BIOSTATISTICS SEMINAR

Quantile Mediation Analysis

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Mediation analysis is widely used in practice to examine if, and if so how, an intermediate variable mediates an exposure effect on an outcome. In some biomedical studies such as biological aging and obesity, quantiles of the outcome, instead of its mean, are of central interest. We develop a new methodological framework of quantile mediation analysis to facilitate identifying, estimating, and testing quantile mediation effects under a class of directed acyclic graphs, in which resulting key estimands take some closed form expressions. Since the null hypothesis of no mediation effect is composite, traditional tests such as the Sobel test or MaxP test appear conservative and underpowered. To improve statistical power, we adopt an adaptive bootstrap (AB) method to construct a calibrated test statistic that enables to properly control type I error under a composite null hypothesis. We establish theoretical guarantees for the proposed AB test method. We examine numerically both type I error and power of our AB test method through extensive simulation experiments and illustrate it in assessing mediation effects of lipid metabolites on the association between exposure to phthalates and childhood obesity.

Thursday, February 29, 2024, 3:30-4:30PM Eastern

133 Rosenau Hall

Zoom Link:
https://unc.zoom.us/j/98423779288?pwd=b0tqYThCQTAxeDdTQ0FRY3RnazdwQT09

Meeting ID: 984 2377 9288

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