Reading & Reading Exercises Meeting 6

Pearl, J. (2016). Lord's paradox revisited - (Oh Lord! Kumbaya!). *Journal of Causal Inference, 4*(2). https://doi.org/10.1515/jci-2016-0021

Reading questions based on Pearl:

1. In the lecture we talk about the treatment X, the pre-test Y1, the post-test Y2, and the gain scrore G=Y2-Y1. Make a little overview for yourself that relates these to the characters that Pearl uses for them (e.g., S, Wi, etc.).
2. Pearl explains that in the example of Lord, the pretest is actually a mediator; why would one want to control for a mediator, and/or why would one not want to control for a mediator?
3. On p.6, Pearl refers to Wright and Pearl and states the total effect can be obtained by taking the products of the coefficients along each path, and adding these up. When considering Figure 2b, there are in total 4 paths from treatment S to the gain score Y; how do these give the result TE= b - a(1-c) that Pearl reports?
4. In Pearl's example around Figures 4 and 5, the roles of pretest and treatment are reversed. How does this change the problem?

Kim, Y. & Steiner, P. M. (2019). Gain scores revisited: A graphical models perspective. *Sociological Methods & Research*. https://doi.org/10.1177/0049124119826155

Reading questions to K&S:

1. Relate the notation used by Kim and Steiner, to the notation used in the lecture and in the paper by Pearl (e.g., treatment in the lecture is denoted by X, in the first example of Pearl it is denoted by S, and in Kim and Steiner it is Z). Do you see the connection between Figure 2(A) from K&S and the figures regarding unmeasured counfounding from the lecture?
2. The elegance of the chance score analysis is based on the fact that *under particular assumptions* it ensures that two backdoor paths cancel each other out. What are those assumptions?