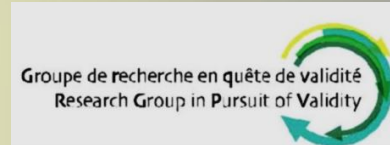


Measurement Validity at the Nexus of Data Science, Digital Innovation, and a Social Justice Imperative: Embracing The Many Ways Of Being Human

Invited Webinar to the Research Group in Pursuit of Validity / Wébinaire du Le Groupe de Recherche en Quête de Validité

March 18, 2022



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University of British Columbia

Outline

1. Setting the Stage: Three big challenges (hurdles)

A guiding principle: the many ways to being human

2. How ‘the many ways of being human’ plays itself out in our theorizing about and conceptualization of validity?

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

3. How the ‘many ways of being human’ manifests itself in assessment research

Motivating case: Fairness & Equity: Ecological Model of Item and Test Responding

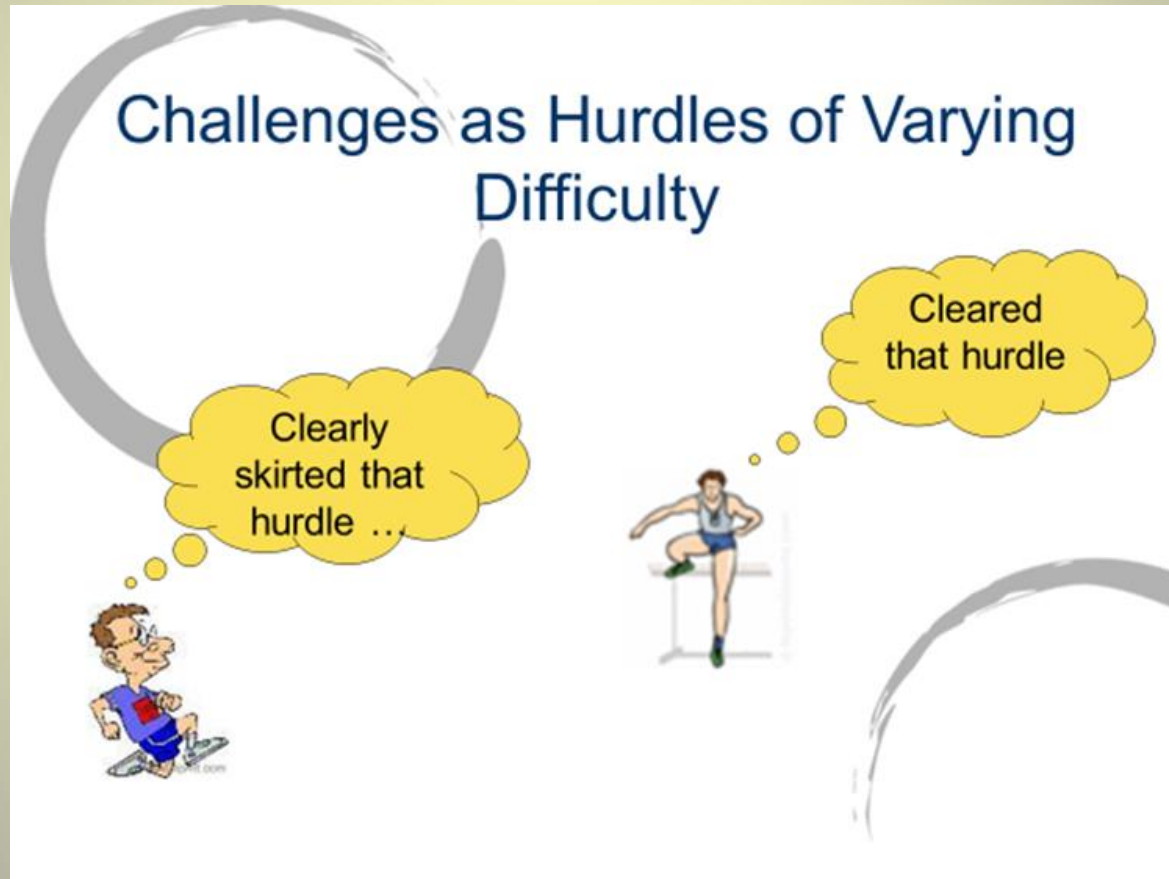
4. Tensions, Intersectionality, And What Is On The Horizon

Main Thesis:

There are several big challenges (hurdles) when considering methodologies used to ensure validity, and fairness and equity in testing and assessment

- A guiding principle: the many ways to being human

- I use the metaphor of a hurdler, with some hurdles being more easily cleared. In contrast, others we, collectively as a community of scholars, have (until recently successfully) skirted.



Three Big Challenges (hurdles)

There are other (smaller) challenges, but I thought I would highlight three of the bigger ones.

1. To **what extent** are we **measuring our attribute or competency of interest** with the test, assessment, or survey in use?
2. What are the implicit and explicit conceptions of fairness and equity of the methodology of my choice?

