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Practised intelligence testing based on a modern test conceptualization and its reference to the common intelligence theories

Klaus D. Kubinger [a,*], Margarete Litzenberger [a], Christine Mrakotsky [b]

[a] *Department of Developmental Psychology and Psychological Assessment, Faculty of Psychology, University of Vienna, Liebiggasse 5, A-1010 Vienna, Austria*

[b] *Department of Psychiatry, Children's Hospital Boston/Harvard Medical School, 300 Longwood Avenue, Boston, MA 02115, USA*

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Abstract

The question is to what extent intelligence test-batteries prove any kind of empirical reference to common intelligence theories. Of particular interest are conceptualized tests that are of a high psychometric standard – those that fit the Rasch model – and hence are not exposed to fundamental critique. As individualized testing, i.e., a psychologist and a testee face to face, is often preferred by many practitioners, a Wechsler-like test-battery will be dealt with here: The Adaptive Intelligence Diagnosticum (AID 2; [Kubinger, K. D. &, Wurst, E. (2000). Adaptives Intelligenz Diagnostikum—Version 2.1(AID 2). [Adaptive intelligence diagnosticum 2.] Weinheim: Beltz.]). Using the standardization sample, confirmatory factor analyses were performed with respect to intelligence theories and models, respectively, as concerns Spearman, Wechsler, Thurstone, Cattell, Jäger, and Carroll. Additionally, a confirmatory factor analysis was performed with respect to a simplified neuropsychological model of specific learning disorders, which proved to fit the data best, even better than the (exploratory) four factor solution as given in the AID 2-manual. This model is based on the three interdependent factors "perception", "retrieval", and "utilization". The answer is that if modern test conceptualizations attempt to fulfill pragmatic purposes they hardly have any relation to pertinent intelligence theories, but rather create their own kind of informal, heuristic model of "intelligence".

Keywords: Intelligence theory; Rasch model; Wechsler-like test-battery; Confirmatory factor analysis; Learning disorders

* Corresponding author. Tel.: +43 1 4277 47850/47855; fax: +43 1 4277 47905.
E-mail addresses: klaus.kubinger@univie.ac.at (K.D. Kubinger), margarete.litzenberger@univie.ac.at (M. Litzenberger).

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1. Introduction

1.1. Intelligence assessment within consulting psychology

Intelligence assessment has more application today than ever before. And consulting psychology seems to make the most use of individually administered test-batteries; in other words, a psychologist and a testee face to face. Regardless of whether the testees are preschoolers, children, juveniles, adults or even senile people, practitioners prefer to use a pertinent individual test-battery rather than test-batteries that are designed for testing a group of testees at once. This is because individual test-batteries provide the opportunity to stimulate a testee's interaction with certain materials as well as with the psychologist him/herself. As a matter of fact, this intention correlates highly with the use of a kind of Wechsler-like test-battery (cf. the very beginning by Wechsler, 1939).

Hence, an enormous amount of effort has, meanwhile, been put into trying to achieve high psychometric standards with such test conceptualizations. This would firstly entail the calibration of the subtest items according to the Rasch model (cf. the worldwide PISA study which, of course, applies this model and some generalization of it, respectively, for reasons of psychometric standards; see for instance Adams & Wu, 2002), and secondly, the application of the concept of adaptive testing. However, the question is whether such a psychometrically high standard of test conceptualization actually reflects any common intelligence theory. Maybe practitioners would then be supported by test-batteries that measure across the state of the art theory and therefore, so to say, create their own kind of informal, heuristic "model" of intelligence. Consulting would then follow this and not any common theory.

This is the question that is to be answered in this paper.

1.2. The common intelligence theories

In determining the number of dimensions, factors or abilities necessary in order to properly explain individuals' differences in performance on cognitive tasks (tests), several models have been historically established. There are, beginning with Spearman (1904), the well-known attempts and models by Thurstone (1938), Guilford (1967), and Cattell (1963), later the Berlin model of intelligence structure by Jäger (1984) and, nowadays, the three stratum theory by Carroll (1993).

Although some of them are explicitly hierarchical and others are not, any *g*-factor that is hypothesized in a model at some higher stage other than at a group factor stage is not of consideration in the following; that is, of course, without regard to Spearman. This is because such a higher order factor would not influence the amount of explained variance of the basic factors by the test-battery's subtest scores. And in consulting practice, it is the basic or group factors that are to be interpreted rather than a higher order factor. That is, there are to hypothesize a general factor model according to Spearman, seven primary ability factors according to Thurstone, two group factors according to Cattell and so on.

1.3. Psychometric standards of test calibration

Nowadays, no psychological test may be applied or even published if the test does not clearly fit certain psychometric requirements and standards. The issue is that of "fairness": do the obtained scores indicate the extent of a testee's true ability? That is, scoring rules must not be left to the test author's intuition, but must be empirically validated.