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Class 6 - Elements III: Constructs and variables

Agenda

- Skills corner: DAGs x formal theory (15 minutes)

- Conceptual grounding (5 minutes)

- Core paper discussion (40 minutes)

- *Break*

- Compare-contrast presentation (40 minutes)

- Key thinking tool: Validity assessments (15 minutes)

Skills corner

Switching gears

- Up until now, we have been focused on reading and digesting information from articles

- Now, we turn to developing your supporting skills for integrating theoretical and empirical models, analyzing and interpreting data, discerning what methods and inferences are appropriate

Key Thinking Tool: DAGs
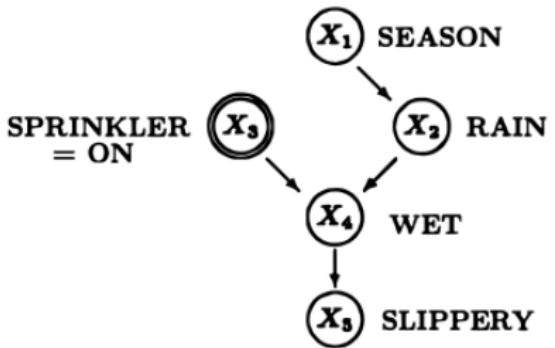
Directed *acyclic* **graph**

has nodes (constructs) and edges (relationships)
there are no loops
the relationships have a direction of influence (correlations are
bidirectional)

Key Thinking Tool: DAGs

Figure 1: A Bayesian DAG model courtesy of (Pearl 2001)

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Why DAGs?

They provide a visual tool to determine if the claims we make can possibly be causal (Pearl 2010)

They provide a scaffold upon which future researchers can more easily build

And at a minimum, they force us to **write out our model explicitly** in terms of constructs and relationships

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Key Thinking Tool: Formal theory
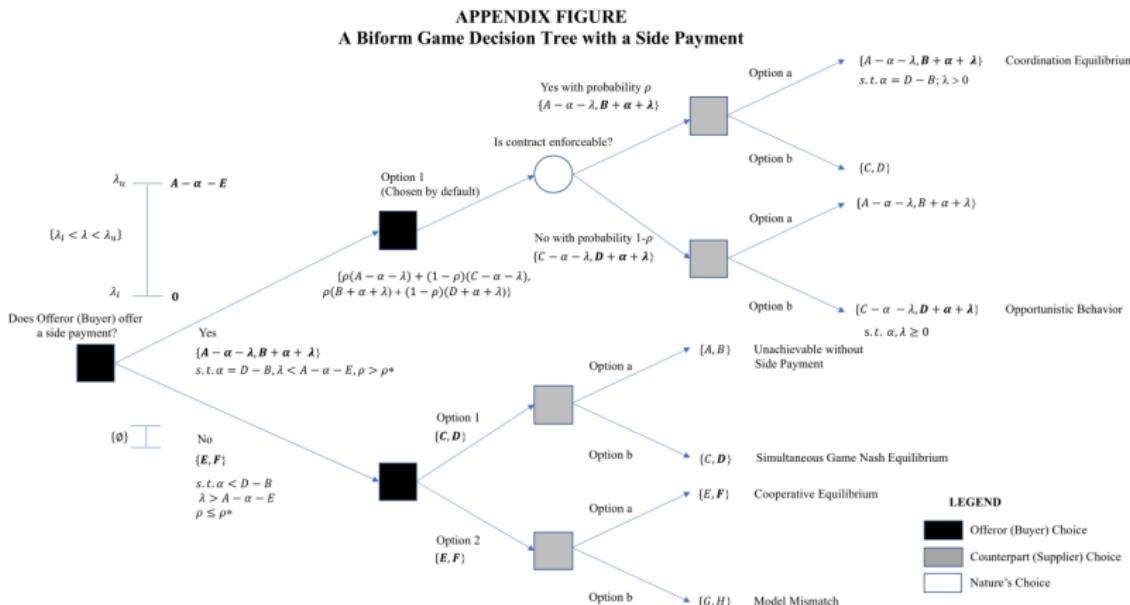
Figure 2: An example analytic model from (Fox, Grove, and Souder 2021)

Why formal theory?