Response: My approaches embody **statistical and psychometric** models, an **ecological model of item and test performance**.

By observing the testing situation, we hope to identify clues about the way the test is constructed, understood and performed as a social occasion.

Three Big Challenges (hurdles)

3. How are my conceptions of fairness and equity informed by the societal demographics, logic, or organization of our political and social systems and shaped by my **social values**, as I live them?

Response: To what extent might we be measuring, unintentionally, other (un)important constructs that are not meant to be included in our inferences of our attribute or domain of interest, such as, conformity to expected cultural norms (e.g., related to, for example, multiculturalism, ethnicity, gender identity, and gender roles)?

Zumbo, B. D. (2007b). Three generations of differential item functioning (DIF) analyses: Considering where it has been, where it is now, and where it is going. *Language Assessment Quarterly*, 4(2), 223–233.

Zumbo, B.D., Liu, Y., Wu, A.D., Shear, B.R., Astivia, O.L.O. & Ark, T.K. (2015). A Methodology for Zumbo's Third Generation DIF Analyses and the Ecology of Item Responding. *Language Assessment Quarterly*, 12, 136-151.

Addey, C., Maddox, B. & Zumbo, B.D. (2020) Assembled validity: rethinking Kane's argument-based approach in the context of International Large-Scale Assessments (ILSAs). *Assessment in Education: Principles, Policy & Practice*, 27:6, 588-606. DOI: 10.1080/0969594X.2020.1843136.

There are many ways to be human

- The principle, as I see it, that there are many ways to be human is **at the core of how I live and theorize** and how I express my **experience and identity**.
- Over the last 30 years my experience has been that the **field of assessment** has tended to go into a **moral panic over gender identity, gender expression, and aspects of cultural expression**.
 - At the core of my theorizing and the methods I develop and/or advocate aim to challenge that view and aim to honour the many ways of being human and capturing the human experience.

HOW 'THE MANY WAYS OF BEING
HUMAN' PLAYS ITSELF OUT IN OUR
THEORIZING ABOUT AND
CONCEPTUALIZATION OF VALIDITY?

A brief over-the-shoulder look back at validity theory

- Much of what travels under the umbrella of validity theory and validation practices is the methodology of measurement (testing, assessment, and surveys).
 - How should one go about doing and evaluating measurement validity?
 - How should one go about doing and evaluating measurement, testing, and assessment?
- The question is one of the methodology of methodology, i.e., of metamethodology.

A brief over-the-shoulder look back at validity theory

- That is, historically, we have moved from a correlation (or a factor analysis to establish “factorial validity”) as sufficient evidence for validity to an integrative approach to the process of validation involving the complex weighing of various bodies, sources, and bits of evidence – hence, by nature bringing the validation process squarely into the domain of disciplined inquiry and science.

A brief over-the-shoulder look back at validity theory

- As Shear and Zumbo (2014) and Zumbo, and Zumbo (2021) show, over the past 50 years, the concepts and theories of test validity have grown increasingly expansive, and the methods for test validation have become increasingly complex and multi-faceted.
 - Shear and Zumbo state that validity theorists have highlighted the important distinction between validity and validation (Borsboom et al., 2004; Zumbo 2007a, 2009).

A brief over-the-shoulder look back at validity theory

- Whereas validity is the property or relationship we are trying to judge, validation is an activity geared towards understanding and making that judgment.
 - Zumbo (2009) reminds us of the importance that a guiding rationale (i.e., validity theory) must play in selecting and applying appropriate analyses (i.e., validation), while Borsboom et al. note that failing to distinguish between validity and validation can lead to conceptual and methodological confusion.

A brief over-the-shoulder look back at validity theory

- These authors are highlighting the importance of having a clear concept of validity, which can then be used to guide the use of validation methods.
 - Frankly, at this point in the development of assessment practice, it is not as important which of the several views (“theories”) of validity one adopts as it is that someone adopts one and uses it to guide their validation practices.
 - For our purposes today the focus will be my explanation-focused view of validity and validation- see, Zumbo, 2021; Zumbo & Shear, 2021 for overviews.

