



Assessing behavior in standardized settings: The role of objective personality tests

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ABSTRACT. In this theoretical study objective personality tests are presented as a possible means of assessing behavior in standardized settings. A new generation of objective personality tests that are directly linked to the use of computers is described. One of the prime characteristics of these tests is that they do not have any face validity and are therefore less susceptible to the faking or other answer distortions that are regularly found in the subjective assessment of personality by means of questionnaires. Recent developments in the area of objective personality tests are presented. The Hyperkinetic Syndrome Assessment Method (HKSD) is described as an example of the new generation of objective personality tests. The construction rationale, psychometric properties, and results on its validity are presented. Results from studies with clinical and non-clinical samples demonstrate the usefulness of the HKSD in practice. Objective personality tests are discussed as alternatives in the field of psychological assessment and as valid, economical instruments for the assessment of behavior.

KEYWORDS. Psychological assessment. Objective personality test. Experimental-psychological behavior assessment. Hyperkinetic syndrome. Theoretical study.

RESUMEN. En este estudio teórico los tests objetivos de personalidad son mostrados como una posible forma de evaluar el comportamiento en situaciones concretas. Se describe una nueva generación de tests objetivos de personalidad, vinculados al uso de

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computadoras. Una de las principales características de estos tests es que no presentan validez aparente y son, por consiguiente, menos susceptibles de falseamiento u otras distorsiones de respuesta que habitualmente se encuentran en la evaluación subjetiva de personalidad mediante cuestionarios. Se examinan los desarrollos recientes en el área de tests de personalidad objetivos. El *Hyperkinetic Syndrome Assessment Method (HKSD)* es descrito como ejemplo de la nueva generación de tests objetivos de personalidad. La justificación razonada de la construcción, propiedades psicométricas y resultados sobre su validez son expuestos. Los resultados de estudios con muestras clínicas y no clínicas sostienen la utilidad del *HKSD* en la práctica. Los tests objetivos de personalidad se discuten como alternativas en el campo de evaluación psicológica, como instrumentos válidos y económicos para la evaluación del comportamiento.

PALABRAS CLAVE. Evaluación psicológica. Test objetivo de personalidad. Evaluación experimental-psicológica del comportamiento. Síndrome hiperkinético. Estudio teórico.

RESUMO. Neste estudo teórico os testes objectivos de personalidade são apresentados como uma possível forma de avaliar o comportamento em situações concretas. Descreve-se uma nova geração de testes objectivos de personalidade, vinculados ao uso de computadores. Uma das principais características destes testes é o facto de não apresentarem validade aparente e são, por isso, menos susceptíveis de falseamento ou outras distorções de resposta que habitualmente se encontram na avaliação subjectiva de personalidade através de questionários. Analisam-se os desenvolvimentos recentes na área de testes de personalidade objectivos. O *Hyperkinetic Syndrome Assessment Method (HKSD)* é descrito como exemplo da nova geração de testes objectivos de personalidade. Expõe-se a justificação fundamentada da construção, as propriedades psicométricas e os resultados sobre a sua validade. Os resultados de estudos com amostras clínicas e não clínicas suportam a utilidade do *HKSD* na prática. Os testes objectivos de personalidade são discutidos como alternativas no campo da avaliação psicológica, como instrumentos válidos e económicos para a avaliação do comportamento.

PALAVRAS CHAVE. Avaliação psicológica. Teste objectivo de personalidade. Avaliação experimental-psicológica do comportamento. Síndrome hiper-cinético. Estudo teórico.

Introduction

Objective personality tests and the measurement of behavior

The purpose of this theoretical study (Montero and León, 2005) is to comment on a discussion of the role of behavioral assessment in the process of psychological assessment. Sierra and Bucla-Casal (2001) showed that observational and functional analyses are rarely used while there is an increase in the use of self-report techniques (see also Taylor, 1999). This paper will focus on the psychological assessment of personality and will provide an overview of the use of behavioral variables in objective personality tests. After a general introduction there will be a description of a computer-aided test for the assessment of hyperkinetic syndrome that is representative of a new generation of economical, computer-aided, objective assessment tools.