1. precision and transparency

2. logical consistency, and

3. an ability to identify unanticipated implications (Adner et al. 2009, 202)

Integrating DAGs with formal theory

- DAGs can make clear how a model fits within a larger set of nomological networks, be they theoretical or phenemenonological

- Formal theorizing provides the tools to consider more complex relationships and nth-order effects than verbal theorizing readily affords, which tends to capture first-order, linear[1] chains of logic

- Note that the final paper may not showcase this work, but it can be the scaffolding to facilitate deep thinking

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[1]Note that linearity is not as technically constraining as it may seem. Linearity means that a tested function must be linear with respect to its **parameters**, not its **arguments**. Thus, $y = \beta x^2$ is permissable but $y = \beta^2 x$ is not. The issue is not so much a technical issue but straight-line thinking

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Grounding

Making things real

- Constructs: Bounding ideas to give them form

- Variables: (Imperfectly) reifying constructs to make them observable

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Readings for Today

Common Readings

1. Suddaby, R. (2010). Editor's Comments: Construct Clarity in Theories of Management and Organization. Academy of Management Review, 35(3), 346-357. https://doi.org/10.5465/amr.35.3.zok346

2. Larsen, K, Bong, CH. 2016. A tool for addressing construct identity in literature reviews and meta-analyses. MIS Quarterly 40, No. 3: 529-552.

3. Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing Construct Validity in Organizational Research. Administrative Science Quarterly, 36, No. 3, 421-458. https://doi.org/10.2307/2393203

Suddaby (2010)

Clear constructs are simply robust categories that distill phenomena into sharp distinctions that are comprehensible to a community of researchers — that is, animal, mineral, or vegetable; gas, liquid, or solid. (Suddaby 2010, 346)

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Suddaby (2010)

Discussion Questions

- Do you agree with Suddaby's definition of a construct?

- Can you provide an example of a clear construct from your readings? Why is it so?

- How about a construct that is completely unclear? How could we make it better?

Suddaby (2010)

The essence of construct clarity comprises four basic elements (Suddaby 2010, 347).

- **Definitions**: skillful use of language to persuasively create precise and parsimonious categorical distinctions

- **Scope conditions**: circumstances under which a construct will or will not apply

- **Semantic relationships**: how does the construct relate to others

- **Coherence**: consistency with relation to overall theoretical argument

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Larsen and Bong (2016)

Table 1. Construct Identity Fallacy Matrix		Construct Names	
		Same	Different
Phenomena	Correspondent	Correct outcome: True positive	Jangle fallacy: False negative
	Independent	Jingle fallacy: False positive	Correct outcome: True negative

Larsen and Bong (2016)

Discussion Questions

- What are the jingle / jangle fallacies?

- Have you seen something like this in your work or research to date?

Larsen and Bong (2016)

Key points

- There are tools to help you find and locate constructs

- You can help future research by taking the time to determine whether you need to create a new construct to make your point

- Aside: This paper also is a nice example of weaving quantitative analysis into a literature review by drawing on the sensitivity/specificity framework (TP/FP, TN/FN)

Bagozzi Yi and Phillips (1991)
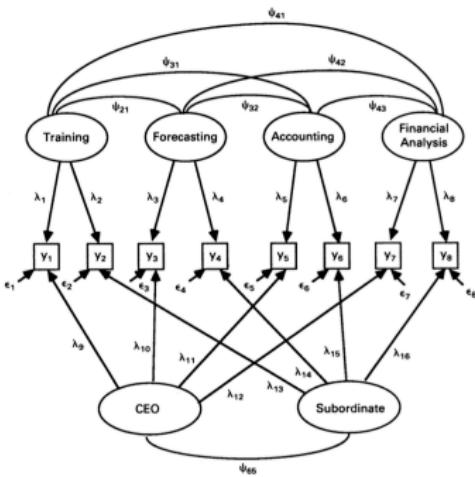
Figure 3: An example of an MTMM-centric CFA

Bagozzi Yi and Phillips (1991)

Discussion questions

- I know this was dense, what did you get out of this paper?