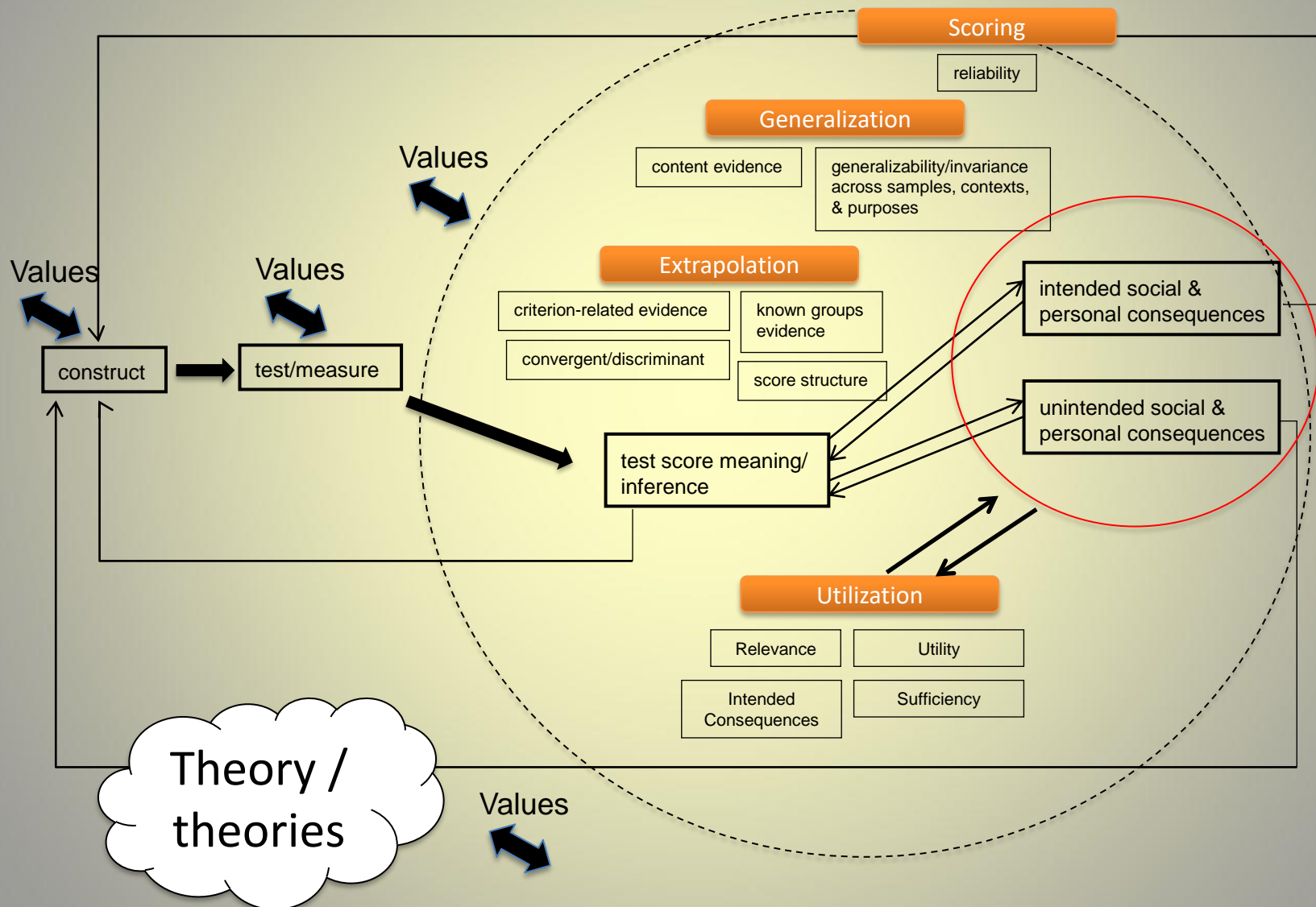
Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- I have espoused a different explanatory view. I have my roots more firmly in a pragmatic approach and particularly an inference to the best explanation like strategy.
 - Second, in separating “validity”, per se, from the validation process then I have a clearly sense of the role of social consequences, justice, and fairness in the validation process and separate from validity itself. This recognized measurement as a power tool in public debate and public policy (Addey, Maddox, Zumbo, 2020).

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- The basic idea underlying my explanatory approach is that, if one could understand why an individual responded a certain way to an item or scored a particular value on a scale, then that would go a long way toward bridging the inferential gap between test scores (or even latent variable scores) and constructs.

A Metatheory of Validity (see, Zumbo, 2021)



Arguments and Explanations

- I know (assume) that you are well aware of current argument-based approaches of Mike Kane, Lyle Bachman, and others. [See appendix]

At a more conceptual level, we might compare the argument-based approach and explanation-focused view by posing the following question...

- Is an explanation an argument or is an argument an explanation?
- Probably are multiple answers. Turning to logic, explanations are seen as types of arguments.

There are at least two types of arguments: justificatory and explanatory.

Zumbo, B.D., & Shear, B.R. (2021). *Concepts of Validity: Bridging Concepts and Practices* [Video]. UBC-Paragon Webinar Series 2021-3. University of British Columbia, Vancouver, B.C.

Sinnott-Armstrong, W. & Fogelin, R. (2010). *Understanding Arguments: An Introduction to Informal Logic*. United States: Wadsworth CENGAGE Learning.

Types of Arguments

Distinguished largely by purpose or use rather than form:

- Explanatory: provide an explanation of why or how something we agree about has happened; how did we arrive at a particular interpretation?
- Justificatory: provide reasons for belief; why should I accept the proposed interpretation?

