Quality of Life Research (2019) 28:2633–2634
https://doi.org/10.1007/s11136-019-02276-9

RESPONSES TO "ADVANCING QUALITY-OF-LIFE RESEARCH BY DEEPENING OUR UNDERSTANDING OF RESPONSE SHIFT" BY BRUCE D. RAPKIN & CAROLYN E. SCHWARTZ

Relating response shift and cognitive appraisal to measurement validation

Richard Sawatzky[1,2]

Accepted: 13 August 2019 / Published online: 17 September 2019

Rapkin and Schwartz draw attention to "cognitive appraisal" as foundational to understanding response shift. Their argument is grounded in the theoretical premise that response shift arises from a process of cognitive change in how people interpret and respond to items for measuring quality of life and other patient-reported outcomes. In this invited response, I relate the notion of cognitive appraisal to theoretical perspectives of measurement validity that focus on inferences, actions, and decisions made on measurement scores [1]. From this point of view, response shift research on cognitive appraisal can be viewed as a form of measurement validity evidence, where the goal is to arrive at justifiable inferences about the meaning of variability in longitudinal change of measurement scores [2]. I conclude with a discussion of methods for examining individual differences in response shift, including a novel approach that involves the use of latent class models.

Theories of measurement validity have evolved significantly from foundational work by Cronbach and Meehl on nomological networks, to criterion- and content-based evidences, and to Messick's view of validity as "an integrated evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores" [3]. Of particular relevance to research on response shift, Messick draws attention to the need for evidence about "response processes". In their edited book on "Understanding and Investigating Response Processes in Validation Research", Hubley and Zumbo build on these foundations in defining response processes as "the mechanisms that underlie what people do, think, or feel when interacting with, and responding to, the item or task" [4]. Ivan Barofsky has similarly argued for understanding the role of cognitive processes underlying subjective health-related quality of life measurement [5].

The notion of "cognitive appraisal" in response shift research aligns with the increasing emphasis on "response processes" in measurement validity theory. However, there are also several noteworthy differences. First, it is important to recognize that "response processes" are not exclusively cognitive but include various other explanations for how people respond to items. For example, emotional disposition in how one responds to an item may be influenced by changes in the physical environment or social context a person is in when completing a questionnaire. Second, the notion of response shift as cognitive appraisal focuses on a change in how people think about the construct being measured. On the other hand, response processes focus specifically on how people respond to items. The implication is that, with respect to longitudinal change, a change in response process (e.g., how people interpret an item) may occur even if there is no change in how a person views the construct being measured. That is, the way in which an item reflects the construct may change even if a person's perspective of the construct has not. The question then arises about whether this necessarily constitutes response shift. Based on how Rapkin and Schwartz define cognitive appraisal in the context of response shift, one would conclude that this particular situation is not response shift.

The similarities and differences between cognitive appraisal in response shift and response processes have implications for the methodological approaches to response shift research. One implication is that a lack of longitudinal measurement invariance may not necessarily constitute response shift. Conversely, response shift may not manifest in a lack of longitudinal measurement invariance. According to Rapkin and Schwartz, to conclude that response shift has

✉ Richard Sawatzky
Rick.Sawatzky@twu.ca

[1] School of Nursing, Trinity Western University, 7600 Glover Road, Langley, British Columbia (BC) V2Y 1Y1, Canada

[2] Centre for Health Evaluation and Outcome Sciences, University of British Columbia, Vancouver, BC, Canada

occurred, there must be corresponding evidence of a change in cognitive appraisal of the measured construct. Consequently, although methodological approaches to examining longitudinal measurement invariance can provide valuable insights for examining response shift, they may not provide conclusive evidence of response shift.

An additional important consideration is that there may be variability amongst individuals about the extent to which response shift has occurred, even if they are exposed to the same catalyst. Clearly, attention to individual differences in how people respond to measurement items is foundational to understanding response shift. Rapkin and Schwartz recommend using statistical methods for examining variability in residual differences between the observed and expected measurement scores based on regression-based methods for examining response shift. In addition, individual differences in response shift can be examined using a variety of well-established latent variable approaches (e.g., as represented by measures of "person fit" in Rasch or item response theory (IRT) models, and latent variable mixture models, e.g., [2]).

Finally, individual differences in response processes over time can be viewed as a form of heterogeneity, where some people may experience different forms of response shift, and others may not. Latent class models can be used to examine heterogeneity by nesting longitudinal measurement models within two or more latent classes [2]. The latent classes can be specified to represent hypothetical subgroups of people who are relatively more homogeneous with respect to the extent to which the relationship between the latent construct and the measurement items is invariant over time. For example, one can specify one latent class of people who experienced no response shift by restricting all measurement model parameters (e.g., discrimination and difficulty parameters of an item response theory model, or loadings, intercepts and item residuals of a factor analysis model) to be equal over time. Other latent classes with different degrees of response shift can be specified by allowing one or more of the measurement model parameters to vary over time. Posterior probabilities of latent class membership can be obtained to predict the degree to which each individual is likely to experience response shift (analogous to individual residual scores in regression-based methods). In addition, a measure of cognitive appraisal can be included as a predictor of the latent classes to examine the extent to which heterogeneity in longitudinal measurement invariance is associated with cognitive change. Although the use of latent class models for response shift detection requires further research, these models have potential for advancing the field by drawing attention to heterogeneity in response shift. Simulation studies and empirical research are recommended to compare different statistical approaches for examining response shift at the individual level.

Funding Funding was provided by Canada Research Chair/Canadian Institutes of Health Research.

Compliance with ethical standards

Conflict of interest Sawatzky, the author of this study, declares that he has no conflicts of interest. This article does not contain any studies with human participants performed by the author.

References

1. Zumbo, B. D., & Chan, E. K. H. (2014). *Validity and validation in social, behavioral, and health sciences*. New York: Springer.
2. Sawatzky, R., Sajobi, T. T., Brahmbhatt, R., Chan, E. K., Lix, L., & Zumbo, B. D. (2017). Longitudinal change in response processes: A response shift perspective. In B. D. Zumbo & A. M. Hubley (Eds.), *Understanding and investigating response processes in validation research* (pp. 251–276). New York: Springer.
3. Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13–103). New York: Macmillan Publishing Co Inc.
4. Hubley, A. M., & Zumbo, B. D. (2017). Response processes in the context of validity: Setting the stage. In B. D. Zumbo & A. M. Hubley (Eds.), *Understanding and investigating response processes in validation research* (pp. 1–12). New York: Springer.
5. Barofsky, I. (2012). *Quality its definition and measurement as applied to the medically ill*. New York: Springer.