**Research Seminar: How to Make Causal Inferences Using Texts**

**Speaker: Brandon Stewart, Princeton University, Sociology**

**Day and Date of Seminar: Wednesday, November 29th, 2017**

In this seminar, the speaker talked about how texts are increasingly used to make causal inferences: either with the document serving as the treatment or the outcome. He reiterates the basic concept behind text data and causal inference, their existence usually in natural combination and how text analysis poses many problems for causal inference because the data are high-dimensional – text can express many different concepts and can express the same concept in many different ways.

Speaker’s research suggests a tradeoff between discovery and testing in causal inference with text as treatment and outcome and provide a simple solution. Further explaining why developing the mapping between the text and categories of interest in the same set of data that is used for measuring a treatment effect violates the Stable Unit Treatment Value Assumption (SUTVA) commonly invoked in causal inference through a concept called as “**analyst-induced SUTVA violation**” (AISV). Speaker’s research suggests the solution to this problem with a simple split of the data that allows the researcher to freely define measures of interest through exploratory analysis of one dataset. It also suggests to test these measures of interest on the held-out data to confirm that the relationships are not an artifact of exploration. This train-test split, is similar to machine learning and A/B tests in industry, which approximates a sequential notion of science where first a finding is discovered and in a separate experiment confirmed. In their (Speaker and Co-researchers) research, they apply this process of sequential science to two applications, one where text is the outcome of a survey experiment, and one where text is the treatment affecting a response.

The speaker clarified the issue with analysis of high-dimensional data like text that requires the researcher to discover the mapping between the data and the quantities of interest which ultimately undermines the researcher’s ability to make causal inferences. In his research, he clarified this issue by describing the Analyst-induced SUTVA violation and show that this type of SUTVA violation can be solved with a simple split of the dataset into a training set used for discovery and a test set used for testing. Also, the analyst-induced SUTVA assumption does not only apply to text data, but to any latent representation of treatment and outcome variables. The research also advocates the use of train/test split framework in the context of other types of data that require a low-dimensional representation of high-dimensional data.

Among the many parts of the seminar that stood out to me, one being particular, was the part that talked about stepping back from assigning any truth-value to one given study. Though the research is conducted to discover new findings or re-evaluate the result of preexisting ones, but research (some/many) are still being operated under the mindset of producing the absolute truth, “infallible results. I believe, that if given result can't be taken as true or real on its own, we should work on the research as if we believe that and work to leave enough column for any further advance. Practicing with that belief in that collective model of producing knowledge, on an individual level, is structuring research in a modular way and doing things like train-test splits. The logical outcome of a good methodology is that even when wrong, your methods can adapt themselves to eventually be right. The logical outcome of this kind of adaption could be that research can never wrong, only steps away from being right.

Text analysis is a part of a collective topic in a field that I aim to explore, learn and do research in. While learning about the methods to capture, analyze and provide cumulative solution to the growing problem of cyberbullying in the social media generation, the knowledge about employing various techniques to analyze the high-dimensional, complicated, and sparse data like text, can drastically improve the results and create a space for researchers to try out different models and methods.