

I am broadly interested in studying and developing statistical and measurement approaches to data analyses in social science studies. My research interests focus on causal inferences in intervention studies, multilevel models for nested data, regular and intensive longitudinal data analysis, and psychometrically validating psychological measures. I am also interested in handling complex data conditions with missing data, measurement errors, and/or confounding variables in statistical analyses. In addition, I have been collaborating with researchers from education, psychology, medicine, family studies, and other areas of social sciences. Below, I briefly summarize my research activities and how my work is related to the Institute for Successful Longevity (ISL) missions.

One of my major research areas, causal mediation analysis, investigates causal relations when an input variable causes an output variable through an intermediate variable. Mediation analysis has widespread applications to help researchers identify and address the causal processes of the most pressing social issues (e.g., how a medical intervention reduces the mortality rate of patients via suppressing inflammatory response and how retirement impacts mental health via grandparental childcare). I have been devoted to developing appropriate mediation models and handling methodological issues in mediation analyses, such as covariate selection and measurement error correction. My work on developing machine learning methods for causal mediation analysis is funded by the Spencer Foundation, and we submitted a grant to NSF to support continued research in this area.

Another line of my research focuses on modeling clustered/nested data. It is common to have data with nested structures in social sciences, including the areas of ISL faculty (e.g., patients within clinics, families within neighborhoods, and repeated measures for the elderly). Appropriate accounting for the clustered data structure in data analysis is important to reach valid and accurate conclusions. For example, patients within a clinic receive treatment from the same group of doctors and nurses, and their experiences and medical procedures tend to be more similar than those from a different clinic. Thus, it is necessary to account for the dependence within clinics and examine differences in patient outcomes (e.g., cognitive ability for the elderly) among clinics. I study methods to synthesize treatment effects or relationships among variables with nested data.

I am also interested in regular and intensive longitudinal data analysis, where one can study the changes in key psychological constructs (e.g., mental well-being) and individual differences in these changes, fluctuations of these constructs over time, the implication of these fluctuations, and within-person relations (e.g., between social interactions and mental well-being) over time and between-people differences in these relations. These areas closely match much of the existing work and missions of the ISL.

I have consulted students and faculty in and outside the College of Education, Health, and Human Sciences. I see my role as helping students and faculty from applied areas select appropriate statistical models, handle issues that appear in statistical analyses, and report their results. As a methodologist, I can consult and collaborate with colleagues regarding their study designs, statistical modeling, and data analyses. Given my research interests, I can also advise handling sub-optimal and/or complex data conditions (e.g., with missing data, multilevel data structure, and/or longitudinal data). The ISL would provide an excellent opportunity for me to connect with faculty with shared research interests and to utilize my methodological work in longevity and health studies.