Focusing on the purpose of the argument brings our attention to who the audience is. This may be important.

Interpretive argument as explanatory?

Validity argument as justificatory?

Arguments and Explanations

- These two sorts of arguments often have similar forms, moving through chains of inferences.
- But their purposes and the context in which we use them will often differ.
 - Please note that inference to the best explanation essentially combines these; first we formulate an explanation, then a justificatory argument to convince us it is indeed the best possible explanation.
- There is an interesting parallel here between focusing on the use of a test to guide validation work; similarly, we can focus on the use of the argument to guide our construction of the argument.

Types of Arguments

Although it is clear how the validity argument serves to evaluate the particular pieces of the interpretive argument, what standards ought to be used to judge whether the interpretive argument, in context, is complete or serves its purpose (Messick, 1995)?

Perhaps by conceptualizing the interpretive argument as explanatory, we gain a new set of criteria (for explanations) by which to evaluate our interpretive argument.

Messick S. (1995). Validity of Psychological Assessment : Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50(9), 741-749.

Types of Arguments

- By framing the two parts of the validity argument as explanatory/justificatory, we can leverage various frameworks for evaluating explanations in the service of developing our interpretive argument.
- In addition to Kane's clarity, coherence, plausibility of inference and assumptions..."Implicit assumptions can be particularly harmful because they may be left unexamined" (p. 29).

Types of Arguments

- Just as measures are fallible (hence the need for validation) so too are our arguments fallible. And some arguments may be solid in one context but not in another.
 - Hence, we need an analogous procedure to be sure our arguments are sufficient in a particular case, the same way we evaluate whether a test use or interpretation is sufficient in a particular context.
- Criteria for inference to the best explanations (think: selecting the best interpretive argument):
 - “In sum, a hypothesis provides the best explanation when it is more explanatory, powerful, falsifiable, modest, simple, and conservative than any competing hypothesis” (Sinnott-Armstrong & Fogelin, 2010, p. 262).

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- According to this view, validity per se, is not established until one has an explanatory model of the variation in item responses and/or scale scores and the variables mediating, moderating, and otherwise affecting the response outcome.
- This is a tall hurdle indeed. However, I believe that the spirit of Cronbach and Meehl's (1955) work was to require explanation in a strong form of construct validity.

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- Overlooking the importance of explanation in validity we have, as a discipline, focused overly heavily on the validation process and as a result we have lost our way.
 - This is not to suggest that the activities of the process of validation, such as correlations with a criterion or a convergent measure, dimensionality assessment, item response modeling, or differential item or test functioning, are irrelevant or should be stopped.

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- Quite to the contrary, the activities of the process of validation must serve the definition of validity.
 - My aim is to re-focus our attention on why we are conducting these psychometric analyses: that is, to support our claim of the validity of our inferences from a given measure.

Validity as Contextualized and Pragmatic Explanation, and Its Implications for Validation Practice

- One of the limitations of traditional quantitative test validation practices (e.g., factor-analytic methods, validity coefficients, and multitrait-multimethod approaches) is that they are descriptive rather than explanatory.
 - The aim of my explanatory approach is to lay the groundwork to expand the evidential basis for test validation by providing a richer explanation of the processes of responding to tests and variation in test or items scores and hence promoting a richer psychometric theory-building.

HOW THE ‘MANY WAYS OF BEING HUMAN’ MANIFESTS ITSELF IN ASSESSMENT RESEARCH

Motivating setting: The case of fairness in assessment and testing

TENSIONS, INTERSECTIONALITY, AND WHAT IS ON THE HORIZON

Zumbo, B.D. (2018). *Tensions, Intersectionality, And What Is On The Horizon For International Large-Scale Assessments In Education*. Invited Foreword to the book “International Large-Scale Assessments in Education” edited by B. Maddox, (pp. i-iii). London, UK: Bloomsbury Press..

Fairness & Equity: Ecological Model of Item and Test Responding

In studies of fairness **gender** has, in the main, been characterized in the binary as biological sex wherein (binary) biological sex differences on item performance that are eventually explained by item characteristics such as item format and item content.

In what I described in 2007 as my **Third Generation DIF “gender”** more properly should **be considered a social construction**, and gender differences on item performance are explained by contextual or situational variables (ecological variables, if you wish), such as institutionalized gender roles, classroom size, socioeconomic status, teaching practices, and parental styles.

