

Complexity

Given the difficulty of solving intricate problems such as the obesity epidemic, researchers are turning to the concept of complexity. This sees problems as a system with multiple causal paths and feedback loops rather than a more simple matter of a cause and an effect.

This concept hit the medical big time recently when a viewpoint espousing a complexity approach for public health was published in the Lancet. The Lancet is widely read and has an impact factor of a zillion. It raises important questions about an emphasis on Randomised Control Trials (RCTs). They have good internal validity (i.e. they are ace for establishing causality). But they may lack external validity (i.e. the intervention and any effect may not generalise for various reasons). This emphasis on RCTs may also lead to an emphasis on individual level interventions. It may also ignore multiple other pathways in the system and

their interaction.

Where I differ from the authors is that I think that non-complexity causal methods recognise and can often address these issues. A good overview is given in this paper . It asks important questions of those advocating complexity while also recognising its potential importance.

Cause

Let me pick up a point, the critique of RCTs. The authors advocate for natural experiments. That's great, as they are great for studying cause and effect. Why are they great? Well it is because they come from the same family of methods as the RCT, counterfactual methods. They all share the same statistical justification. That is that they solve (with assumptions) the problem that we can't rerun time to have the same populations exposed to different interventions. Another important commonality is that there is an intervention.

So the problem, it seems to me, isn't the RCT being "linear" (otherwise you would have the same issue with natural experiments). It is the fact that they are perceived difficult to do for upstream policy interventions. Moreover, those working in the counterfactual framework consider issues that concern complexity fans. These include, mechanisms (i.e. mediation -

which is complex to do even in RCTs) on causal pathways, interaction (the joint effect of different interventions), moderation, time-varying interventions, time-varying confounding and time-varying outcomes (feedback loops), transportability (generalisation, contextualisation), looking at numerous outcomes, spillover effects, and the drawing of graphs to unpack these issues.

Complexity and cause

I have a lot to learn about complexity (and causal methods) as my ill-informed descriptions above testify to. Yet I do think it would be productive for those advocating complexity to engage with causal methods (and vice versa) as they are concerned with addressing similar issues.

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