

ESTIMATING INDIVIDUALIZED MEDIATION EFFECTS USING SINGLE-CASE EXPERIMENTAL DESIGNS

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Details. This is an advanced workshop. Preference is half-day. Maximum number of participants is 30. The target audience is applied single-case experimental design (SCED) researchers interested in estimating individualized mediation effects using SCEDs. Prior knowledge of SCEDs, linear regression analysis, the principles of statistical inference are required. Prior knowledge of running linear regression analysis in RStudio is an advantage.

Background and Rational. SCEDs allow researchers to investigate intervention effects at the individual level and how these effects change over time. In contrast, group experimental designs focus on the average treatment effect. Further, SCEDs can be used to estimate causal mediation effects which allows researchers to test hypotheses related to causal mechanisms underlying intervention effects. For instance, a reading intervention is hypothesized to enhance narrative story comprehension in students with autism spectrum disorder *through* increasing their task engagement. Modeling approaches have been described and empirically validated for mediation analysis for a variety of SCEDs types (e.g., multiple baseline designs with and without time trends).

Format and interaction. The workshop will begin by introducing the linear regression framework to estimate intervention effects for SCEDs. Next, the framework will be extended to estimate mediation effects. Real-world examples and RStudio demonstrations will be provided as well as guided practice and hands-on activities for participants. Copies of commented RStudio code and output for every analysis will be provided. The proposed workshop will consist of two components including lectures and small group activities designed to provide participants with the opportunity to practice the demonstrated skills and to check their understanding. Activities will involve one or more objectives including: model specification, coding of models using RStudio, and output interpretation. The instructors will work with each group to address questions and concerns.

Objectives and outcomes. The goal of this course is to introduce the use of the regression framework to estimate individualized mediation effects. After completing the workshop, participants should be able to: (1) specify appropriate models for causal mediation analysis to analyze mediation effects for simple AB designs (SCEDs with one baseline A and one intervention B), (2) write RStudio syntax to estimate the models, and (3) interpret the results. Participants will learn to specify models for SCED data with different kinds of trajectories (e.g., change in level versus linear growth during the baseline/intervention phase), and different variance structures within a participant (e.g., autocorrelated errors versus non-autocorrelated errors).

Conflict of interest disclosure. Nothing to report.

Dr. Mariola Moeyaert. Dr. Moeyaert is an Associate Professor in the Division of Educational Psychology and Methodology at the University at Albany. Dr. Moeyaert successfully completed two IES funded grants related to analysis and meta-analysis of SCEDs, served as statistical consultant on more than 10 externally funded grants (e.g., IES, NIH, HRSA, and Foundation for Child Development) and is currently PI on an IES grant related to causal mediation for SCEDs. Dr. Moeyaert was an instructor of the Training Institute on Single-Case Intervention Research Design and Analysis, also funded by the Institute of Education Sciences. She is a member of the American Educational Research Association, Associate Editor of Behavior Modification and Methodological Consulting Editor of the Journal of Experimental Education, Psychological Methods, and Educational Research Review. She has no further potential conflicts of interest related to the content of this workshop.

Dr. Milica Miočević is an Associate Professor in the Department of Psychology at McGill University. Her research centers on Bayesian methods and statistical mediation analysis as applied in the social, health, and behavioral sciences and has been funded by the European Commission, the Institute of Educational Sciences, the Social Sciences and Humanities Research Council, and the Natural Sciences and Engineering Research Council of Canada. She was a Marie Curie fellow, and she currently holds a William Dawson fellowship. She has no further potential conflicts of interest related to the content of this workshop.

Dr. Matthew Valente is an Associate Professor in Biostatistics and Data Science with expertise in statistical mediation and causal inference methods. He is currently a Principal Investigator on an Institute of Education Sciences (IES) grant titled “Methods for Synthesizing Causal Mediation Effects in Single Case Experimental Design Data” and a Co-Investigator on IES grant titled “Interventions for English Language Learners at Risk for ADHD”. He is a member of American Educational Research Association (AERA), American Psychological Association (APA), and the Society for Prevention Researcher (SPR). He is reviewer on the editorial board of Multivariate Behavioral Research (MBR). He has no further potential conflicts of interest related to the content of this workshop.