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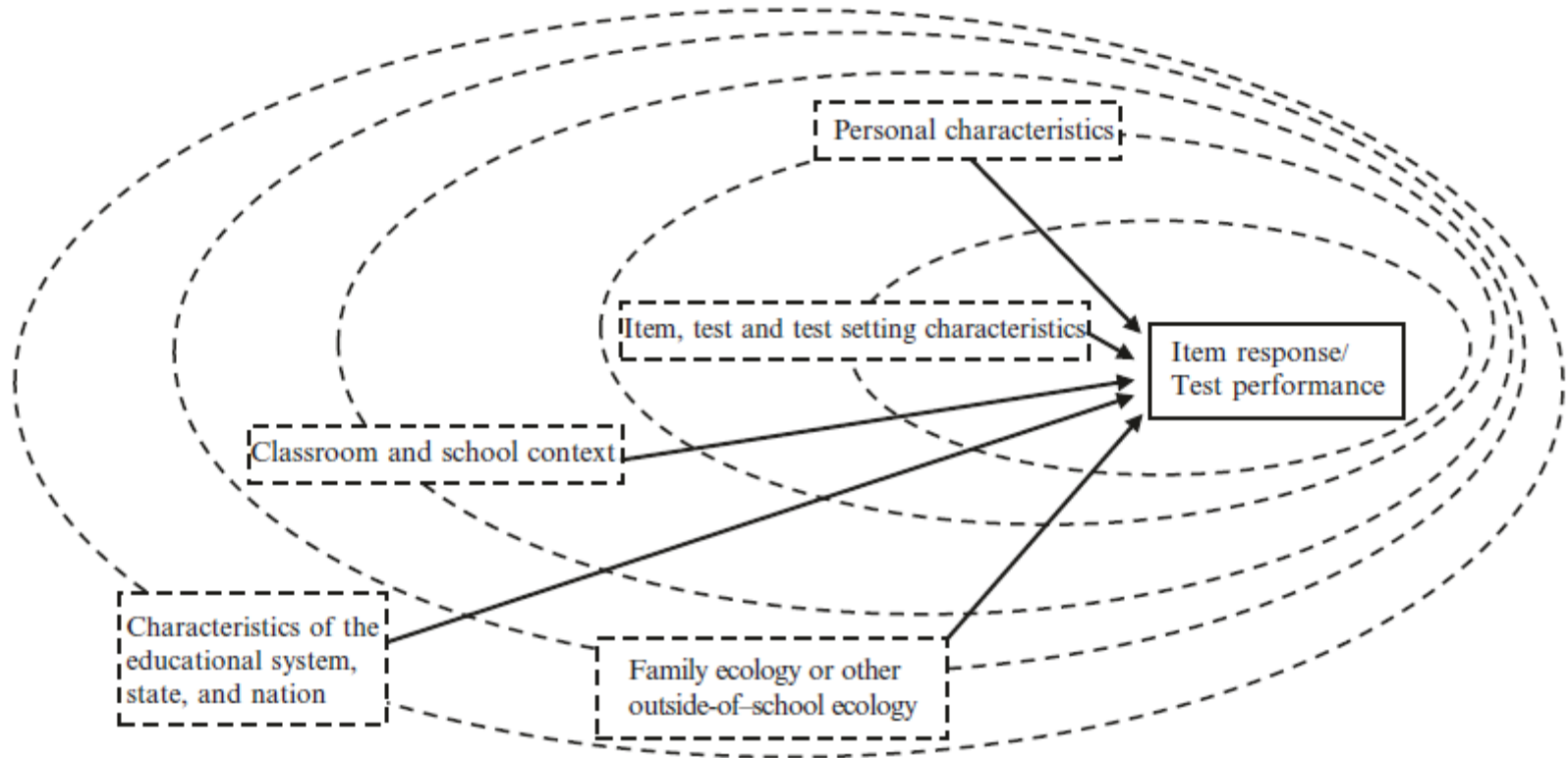
Ecological Model of Item and Test Responding

We believe that these **richer ecological variables** have been **largely ignored** in relation to explanations for (and causes of) DIF because of the focus on test format, content, cognitive processes, and test dimensionality that is pervasive in the second generation of DIF.

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Zumbo, B.D., Liu, Y., Wu, A.D., Shear, B.R., Astivia, O.L.O. & Ark, T.K. (2015). A Methodology for Zumbo's Third Generation DIF Analyses and the Ecology of Item Responding. *Language Assessment Quarterly*, 12, 136-151.

Ecological Model of Item and Test Responding



- Zumbo, B.D., Liu, Y., Wu, A.D., Shear, B.R., Astivia, O.L.O. & Ark, T.K. (2015). A Methodology for Zumbo's Third Generation DIF Analyses and the Ecology of Item Responding. *Language Assessment Quarterly*, 12, 136-151.
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What my approach to fairness and equity implies ...

- Traditional views follow a “**social address**” model of criterion prediction and group differences.
 - This spills over in to test validation; group differences.
- In using the common “social address” approach to group comparisons, **classification into groups** might be **confused with fixed biological or ethnic classification**.

Emphasizing the dangers of bio-determinism, John Stuart Mill (1848) in the *Principles of Political Economy*, wrote:

Of all the vulgar modes of escaping the consideration of the effect of social and moral influences on the mind, the most vulgar is attributing the diversities of conduct and character to inherent natural differences. (p. 319).

