

The Importance of Using Valid and Reliable Measures in Psychology and Psychiatry

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Measurement plays a key role in reproducibility and replicability of research findings and in confidence researchers may have in their findings to derive theoretical conclusions from them. However, the topic of measurement has received far less attention than we would have expected in the literature [1].

Although psychological measures can take a variety of forms, as in the case of reaction time-based implicit measures [2], they most commonly take the form of self-report scales. Self-reports that measure the severity of common mental disorders on the basis of subjective symptoms (e.g. depression or anxiety) have been central for the assessment in clinical psychology and psychiatry [3]. This derives from the fact that many of the theoretical outcomes of interest to psychology and psychiatry cannot be objectively or directly assessed as they are latent constructs that are unobservable in nature. Examples are quality of life, health representations and perceptions, beliefs, emotions, mood states, degree of distress, or personality traits. Thus, such theoretical constructs are measured through an inferential process that requires the development of instruments to assess them indirectly.

Designing valid measures of latent constructs requires such instruments be subject to an ongoing process known as validation. This process consists of sequential phases such as conceptualization of the construct, development and selection of indicators (items) to assess it, ensuring that the resulting scale content is both relevant and representative, using quantitative analyses (e.g. item and factor analyses, and assessments of consistency and stability) to determine the psychometric properties of the scale. The psychometric assessment of measures should focus mainly on validity and reliability. Validity is the degree to which an instrument is capable of measuring a concept or trait. In other words, validity indicates that a measure truly assesses what it aims to measure (e.g. anxiety) without ambiguity or overlap with other related constructs (e.g. neuroticism). Reliability refers to the quality of the measurement process, that is the extent to which an instrument would give the same results under the same conditions in terms of internal consistency and stability across-time. Another important quality is the equivalence of measurement properties across populations, time points, and contexts, that is measurement invariance [4]. Measurement invariance determines if items used in a scale refer to the same construct to members of different groups.

Establishing and reporting the psychometric properties of a measure is fundamental to its utility in testing theory, designing interventions, and making clinical decisions. A lack of good psychometric characteristics, on the contrary, may lead to questionable theoretical conclusions and reduce replicability of results. However, Flake., *et al.* [1], examining the literature, found that many constructs studied in psychological research were assessed with ad hoc measures and/or lacked evidence of appropriate validation. Although tests such as Cronbach's α for assessing internal consistency and test-retest reliability were frequently reported, other tests of structural validity, such as measurement invariance, were infrequently conducted. So that it was difficult to determine if a given measure reflects the same construct across samples, contexts, and conditions.

Since Hussey and Hughes [5] questioned whether this tendency to underreport tests of validity is due to a mere problem of underreporting or to the potentially deeper issue of hidden invalidity, they submitted 15 self-report measures to a comprehensive battery of structural-validity tests. Although 89% demonstrated good internal consistency, and 100% demonstrated good test-retest reliability, only 73% demonstrated good fit with the expected factor structure, and 4% demonstrated measurement invariance for age and gender groups. The authors therefore suggested that the underreporting of structural validity may reflect hidden invalidity.

Sunderland, *et al.* [3] observed that the large heterogeneity and subjective nature of symptoms associated with mental disorders requires high-quality self-report measures to validly capture these experiences and assist with diagnosis and treatment decisions. However, they also highlighted several threats to validity and reliability that may occur on the side of both respondents and the instrument, such as nonoptimal response patterns (e.g. socially desirable responding), limitations in self-knowledge or a lack of insight, poor cognitive capacity, cross-cultural differences or biases, conversion of paper-and-pencil instruments to electronic administration. Regarding cross-cultural and online administration of existing scales, the assessment of invariance across settings can help assuring the validity of the results obtained with their use in order to trace conclusions from them.

In conclusion, self-report instruments for psychological constructs and mental disorders are still the most cost-effective and time-efficient method for collecting large amounts of data. However, clinicians and researchers need to evaluate the strengths and weaknesses of the scales they intend to use with specific consideration to their psychometric characteristics. Such characteristics should not be restricted to a single index like Cronbach's α , but rather should include other indexes as well, which can provide information on their validity and possibly on their invariance across different cultures or administration forms (e.g. paper-and-pencil versus online) when appropriate.

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