

This article was downloaded by: [McGrath, Robert E.]

On: 6 March 2009

Access details: Access Details: [subscription number 909268732]

Publisher Psychology Press

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Measurement: Interdisciplinary Research & Perspective

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title-content=t775653679>

### On Prototypes and Paradigm Shifts

Robert E. McGrath<sup>a</sup>

<sup>a</sup> Fairleigh Dickinson University,

Online Publication Date: 01 January 2009

**To cite this Article** McGrath, Robert E.(2009)'On Prototypes and Paradigm Shifts',*Measurement: Interdisciplinary Research & Perspective*,7:1,27 — 29

**To link to this Article:** DOI: 10.1080/15366360802715379

**URL:** <http://dx.doi.org/10.1080/15366360802715379>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

---

## COMMENTARY ON ISSUE 6(1–2)

---

### On Prototypes and Paradigm Shifts

Robert E. McGrath

*Fairleigh Dickinson University*

I agree with the editors of this informative series of articles (Haig & Borsboom, 2008) that the number of articles appearing in recent years questioning basic assumptions about psychosocial measurement instruments, such as their mathematical qualities and their potential as valid indicators, augurs well for serious reconsideration of measurement practice. In my comments on the series I will focus on two issues. The first is my own pet hypothesis about how psychosocial measurement evolved in the way it did. The second is what I think would need to happen before such reconsideration is likely to lead to praxis.

I have suggested elsewhere (McGrath, 2005a) that the problems with the validity and mathematical characterization of psychological variables emerged out of psychologists' attempt to operationalize psychosocial concepts (Markus, 2008) considered to be culturally important such as intelligence, extroversion, or job performance. These concepts are complex and multidimensional and generally exist in language only as prototypes (Rosch, 1973) or Platonic idealizations defined in terms of a common clustering on a number of more elemental dimensions. For example, the prototype of depression is characterized by high levels of sadness, hopelessness, and suicidal feelings; low rates of pleasurable activity and positive emotionality; and so forth.

Reasonable observers should reliably be able to identify individuals who closely match the prototype of depression, a group that might be called *exemplary* depressives, as well as individuals who are exemplary in their absence of depression. Few cases of depression or its absence are exemplary, however. For everyone else, there are varying degrees of distance from the prototype across the set of dimensions (setting aside for purposes of this brief exposition the issue of whether these dimensions are actually at least ordinal). It is here that ordering based on complex prototypes inevitably fails, because the language offers little guidance on establishing relative distance from the prototype across multiple dimensions. The result is

---

This commentary was inadvertently omitted from Issue 6.1–2. The editors apologize to the author for the error.

Correspondence should be addressed to Robert E. McGrath, School of Psychology, Fairleigh Dickinson University, 1000 River Road T-WHI-01, Teaneck, NJ 07666. E-mail: mcgrath@fd.edu

that location on the variable generated from a traditional multi-item scale, with different items representing different dimensions of the complex construct, is assigned rather than inherent to the object. Multi-item measurement in psychology is not measurement at all but rather indexing, similar to the process for identifying the best colleges or the best places to live. It is easy to see how the resulting scale will inevitably fail to meet Borsboom's (2008) standard for an observed variable,<sup>1</sup> or Michell's (2008) expectation that mathematical qualities should be demonstrable.

One sign of the artificiality of this assignment is evident when the test user is asked what it means to say that person *a* is more depressed than person *b*. The answer will probably be couched in terms of specific concepts central to the depressive prototype, such as person *a* is more likely to be suicidal than person *b*, or probably demonstrates greater sadness. The irony is that the individual items of the multi-item scale provide direct evidence about the accuracy of these inferences, but inferences are rendered more tentative than they need to be because the test user has focused on the aggregate score rather than the multidimensional space created by the set of item responses.

What muddies the waters for recognizing multi-item scale variables as indices is the application of psychometric theory or some related model that creates an impression of coherence to the variable structure. In fact, the issue of when it is appropriate to aggregate is inherently a conceptual rather than statistical matter, since a statistically reliable scale can be generated by combining a sufficiently large sample of any collection of highly correlated indicators regardless of whether or not they share the same referent.

My second point has to do with whether discussions such as those in the target articles will produce a paradigm shift in psychological measurement practice. Unfortunately, I have my doubts. The issues addressed in the articles are not new. In fact, Krantz, Luce, Suppes, and Tversky (1971) raised formal concerns about the representational aspects of multi-item scales over 35 years ago. Admirers of mathematical formalism in measurement have been scratching their heads ever since about the failure of these concerns to affect practice in psychology (e.g. Cliff, 1992; Schönemann, 1994).