What my approach to fairness and equity implies ...

- In a series of chapters and papers from 1998 to 2021, I have made the case that the aim is: **identifying the determinants (or explanatory theory)** of task / item / test score variation ... **the explanation is the basis of any strong validity claims.**
- I take an **ecological systems approach** (a la Bronfenbrenner)
- Most research on response processes focuses on cognitive factors.
 - We have taken a **broader view of response processes** proposed by Zumbo & Hubley (2017) and embrace the notion of **assessment 'in vivo'** to shine a spotlight on test-takers' behaviour, stance, gesture, motivation, and affect besides cognition.

What my approach to fairness and equity implies ...

- Political context, consequences of testing, assessment data usage, and matters of social justice are core to equity and fairness.
- Typically, the outcome of a test or assessment serves multiple purposes. One needs to validate each of the various uses of the well-being data by the different stakeholders -- e.g., regional comparisons, time trends, policy evaluation, etc.. (Zumbo & Chan, 2014)
- **My approach highlights response processes, explanation of task / item / test variation, and is 'in vivo'** (Zumbo & Huble, 2017)

What my approach to fairness and equity implies ... a concern for intersectionalities

- By ‘intersectionalities’ I mean the interconnected nature of social categorizations, be they personal categories such as gender, race, ethnicity and social class.
 - It is not about “interactions” in the way we talk about them in our methodology courses (e.g., interaction terms in statistical models). Too limiting.
 - In short, it is about **the many ways of being human**.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- At the core of that intersectionality are overlapping and interdependent systems of advantage/disadvantage, including the potential for discrimination.
 - In the way I am using intersectionality, these advantage/disadvantage as well discrimination apply to personal intersectionalities.
 - In addition, my use of intersectionality reflects the intersectionality of methodological and theoretical challenges in researching assessment

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- The early tensions in the history of assessment and measurement studies between
 - i. social science scholars of with
 - ii. psychometricians and educational assessment specialists, came from some psychometricians telling us that intersectionality is for science-denying postmodernists.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- Very recent ideas in the 2021 NCME Summer Seminar, the recent Queens ETS conference and my research program point to the contrary, that many psychometric-minded scholars use social and personal intersectionality to do good work.
 - My research program shows, to understand a complex social phenomenon you need a sufficiently fine-grained and deeply interwoven categories to discover differential effects.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- My hope is that the narrative of disciplinary traditions in collision is a thing of the past and that this new view leads to the overall improvement of the quality of life of students and citizens of our world.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- From a more philosophical lens, my research program highlights that the use and interpretation of assessment (and surveys) makes particular kinds of statement about an educational phenomenon of interest (e.g., knowledge of domain, or a health status) whose definitions rely on normative standards.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- These normative statements make claims about how things should or ought to be, how to value them, which things are good or bad, and which actions are right or wrong.
 - Empirical generalizations about them thus present a special kind of value-ladenness.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- Philosophers of science have already reconciled values with objectivity in several ways (see, for example, Douglas, 2004, 2011).
- None of the existing proposals are suitable for the sort of claims made in the use of assessments and survey; which I would describe as a blending of normative and empirical claims.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- Some would argue that these blended claims should be eliminated from science – in part, this reflects the early psychometric stance in the disciplinary tension I described early.
- I argue that we should not seek to eliminate these blended claims from the use of assessment and surveys or in assessment and survey studies.
 - Rather, we need to develop principles for their legitimate use.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- What is next on the horizon was signaled by Sam Messick in his work on validity theories and is nudged along by the view of validity and fairness I describe herein; that is, to find or discover the hidden value propositions in the use and interpretation of assessments.
 - This needs to be systematic and documented as part of the process of validation and interpretation of assessments and surveys.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- As Addey, Maddox, and Zumbo (2020) show, this needs, in part, to focus on disagreements about the empirical claims from assessments and surveys.
 - Finally, one needs to check if value presuppositions are invariant or robust to these disagreements, and if not to conduct an inclusive deliberation that focuses on disagreements about the empirical claims from the test.

What my approach to fairness and equity implies ... a concern for intersectionalities and the many ways of being human

- Elsewhere (e.g., Zumbo, 2017; Zumbo & Hubley, 2017) I have argued that this sort of value-ladenness is already part of the science of measurement and testing -- and, I would argue, science more generally.
 - Pretending that measurement and testing can be reformulated into value-free claims devalues perfectly good practices and stakes the authority of science of measurement and testing on its separation from the community that it needs and enables. This community of students, parents, and policy-makers need to be viewed from an intersectional stance.