The use of questionnaires in personality assessment has been widely discussed. As the literature shows (*e.g.*, Kubinger, 2002; Viswesvaran and Ones, 1999) faking of questionnaires is a problem in the process of psychological assessment. Research on alternative assessment techniques is therefore important. This is true especially in considering vocational selection processes (*cf.* Elliott, Lawty-Jones, and Jackson, 1996). From a behavioral point of view the responses of a subject to questionnaires represent samples of the subject's behavior in the assessment situation (*cf.* Barrios and Hartmann, 1986). The usefulness and significance of the results for other (non assessment-related) situations depend on various factors. The effects of faking are particularly relevant in this case. In many cases it is not clear how far this observed behavior could be generalized for other situations. The same is true for different areas of research. Franke (2002), for example, noted that it is not known how often subjects respond with fake good or fake bad response behavior in clinical settings. Her conclusion is that in personality assessment a multi-modal approach in using different psychodiagnostic techniques is the most appropriate way of coping with faking. While working with questionnaires a psychologist has to assume that the testee has recognized the relevant trait in his/her own behavior and is willing to answer without faking. Besides asking the testee there are methods that allow the assessment of actual behavior in structured settings.

In 1967 Cattell and Warburton published a compendium of so-called objective personality tests (*cf.* Ortner, Proyer, and Kubinger, 2006; Schmidt, 1975). The term objective is unfortunately misleading since all psychological inventories should be objective in terms of scoring and the interpretation of the test results. Cattell and Warburton refer here to something different: "objective means not only that the test performance should be similarly scored by two different psychologists, but also that the test stimulus situation, and the whole mode of response, should be such that the testee himself could not fake the response, or distort it to fit his subjective self-concept or his desire" (p. 15). Tests that are commonly referred to as "objective" are called "conspective" in Cattell's terminology. The idea behind objective personality tests is that these tests should be constructed in such a way that the testee does not really know in what way his/her behavior is being measured or what kinds of personality inference will be deduced from his/her scores (test reactions). In general, the testee is not required to evaluate him/herself but his/her behavior in a performance situation is registered. This means that objective personality tests should be difficult to fake. The tests do not show any face validity related to the purpose of measurement; the subjects should therefore not be able to distort the results because the rationale of the test and the way in which it is scored is not transparent (*cf.* Cattell and Schuerger, 1978). This means that the choice of tasks and the specific scoring methods are of special importance here. The idea behind objective personality tests can be summarized by stating that information on the subject's personality is collected in an observation of his/her performance in miniature life situations, while the subject does not know from what angle his/her behavior is being interpreted (*cf.* Cattell, Knapp and Scheier, 1961; Cattell and Schuerger, 1978). Objective personality tests must still be constructed to fulfill all the common quality criteria of psychological tests (Carretero-Dios and Pérez, 2005; Lienert and Raatz, 1994).

Objective personality tests – historical and recent developments

Though objective personality tests have a long tradition (e.g., Burt and Ives, 1924; Eysenck, 1947, 1968; Fryer, 1931; Super and Roper, 1941) they are mostly associated with the name and work of R. B. Cattell. The Objective-Analytic Test Kit (Cattell and Schuerger, 1978) is one of the most important contributions in this field of psychological assessment. It comprises a broad variety of tests allowing the measurement of many different constructs in terms of the Cattellian personality theory. In the literature empirical results for the Objective-Analytic Test Battery are on the whole less encouraging (e.g., Kline and Cooper, 1984), but it has been shown that some of the objective tests might be of use for the assessment of psychoticism and Machiavellian and authoritarian attitudes (Cooper, Kline, and May, 1986). For the measurement of psychoticism with objective tests see also Cattell and Tatro (1965). Other important early test developments were the Objective-Analytic (O-A) Anxiety Battery (Cattell and Scheier, 1960), and the Motivation Analysis Test (Cattell, Horn, Sweney and Radcliff, 1964). The term analytic refers to factor analytic, indicating that only traits that have proven stability across diverse populations are used in the test batteries (cf. Cattell and Kline, 1977). Though there are several hundred objective tests available (cf. Cattell, 1978; Cattell and Warburton, 1967; Schmidt, 1975) they were never popular in psychological assessment. Many of the concepts of miniature life situations seemed not to be suitable for implementation in paper-pencil tests. Thus many of the ideas presented by Cattell and Warburton or other authors seemed not to be feasible for broad use in practice.

