

From propensity scores to principal scores : matching methods in the context of principal stratification

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Principal stratification has emerged as a principled way to handle post-treatment variables such as non-compliance and missing outcome data. In this framework effects are estimated for “principal strata” defined by the pair of potential intermediate values (e.g., the complier average causal effect) ; these are termed “principal” effects. However, the methods for estimating principal effects often rely on untestable assumptions such as the exclusion restriction and/or monotonicity. In this talk we explore the use of propensity scores to estimate principal effects, which provides an alternative estimation procedure. With this approach, termed “principal scores” by Hill et al. (2003), propensity score type methods are used to match the treatment group compliers with the likely compliers in the control group. The key assumption underlying this approach is “principal ignorability,” which states that principal strata membership is independent of the potential outcomes given the observed covariates. This method thus can provide an additional approach with which to assess the sensitivity of results to the underlying assumptions. We discuss the use of principal scores in the context of adjusting for noncompliance, both with a binary compliance measure (Jo and Stuart, 2009) as well as extensions to continuous compliance and mediation analysis. The methods are discussed in the context of two motivating examples as well as a simulation that assesses the sensitivity of this approach to violation of principal ignorability. Results indicate that the method can work well when strong predictors of compliance are available.

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