

Abstract for the EMPG 1999 Meeting in Mannheim

Levels of Measurement Laws

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Three levels of scientific laws that involve measures onto continua are distinguished. The first level formulates fundamental, qualitative properties of attributes. These involve orderings coupled with other structures, and they lead to numerical representations. The most common are extensive, intensive, and conjoint measurement, of which physics and psychology provide many examples. The second level consists of laws linking distinct structures of the first type. In physics, distribution laws give rise to the structure of physical quantities; in utility theory, somewhat similar laws link joint receipt to gambles; in psychophysics, comparable laws seem less common. The third level involves laws stated within frameworks arrived at the second level. Sometimes these take the form of invariance principles, as in physical dimensional analysis, or as dynamic systems, as in much classical physics. Invariance examples from psychology are examined and contrasted with those from physics.