect size indicates the reverse. However, there are a significant number of instances when the research question involves a comparison between two treatments (i.e., one intervention vs. another intervention). When this is the case, the question arises, what does any individual effect size mean, and more importantly, can meaning be attributed to the average of a distribution of effect sizes. We recently encountered such a situation while attempting to move beyond the traditional literature of classroom studies compared to the effectiveness of distance education (DE). From 2000 to 2006, ten meta-analyses were conducted in which DE conditions (including online and Web-based variations) were compared with a somewhat equivalent classroom condition. In all of these, the DE condition was designated as the treatment and the classroom condition was designated as the control condition (e.g., Bernard et al. 2004). However, in attempting to move beyond this type of comparison, by examining studies that compared different DE instructional conditions, questions arose as to the $+/-$ valence of the comparisons. In this presentation, we will describe our solution to this problem that resulted in our most recent publication (Bernard et al. 2009; in press in Review of Educational Research). The approach involved finding a theoretical construct in the literature of DE allowing us to establish a consistent valence between treatments. Using the construct of three types of interaction (student-student, student-teacher and student-content), we established a protocol for rating treatments in terms of greatest (i.e., treatment) and least interaction (i.e., control). The effect sizes, then, took on a consistent and understandable valence so that the average effect made sense. We will also describe two other aspects of this meta-analysis that allowed us to draw conclusions about the nature of interactions in DE treatments: categorizing studies by type of interaction, and estimating relative strength of each. We will provide a detailed description of these procedures and present some of the results. We will also discuss the merits of this approach and the important issues that are raised in examples from our other on-going meta-analyses using the same approach.
