

*Ben Hansen*  
*Department of Statistics*  
*University of Michigan*

## **Propensity Score Matching to Recover Latent Experiments**

Propensity score matching aims to gain for an observational study various benefits characteristic of experiments, only some of which can be directly observed. When it is successful in those of its aims that are observable, this suggests it has succeeded in the remaining ones: we cite visible successes as evidence of likely success elsewhere. Yet existing theory pertinent to matching supports such connections only vaguely. It seems to require exact matching on the true propensity score, even in the absence of hidden bias. In practice, the best one can do is to match approximately, and on estimated scores.

To address this gap in the literature I propose a novel large sample theory of inference with propensity matched data. It combines conditioning and contiguity arguments to characterize matched sampling distributions without first having to characterize how sampling variability affects matching. Rather than relying on a specific matching technique, it puts the more nearly verifiable of propensity matching's aims in a central role, thus clarifying their contributions to the integrity of inferences about treatment effects and illuminating certain methodological debates. Because it infers statistical structure from diagnostics, rather than the workings of matching procedures, it engenders a broad perspective on relevant methodology. This in turn suggests improvements for matching methods and for matched statistical inference.

**Friday, October 2, 2009 at**  
**11:30 am in B760 EH**

**Coffee and Cookies will be**  
**served at 11:15 am in the**  
**Statistics Lounge, 450 West Hall**