

淡江大學數學系演講公告

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題 目：**Integrated multiple mediation analysis: A robustness–specificity trade-off in causal structure**

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摘要 Abstract:

Recent methodological developments in causal mediation analysis have addressed several issues regarding multiple mediators. However, these developed methods differ in their definitions of causal parameters, assumptions for identification, and interpretations of causal effects, making it unclear which method ought to be selected when investigating a given causal effect. Thus, in this talk, I will introduce an integrated framework, which unifies all existing methodologies, as a standard for mediation analysis with multiple mediators. To clarify the relationship between existing methods, four strategies were proposed for effect decomposition: two-way, partially forward, partially backward, and complete decompositions. This work reveals how the direct and indirect effects of each strategy are explicitly and correctly interpreted as path-specific effects under different causal mediation structures. I further yield a robustness–specificity trade-off in the choice of strategies. Inverse probability weighting is considered for estimation. The four strategies are further applied to a simulation study for performance evaluation and for analyzing the Risk Evaluation of Viral Load Elevation and Associated Liver Disease/Cancer data set from Taiwan to investigate the causal effect of hepatitis C virus infection on mortality.

Keywords: Multiple mediation analysis, Effect decomposition, Inverse probability weighting, Path-specific effects.

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