Thank you

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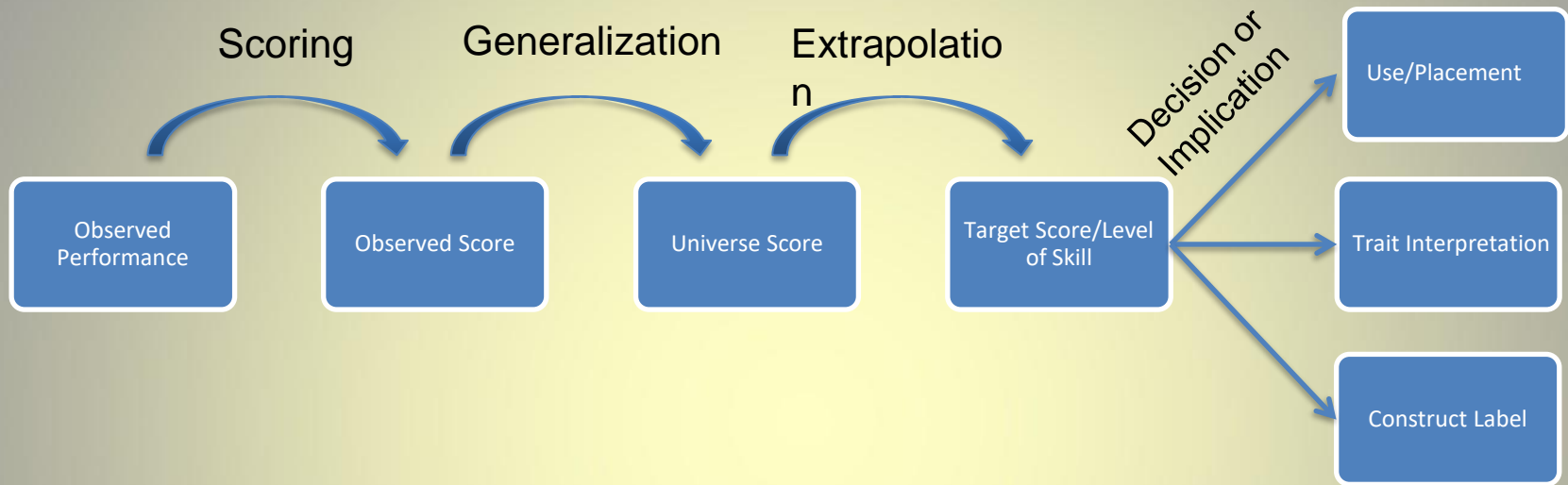
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Appendix

Brief description of argument-based approaches to validity

Kane's Argument-based Approach to Validation



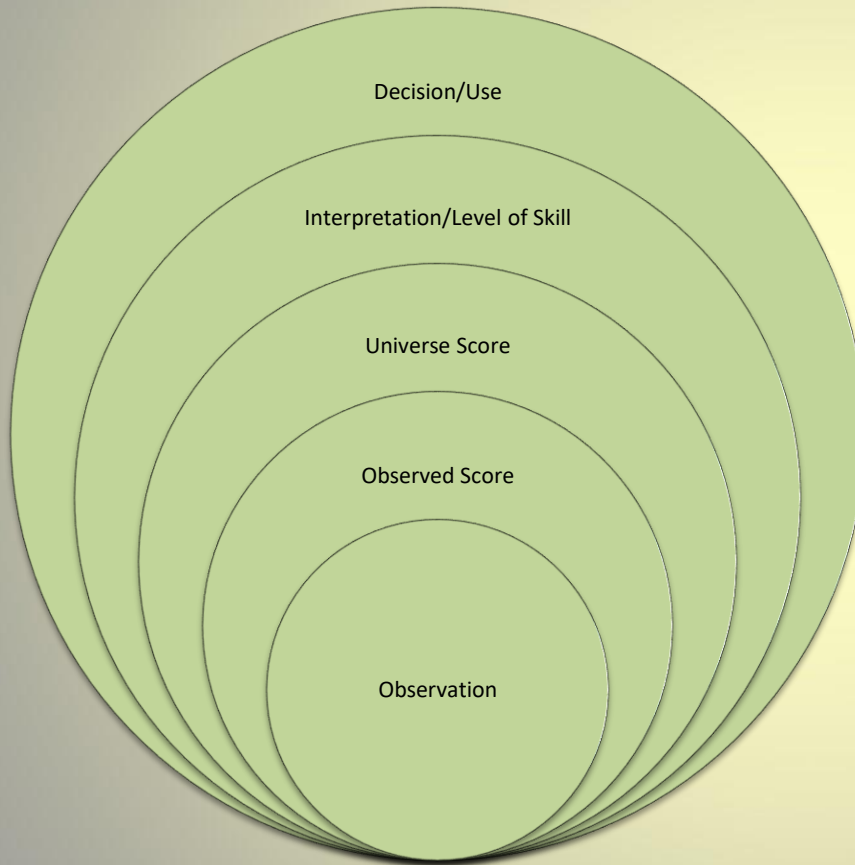
Notes:

Different forms of interpretive arguments.