I would hypothesize that paradigms have not shifted for one very important reason, which is that psychologists have always been more pragmatic than philosophical. The concerns that have been raised are unlikely to play much of a role in measurement practice until psychologists perceive a real benefit from change. Unfortunately, the present set of articles does not advance the implementation of formal considerations in any substantive way. The editors (Haig & Borsboom, 2008) note, "we think that resolving philosophical-cum-theoretical issues plays an important role in furthering our understanding of measurement," but it is unclear why this matters. Michell (2008) concludes "while instrumentalist considerations are sometimes not unimportant in science, on their own, they never amount to a good reason for accepting a proposition as true when that proposition has empirical content." If no better practical solution is

---

<sup>1</sup>I should note some personal reservations about the criteria Borsboom (2008) offers for distinguishing between latent and observed variables. For example, the presence of abdominal rebound pain meets all the criteria for making appendicitis an observed variable, but in a very important way the appendicitis remains latent. Similarly, self-reports of grade point average are notoriously inaccurate (Kuncel, Credé, & Thomas, 2005), but many psychologists would not consider this variable latent in the same way that self-reported extroversion remains latent. Though I thought this point was worth raising, it does not invalidate Borsboom's main theses about the implications for psychology of the lack of observed variables.

offered, what is the alternative? Until it is demonstrated that concern about formal qualities of measurement enhance practice in the social sciences—improving the accumulation of knowledge or the ability to compare alternate models, for example—the case has yet to be made that such concerns are important. While it is true the pragmatists are perhaps overly sanguine about their current practices, it is also true that the formalists have offered no clear alternative. To paraphrase one of Kant's more famous dicta offered in the light of an earlier epistemological controversy, formalism without content is empty, observations without concepts are blind.

So the issue becomes, what else is there? Maraun (1998) has suggested the rejection of common language concepts in favor of technically derived concepts. I have argued against this perspective (McGrath, 2005b) because I do think linguistic concepts have a role to play in the social sciences that does not exist for the physical sciences. In fact, Maraun and Peters (2005) acknowledged that Cattell (1965) engaged in technical conceptualization when he developed concepts such as *premsia*, but the result was concepts of no interest to anyone.

A better alternative may be measurement at the level of the elemental concept (McGrath, 2005a). This is an option my colleagues and I are currently pursuing, which has already revealed to us some interesting information about how people approach self-report measures. It is too early to determine whether this approach will indeed result in the *killer app* that will set in motion the paradigm shift so long desired. What is clear is that until psychologists see the benefit to change, change will not (and perhaps should not) occur.

## REFERENCES

- Borsboom, D. (2008). Latent variable theory. *Measurement: Interdisciplinary Research and Perspectives*, 6(1–2) 25–53.
- Cattell, R. (1965). *The scientific analysis of personality*. Baltimore: Penguin.
- Cliff, N. (1992). Abstract measurement theory and the revolution that never happened. *Psychological Science*, 3, 186–190.
- Haig, B. D., & Borsboom, D. (2008). On the conceptual foundations of psychological measurement. *Measurement: Interdisciplinary Research and Perspectives*, 6(1–2), 1–6.
- Krantz, D. G., Luce, R. D., Suppes, P., & Tversky, A. (1971). *Foundations of measurement*, Vol. 1. New York: Academic Press.
- Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research*, 75, 63–82.
- Maraun, M.D. (1998) Measurement as a normative practice: Implications of Wittgenstein's philosophy for measurement in psychology. *Theory and Psychology*, 8, 435–461.
- Maraun, M. D., & Peters, J. (2005). What does it mean that an issue is conceptual in nature? *Journal of Personality Assessment*, 85, 128–133.
- Markus, K. A. (2008). Constructs, concepts and the worlds of possibility: Connecting the measurement, manipulation, and meaning of variables. *Measurement: Interdisciplinary Research and Perspectives* 6(1–2), 54–77.
- McGrath, R. E. (2005a). Conceptual complexity and construct validity. *Journal of Personality Assessment*, 85, 112–124.
- McGrath, R. E. (2005b). Rethinking psychosocial constructs: Reply to comments by Barrett, Kagan, and Maraun and Peters. *Journal of Personality Assessment*, 85, 141–145.
- Michell, J. (2008). Is psychometrics pathological science? *Measurement: Interdisciplinary Research and Perspectives*, 6(1–2). 7–24.
- Rosch, E. H. (1973). Natural categories. *Cognitive Psychology*, 4, 328–350.
- Schönemann, P. (1994). Measurement: The reasonable ineffectiveness of mathematics in the social sciences. In I. Borg, & P. Mohler (Eds.), *Trends and perspectives in empirical research*. Berlin: Walter de Gruyter.