This changed with the increasing and common availability of computers in psychological assessment. Schmidt and Schwenkmezger (1994) note that the new possibilities in computer-assisted assessment may provide an opportunity for a renaissance of objective tests. While many objective personality tests at the time of Cattell had more or less the same layout as regular questionnaires, the “second generation” of tests is directly linked to the use of computers. Computer technology enables the original idea of creating miniature life situations to be easily implemented. The publication of the test battery *Arbeitshaltungen* (Work Style; Kubinger and Ebenhöf, 1996) was one of the first of this new generation. In this test battery information on impulsivity vs. reflexivity, frustration tolerance, and achievement motivation is obtained through performance tests, without asking the subject for a self-description. Recent developments include a new objective test for the assessment of achievement motivation (Schmidt-Atzert, 2004), risk-taking behavior (Arend, Botella, Contreras, Hernández and Santacreu, 2003), a test for self-confidence that is administered together with an inventory for general knowledge and vocabulary (Wagner-Menghin, 2004), stress-resistance (Ortner, Kubinger, Schrott, Radinger and Litzenberger, 2006), vocational interests (Proyer, 2006; Proyer and Häusler, in press), and a test for hyperactivity disorders (see also Servera and Cardo, 2006) which will be presented in more detail in the following section.

All of these new inventories are necessarily linked to the use of a computer. A new updated definition of objective personality tests was therefore suggested by Kubinger (2006): “Experimental-psychological behavior assessment as a (psychological) ‘technology’ refers to inventories that deduce personal characteristics of style from observable behavior on specific (performance) requirements, whereby the computer registers the way in

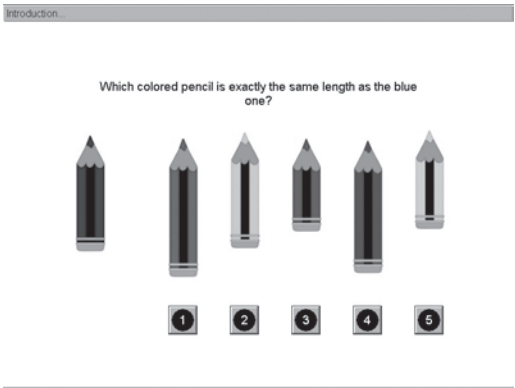
which the testee works on the problem.” (p. 50; translated by the authors). After this general introduction an example of an objective personality test -in this case an experimental-psychological behavior assessment tool for the measurement of hyperkinetic syndrome- will be presented.

An example of experimental-psychological behavior assessment

The Hyperkinetic Syndrome Assessment Method (HKSD; Häusler, 2004) consists of a sequence of five linked subtests which can be used both in preliminary testing for attention deficits and for the assessment of work-style related aspects of hyperactivity disorders. First, the five subtests of the HKSD will be introduced.

- Subtest 1: Determining inspection time. The first subtest measures individual inspection time (Nettlebeck, 1987), the duration of a single observation of a particular visual stimulus comparison. The test items involve comparing the length of two lines, the subject’s task is to identify the longer of the two. The items are constructed in such a way that a sufficiently confident decision can be made on the basis of a single inspection. The measurement of inspection time serves primarily as a baseline for the scoring of Subtest 2.
- Subtest 2: Reflectivity/impulsivity. In this subtest the item material becomes more complex than in the first subtest, so that the task can no longer be solved on a single inspection. There are no longer only two stimuli to be compared; instead there are five lines that need to be inspected to determine which is the same length as the comparison stimulus on the left-hand side (see Figure 1).

FIGURE 1. Instruction item from Subtest 2 of the HKSD.

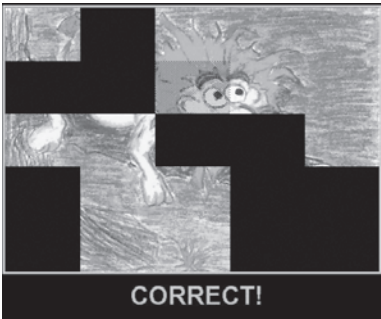


On the basis of the inspection time measured in Subtest 1 it is possible to calculate the number of inspections undertaken by the subject in processing the task. Using a method for separating skill and working style (Häusler, 2005), the processing of the item can be broken down into single sequential comparisons

of stimulus pairs. In this model the two error probabilities –alpha (inspecting a pair of unequal stimuli but assuming incorrectly that they are equal) and beta (inspecting a pair of equal stimuli but assuming incorrectly that they are unequal and continuing the test unnecessarily)– can be estimated. This then enables a skill-free measure of reflexivity ($\frac{\beta}{\alpha}$) and a work-style free measure of efficiency ($1 - \frac{\alpha}{2} - \frac{\beta}{2}$) to be calculated. This method of calculation deals with the potential problem of confusing skill (in this case attention) and working style. A low level of skill and a high level of impulsivity can be regarded as key indicators of hyperactivity disorders.

