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Measurement Theory

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Measurement—defined as the process of assigning numbers to objects in meaningful ways—is fundamental to the process of testing scientific theories. Measurement theory considers (1) the conditions under which such numerical assignments are possible, (2) procedures for making these assignments, and (3) appropriate interpretation of the resultant numbers, after the assignments have been made.

The first component involves establishing a one-to-one correspondence between objects in an empirical set and a subset of the real number system, such that differences between the numbers correspond to substantive differences in some attribute of the objects. The second component involves the scaling procedures (e.g., summated ratings, factor analysis, ideal point models, etc.) that are actually used to assign numbers to objects. The third component involves the levels (or "scales") of measurement (e.g., nominal, ordinal, interval, or ratio), as well as the validity (do the measurement values correspond to the attribute they are intended to represent?) and reliability (to what extent are the measurements affected by random errors?) of the measured values. In the social and behavioral sciences, measurement theory developed because of the need to measure attributes of objects that are not immediately quantifiable (e.g., attitudes, ideology, political involvement, power, status, etc.).

See also*Qualitative Methodologies*; *Quantitative Methodologies*; *Reliability and Validity Assessment*.

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- measurement
- validity
- methodology
- scale
- theories

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