- Based on this paper, how can we demonstrate construct validity?

- Is this logic of all this just circular?

Bagozzi Yi and Phillips (1991)

Key Points

- Psychometric theory is predicated on a linkage between constructs and variables, different methods have different assumptions about their relationship

- Variables have multiple sources of relevant variation - construct/trait, method/measurement tool, and idiosyncratic error

- There are many ways to assess construct validity, each with its benefits and drawbacks

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Break

COFFEE BREAK

Compare / Contrast Presentations

- Schaffer, J. A., DeGeest, D., & Li, A. 2016. Tackling the problem of construct proliferation: A guide to assessing discriminant validity of conceptually related constructs. Organizational Research Methods, 19: 80- 110.

- Law, K. S., Wong, C.-S., & Mobley, W. H. (1998). Toward a Taxonomy of Multidimensional Constructs. The Academy of Management Review, 23(4), 741. https://doi.org/10.2307/259060

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Validity assessments

Moving from a summation to tutorial focus

Going forward, our "lecture" period will move away from tying the various papers together and rather using them as a gateway for us to talk about different tools and techniques for performing analyses

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Types of validity: Construct-centric

- Criterion validity: The extent to which an operationalization of a construct relates to, or predicts, a theoretically related behaviour or outcome (Cronbach and Meehl 1955, 282) (i.e., semantic relationships and coherence)

- Content or "Face" validity: The extent to which the construct is comprises a sample of a universe in which the investigator is interested (does it look like a duck and quack like a duck?) (i.e., defintion and scope conditions) (Cronbach and Meehl 1955)
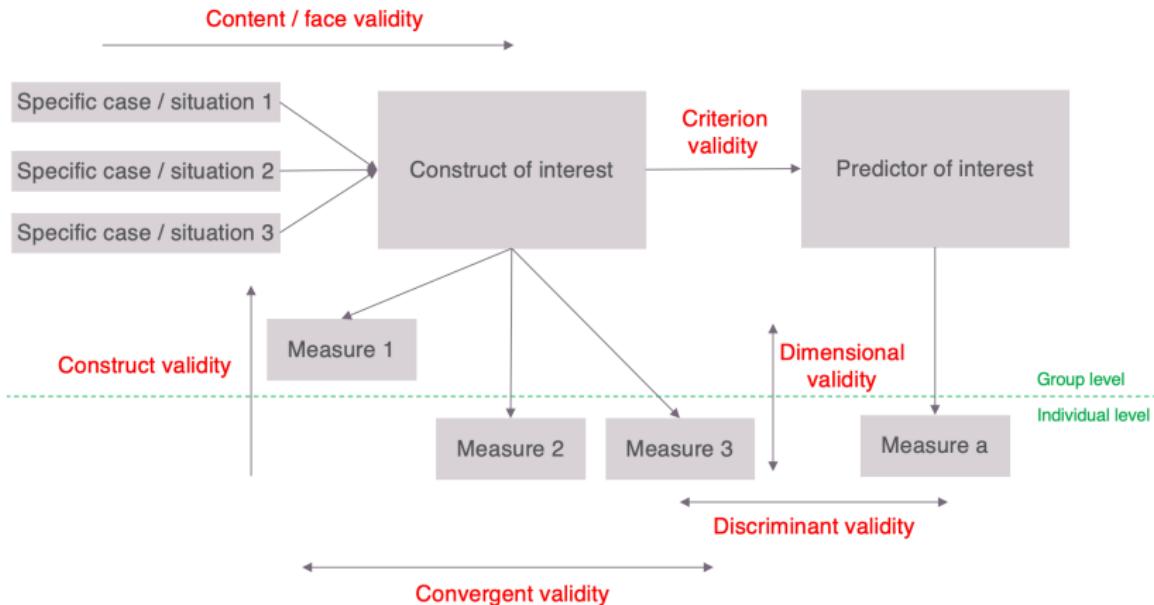
Types of validity: Construct-variable interface

