Title:
Power Analysis for Moderator and Mediator Effects in Clustered Designs

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Paper 1:
Power Calculations for Binary Moderators in Cluster Randomized Trials

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Paper 2:
Power Analysis to Detect the Effects of a Continuous Moderator in 2-level Simple Cluster Randomized Experiments

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Paper 3:
Power Analysis for Cross Level Mediation in Cluster Randomized Trials

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Paper 4:
Examining Teacher, School, and Program Moderators in the Context of Teacher Professional Development Programs

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Symposium Justification

Cluster randomized trials (CRTs) have become a common design in the evaluation of educational programs and practices. The majority of CRTs are designed to enable the researcher to determine whether or not a program or practice is effective. However, it is also likely that the effect of a program may differ depending on individual or teacher characteristics, such as gender, ability level or teacher certification. In addition to these moderator effects, there are also factors that may mediate the effect of a program, such as changes in classroom instruction. The importance of identifying moderator and mediator effects is gaining more attention and is critical to consider during the design phase of a CRT.

The purpose of this symposium is to provide a framework for power analyses of moderator and mediator effects in CRTs. The first paper provides power calculations for binary moderators at any level for a 2-level CRT, 3-level CRT, 3-level multisite cluster randomized trial (MSCRT), and 4-level MSCRT. The second paper focuses specifically on a 2-level CRT and extends the work from paper 1 by providing power calculations for a continuous moderator. The third paper investigates the power to detect mediation effects, specifically addressing power calculations for cross level mediation. The final paper provides a context for applying the power calculations by providing results from an empirical investigation into the size of moderator and mediator effects in the context of teacher professional development studies. Together, the set of papers in the symposium seek to provide tools to advance the design of studies to detect important moderator and mediator effects.