Research in the quantitative and qualitative traditions has advanced both the science of nursing and nursing education through the creation of new theories and the testing and expansion of existing theories. To continue to advance the science of nursing and nursing education, rigorous and well-designed studies are needed.

Any research study involves a series of decisions by the researcher. Familiar decisions are common to both quantitative and qualitative research approaches, such as the research question(s) and the sample, sampling, and data collection. Quantitative research involves additional decisions about the conceptual framework or theory that guides the study and the measures used to operationalize the constructs of interest in the study.

All quantitative research is theory-testing research. The concepts in the theory, as well as the relations between those concepts, form the foundation for the study, which then ultimately guides decision making within the study. These native theoretical concepts become the researcher-derived constructs, which are then operationalized as variables in the study. The relations between concepts, at the theoretical level, move through the construct level and ultimately form the basis of the hypotheses being tested in the study.

Theory then permeates all decisions in quantitative research. The theory guiding the study is especially relevant to measurement decisions. Measures must be selected because the operational definition(s) of the scales and subscales in the measure are consistent with the conceptual definitions of the theory and the researcher derived construct definitions. The importance of this definitional consistency cannot be minimized, as this consistency is central to judgments of validity. Failure to attend to theory in the selection of measures can limit the utility of findings and call the results of a study into question.

But what does the researcher do when existing measures do not have theoretically consistent definitions with the theory guiding the study or when there are no existing measures to choose from? Advancing the science in that area of inquiry will require instrument development.

Instrument development studies require the same level of rigor and thoughtful, theoretically based decision making, as required in any other study. Theory in instrument development remains a central consideration. Item generation, which is one of the more important aspects of instrument development, must be grounded in theory. Using the literature as a source of item generation is certainly an acceptable practice, provided the theoretical base of the literature from which those items are drawn is taken into consideration. After items are generated and the pool of potential items is ready for testing, additional theoretical considerations must be examined as part of the data collection and analysis phases of the instrument development study.

Confirmatory factor analysis may be used to assess the degree to which an a priori measurement model of latent variable and item relations, with theoretically defined restrictions, is reproducible in the collected data. Exploratory factor analysis, as an alternative data analytic strategy, does not impose such strict latent variable and item restrictions. Rather, the items that form factors are the result of mathematical calculations. It is the researcher’s responsibility—and obligation—to interpret these factors, make decisions about which factors to retain and which factors to discard, determine the items associated with each factor, and generate the theoretical definition of those factors. The key consideration here is that although the item groupings into factors are mathematically defined, the ultimate decisions about factors, as well as the items associated with each factor, are based in the theory that is guiding the instrument development study. Naming a factor is important, but specifying the theoretical definition of each factor is essential. These definitions must be theoretically consistent with the original theory or theories that were used as a basis for item generation. Selecting and naming factors based on statistical considerations alone is not an acceptable practice.

Even within exploratory factor analysis, the decision to use the common factor model or the component model is a theoretical consideration. Although the mathematical results from these models may be similar, the interpretation of results in the common factor model is much different than interpretation of results from the component model because of the nature of the relations between the latent variable(s) and the indicators in each respective model (for a more comprehensive discussion of exploratory factor analysis and the component and common factor models, see Fabrigar, Wegener, MacCallum, & Strahan [1999] and Preacher & MacCallum [2003]). In sum-
mary, then, any instrument development study is incomplete without specifying and incorporating the theoretical foundations into the study.

Each of these decisions in instrument development, selection, and evaluation has bearings on the judgment of validity. Validity is not a property of a measure (Messick, 1995); thus, a measure per se is not valid or reliable. Rather, validity concerns the interpretation of scores from the use of a measure and that interpretation is a theoretical concern. The American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education (1999) provide the following definition of validity: “Validity refers to the degree to which evidence and theory support the interpretation of test scores entailed by proposed uses of tests” (p. 9). This definition speaks to the importance of theory in measurement as well.

The generation of new knowledge through research and the evaluation and synthesis of existing research must be undertaken through the primacy of theory. To do anything less inhibits the advancement of nursing science.

References

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The author has disclosed no potential conflicts of interest, financial or otherwise.
doi:10.3928/01484834-20131022-10