Journal of Vocational Behavior

Volume 29, Issue 3, December 1986, Pages 301-331

Major contribution

g: Artifact or reality? â˜†

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https://doi.org/10.1016/0001-8791(86)90011-4

Abstract

The highest common factor in any large and diverse collection of mental tests is measured by means of factor analysis, and is conventionally labeled psychometric *g* (for general ability). The *g* factor, which is highly correlated across even quite different batteries of tests, provided the tests are fairly numerous and varied, reflects the empirical fact of *positive manifold*, that is, positive correlations between all mental tests. After briefly explicating the general psychometric conditions and factor analytic methods for the measurement of *g*, this article addresses the theoretically important question of whether *g* is merely an artifact of the method of constructing psychometric tests and the mathematical operations of factor analysis or whether it has an authentic claim to represent some natural phenomenon that exists independently of psychometrics and factor analysis. Several lines of evidence which refute the argument that *g* is a methodological artifact are presented. The *g* factor, far more than any other linearly independent sources of variance in psychometric tests, is correlated with various

phenomena that are wholly independent of both psychometrics and factor analysis, such as the heritability of test scores, familial correlations, the effects of inbreeding depression and of hybrid vigor, evoked electrical potentials of the brain, and reaction times to elementary cognitive tasks which have virtually no intellectual content. This evidence of biological correlates of *g* supports the theory that *g* is not a methodological artifact but is, indeed, a fact of nature. However, the causal nature of *g* itself is not yet scientifically established. That goal must await further advances in neuroscience.

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â˜† Presented at the fall conference of the Personnel Testing Council of Southern California, â€œThe *g* Factor in Employment Testing,â€ Newport Beach, CA, October 10, 1985.

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