- "Dimensional" validity: The dimension of the constructs and the measures are appropriately specified with due attention paid in operationalization (Law, Wong, and Mobley 1998)

- Construct validity: The extent to which an operationalization measures the concept it is supposed to measure (Bagozzi, Yi, and Phillips 1991, 421)

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Types of validity: Variable-centric

- Convergent validity: The degree to which multiple attempts to measure the same concept are in agreement (Bagozzi, Yi, and Phillips 1991, 425)

- Discriminant validity: The extent to which measures of theoretically distinct constructs are unrelated empirically to one another (Campbell & Fiske, 1959) (Shaffer, DeGeest, and Li 2016)

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One possible visualization of validity elements

Common tools for assessing validity

- Cronbach's alpha (convergent validity)

    - there are many other "congeneric" tests

- Multi-trait, multi-method matrices (MTMM) (convergent + divergent)

    - this is the canonical approach but relatively inflexible

- Confirmatory factor analyses (convergent + divergent)

    - As (Bagozzi, Yi, and Phillips 1991) notes, there are many versions of this

- A whole bevy of tools for multi-level constructs

    - Some examples include ICC, Rwg, among others

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Where does qualitative work fit into all of this?

One interpretation is that qualitative work helps to ascertain the bounds of a construct of interest are and the face validity of any constructs that are subjected to quantitative analyses

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Where does actual data fit into all of this?

Where are our measures coming from?

How might data availability enable or constrain the our ability to successfully explore the various elements of the above diagram?

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Elements IV: Data and measures

1. Stevens, S. S. 1946. On the Theory of Scales of Measurement. Science, New Series, 103, No. 2684, 677-680.

2. Bedian, A. G. 2014. "More Than Meets the Eye": A Guide to Interpreting the Descriptive Statistics and Correlation Matrices Reported in Management Research. Academy of Management Learning & Education, 13, No. 1, 121-135.

3. Heggestad, E. D., Scheaf, D. J., Banks, G. C., Monroe Hausfeld, M., Tonidandel, S., & Williams, E. B. (2019). Scale Adaptation in Organizational Science Research: A Review and Best-Practice Recommendations. Journal of Management, 45(6), 2596-2627.

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Elements IV: Data and measures

4 Compare / Contrast

- Combs, J. G. 2010. Big samples and small effects: Let's not trade relevance and rigor for power. Academy of Management Journal, 53(1): 9-13.

- Simsek, Z., Vaara, E., Parachuri, S., Nadkarni, S., & Shaw, J. D. 2019. New ways of seeing big data. Academy of Management Journal, 62: 971-978.

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Adner, Ron, László Pólos, Michael Ryall, and Olav Sorenson. 2009. "The Case for Formal Theory." *Academy of Management Review* 34 (2): 201–8.

Bagozzi, Richard P., Youjae Yi, and Lynn W. Phillips. 1991. "Assessing Construct Validity in Organizational Research." *Administrative Science Quarterly* 36, No. 3: 421–58.

Cronbach, Lee J., and Paul E. Meehl. 1955. "Construct Validity in Psychological Tests." *Psychological Bulletin* 52 (4): 281–302.

Fox, Brian C., Sergio Grove, and David Souder. 2021. "When Good Deals Need Help Getting Done: Articulating Side Payment Strategies." *Long Range Planning* 54 (6): 102072.

Law, Kenneth S., Chi-Sum Wong, and William H. Mobley. 1998. "Toward a Taxonomy of Multidimensional Constructs." *The Academy of Management Review* 23 (4): 741.

Pearl, Judea. 2001. *Causality: Models, Reasoning, and Inference,*