Symposium Proposal
SREE 2020

Symposium Title:
Causal Mediation in Education Research: Opportunities, and challenges, of examining intervention "mechanisms"

Organizer:
Elizabeth Stuart, Johns Hopkins Bloomberg School of Public Health

Session Description:
In lay terms, mediation analysis aims to examine the "mechanisms" by which interventions achieve their effects. It is of great interest in many applied fields, including education research, with the potential to help understand which components of interventions are most necessary to achieve positive outcomes, or to understand how future interventions should be designed to take advantage of the pathways of effects. In this way the goals of mediation analysis are highly consistent with the conference theme of "practical significance and meaningful effects: Learning and communication what matters."

The methodological development of causal mediation analysis has advanced at a rapid pace in the statistical literature. However, much of that development has not been translated to applied audiences, and less attention has focused on the issues that arise in practice. In particular, recent methodological work has identified multiple causal estimands that provide different answers about the effects of mediators, but for the empirical results to be meaningful in any application, the estimand must match the scientific question. Also, in practice, data do not always support the assumptions required for consistent estimation of causal effects. In these cases, there are alternative questions that can be answered with the available data that can inform practitioners' needs.

This session will focus on recent developments in mediation analysis, and their relevance for studies of educational effectiveness. The first speaker, Dr. Nguyen, will present an accessible overview of the vast range of mediation effects that can be estimated, and how they map onto potential substantive research questions. The next two speakers will then discuss solutions to challenges that often exist in practice. Dr. Qin, will present a sensitivity analysis for an unobserved mediator/outcome confounder; even in randomized trials where the treatment is randomly assigned, confounding of the mediator/outcome relationship can lead to bias. In the third talk Dr. McCaffrey will discuss methods for identifying "true" mediators in the presence of a large number of potential mediating variables. The session will end with a discussion by Dr. Guanglei Hong, an expert in mediation analysis and its use in education research.

By covering both fundamental concepts in mediation analysis as well as data challenges in practice, the session will be useful to researchers with no knowledge of or background in mediation analysis, as well as to those with existing expertise in the area.