Since we’re irrationally concerned about understanding mediation, lets take some notes and do some extra reading 😊

Handbook of Quantitative Methods: Mediation, Moderation, and Interaction (an overview)

Unambiguous Definitions: Simple and Clear definitions that distinguish mediation, moderation, and interaction, from each other (as well as other commonly used terms)

Mediation: Tri-variate (three variables) one-tailed hypothesis concerning MECHANISMS of effect. “How” and “Why” X predicts Y

* A pre-established causal relationship between two variables is theorized to exist due to an intermediate third variable.
  + The ‘third variable’ that is hypothesized to have this effect is known as a ‘mediator’ (intermediate variable, explanatory link, etc.)
* These mediators have mediating effects (aka indirect effects)

Moderation: Tri-variate one-tailed hypothesis, concerns “when” and “for whom” X predicts Y

* Presence of a third ‘moderator’ variable is also termed an ‘effect-modifier’ and/or a ‘causal interaction effect’

Statistical Interaction: Implies that 2 or more concepts ‘work together’ or have a ‘combined effect’ in eliciting a third concept.

* Moderation is a hypothesis that is often answered by the specification of statistical interaction, this can be confusing!

Discriminating Mediation/Moderation/Interaction

* Mediation and moderation are distinct!
  + Both ‘theories for refining and understanding a causal relationship’
  + Both are unidirectional (A and B affect C, rather than, association between A, B, and C)
* Something can be at first a mechanism (mediation) and then later a conditional effect (moderation)
  + E.g. Background adversity, stress-regulators, and stress-response.
    - Stress regulators are shaped by adversity, however, once stress-regulators are developed, their relationship to adversity changes; stress-regulators are now deemed to operate by altering the stress-response to adversity!
    - Thus, at first, it is a mechanism, and then it is a conditional effect.

We can have mediated-moderation:

* Hypothesizing the ‘how’ and ‘why’ of an initially moderated relationship.
* Our moderator affects the relationship directly, as well as through a mediator

Can have moderated-mediation:

* X affects Y directly, as well as through a mediator.
* The effect of X on the mediator, and the mediator on Y, can also me moderated by an additional moderator!

Moderation and Statistical Interaction

* Moderation can be seen as a restricted version of statistical interaction
* This is the difference between two-tailed hypotheses and a one-tailed hypothesis
  + E.g. Evidence that education outcomes are related to interaction of parent background and educational factors (attainment = background + education factor + background \* education factor), CANNOT be interpreted to conclude that education can alter the effects of parental background!
* Moderation is a more restricted one-tailed alternative to the two-tailed hypothesis of statistical interaction (both are tested by specifying statistical interaction terms, however!)

Basic Overview: Testing Mediation

* ‘Causal Steps Approach’
* ‘Sobel Test’: Multiple regressions analyses are conducted and results of each are combined.
* Bootstrapping: Statistical bootstrapping allows us to ignore the Sobel test assumption that we have normality in distribution of variables. We use bootstrapping to estimate Mediation Effects, this is non-parametric and reliable with lower sample sizes.
* Statistical ‘path analysis’: Incorporates bootstrapping within broader statistical modeling framework.

Testing Moderation

* Method changes depending on level of measurement for each of the three concepts featured, continuous or categorical.
  + Random slope effects: For multilevel models that look at hierarchical structure of nested data!
* Explicit vs Implicit tests
  + Variable-based vs Person-based
  + Distinguishes between whether a method focuses on patterns of statistical relationships between variables (random slope effects, statistical interaction terms) or statistical differences between units of analysis (commonly people; subgroup comparisons)