Interpretive argument followed by the validity argument.

Descriptive vs. decision-based interpretations.

Kane's Argument-based Approach to Validation



Notes:

Presence/influence of G-theory.

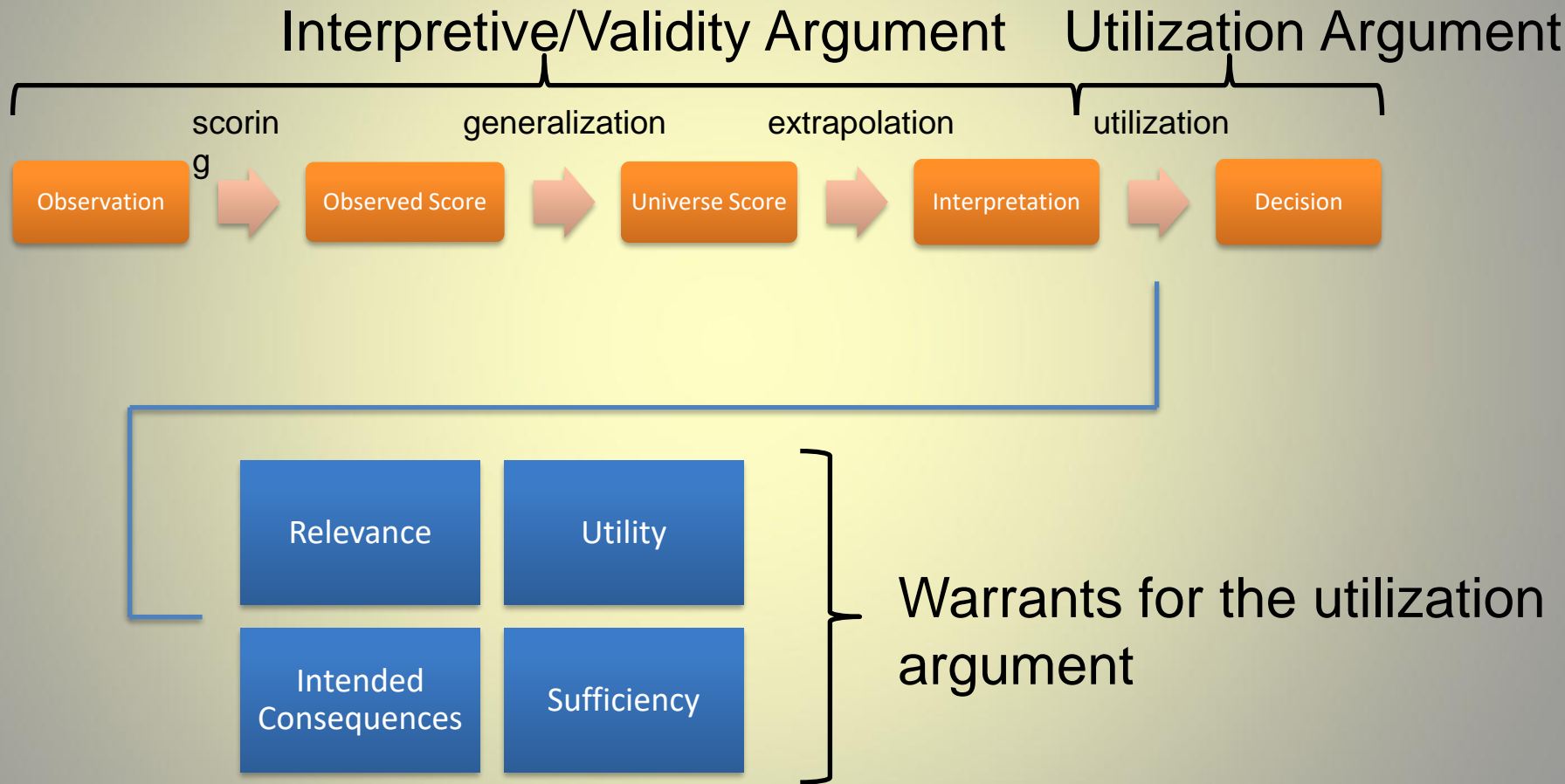
Connection to DLD Framework.

Competency vs construct.

Bachman, supporting a case for test use

- Lyle Bachman differentiates between arguments that lead toward a description versus those that lead towards a particular decision.
- For example, Bachman differentiates between making an inference about a potential candidate's language ability in certain tasks from the subsequent decision about whether to hire that person.
 - He feels there is not enough systematic attention focused on supporting the decision as compared to stating the interpretation.
 - He proposes the following framework, the creates a separate argument for those cases in which we are also evaluating a particular use, not only an interpretation or description of observed performance.

Bachman's Assessment Use Argument (AUA)



Bachman, L. F. (2005). Building and Supporting a Case for Test Use. *Language Assessment Quarterly: An International Journal*, 2(1), 1-34.

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