

中央研究院統計科學研究所

學術演講

講題：Causal mediation analysis with multiple time-varying mediators

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時間：2021年11月8日 (星期一) 上午10:30-12:00

地點：中央研究院統計科學研究所 B1F 演講廳

※茶會：上午10:10開始

※實體與線上視訊同步進行

Abstract

In longitudinal studies, the mediational g-formula is a key method for the assessment of direct and indirect effects. However, current methodologies based on the mediational g-formula can deal with only one mediator. This limitation makes these methodologies inapplicable to most scenarios. Hence, we develop a novel methodology by extending the mediational g-formula to cover cases with multiple time-varying mediators. We formulate two variants of our approach that are each suited to a distinct set of conditions and present the nonparametric identification results of each variant. We further show how complex causal mechanisms (whose complexity derives from the presence of multiple time-varying mediators) can be untangled. A parametric method along with a user-friendly algorithm was implemented in R software. We illustrate our method by investigating the complex causal mechanism underlying the progression of chronic obstructive pulmonary disease. We found that the effects of lung function impairment mediated by dyspnea symptoms and mediated by physical activity accounted for 13.7% and 10.8% of the total effect, respectively. This reveals the mediating role of dyspnea and physical activity on the causal pathway from lung function impairment to health status.

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