- Subtest 3 (optional): Adaptation to difficulty. The same item material is used, but the estimate of the subject’s skill in accordance with the Rasch model (Rasch, 1980; from Subtest 2) is used as a basis for systematically presenting items which are either underdemanding (80% solution probability) or overdemanding (20% solution probability). This ensures that, irrespective of the subject’s level of skill, the test always generates situations that are equally under- or overdemanding. The change in decision-making times is monitored. Adaptation of working time to the level of difficulty is seen as an indicator of a planned approach. If, on the other hand, working time remains constant while performance deteriorates this is regarded as an indicator of inadequate task planning.
- Subtest 4 (optional): Motivatability. The item difficulty is selected to correspond as closely as possible to that of Subtest 2. As new elements a “motivation puzzle” and feedback are introduced into the test. Whenever an item is correctly solved, the feedback “CORRECT!” is given, and as a reward a small piece of the puzzle is uncovered. If an answer is incorrect, only the feedback “WRONG!” is given; the puzzle is not shown and no further pieces of it are revealed. The change in decision-making times and in the ability parameter is monitored. An increase in the amount of work done and in the performance level reflects the motivatability of the subject.

FIGURE 2. Feedback for a correct response in Subtest 4 of the HKSD.



NOTE. For each additional correct answer a further portion of the puzzle is uncovered.

- Subtest 5 (optional): Adaptation to feedback. The same mode of presentation as in Subtest 4 is used, but no genuine feedback is given. Instead, the feedback “WRONG!” is given on several successive occasions, and the change in decision-making time and in the ability parameter is monitored. In order not to confuse or frustrate the respondents, this is followed by a sequence with real feedback and the puzzle as reward stimulus. After repeated negative feedback a subject who is able to monitor his behavior adequately will increase his processing time and work more carefully.

Empirical verification of the HKSD. In order to evaluate the validity of the HKSD a number of studies were carried out with both normal and clinical samples. The construct validity of the HKSD's item material was demonstrated in a study carried out by Häusler (2004). The item difficulties estimated by the Rasch model (Rasch, 1980) could be very well predicted by a multivariate regression analysis construction rationale ($R = .925$; $R^2_a = .833$). It can be deduced from this that the constructional aspects that were explicitly utilized in the development of the items can explain by far the largest part of the variance of the item difficulties. The item difficulty is determined by the difference in length of the distractors ($b = -.460$; $t = -2.1$; $p = .048$) and in addition by the offset of the distractor stimuli ($b = .206$; $t = 2.6$; $p = .017$), the position of the correct answer ($b = .433$; $t = 3.1$; $p = .005$) and the interaction between difference in length and position ($b = -.628$; $t = -2.4$; $p = .025$). Initial indicators of criterion validity in the normal range were obtained in a study of the prediction of school achievement and of behavior in school; the study involved 101 children (56 male, 45 female) aged 6 to 12. The external criterion consisted of the self-reported school grades for behavior (“very good”: 53; “good”: 35; “satisfactory”: 12; “adequate”: 1). The following test scores showed significant and relevant differences between children with the behavior grade “very good” and all the other children in the sample: efficiency ($t_{99} = 4.08$; $p < .001$; $d = .83$); reflexivity ($t_{99} = 4.62$; $p < .001$; $d = 1.12$). Using discriminant analysis it is possible to classify subjects effectively on the basis of these two main variables (78.1% correct classifications by the jackknife method). Evidence of the convergent validity of the HKSD was also obtained. A study still in progress of a cohort sample at the University Clinic for Children's and Young People's Medicine at the General Hospital in Vienna ($N = 63$, age range 5 to 11) has yielded significant correlations with scores on a test battery for the measurement of alertness of children (KITAP; Zimmermann, Gondan, and Fimm, 2004).

Conclusion

Experimental-psychological behavior assessment or –from a more traditional perspective– objective personality tests seem to be a feasible alternative to the increasing use of questionnaires, as described in Sierra and Bucla-Casal (2001). By means of such assessment an economical way of testing can be realized through the use of the computer. Information is collected from the actual behavior of the subject on a standardized task. Recent developments in the construction of objective personality tests have shown

higher applicability and higher usability than the first generation of objective tests. These tests provide information that cannot be obtained by using questionnaires.

A test battery for hyperkinetic syndrome (HKSD) was presented as an example of the new generation of objective personality tests. Here, standardized settings are used in a computerized scenario for the assessment of behavior. Psychometric properties and results of validation studies are encouraging and provide information on the usefulness of the inventory. With regard to construct validity, results from analysis with models from the item response theory (Rasch model; Rasch, 1980) indicate sufficient model fit. Studies of convergent validity are still in progress. However, preliminary results are encouraging. At this point it should be mentioned that the concurrent validity of an objective personality test is sometimes difficult to demonstrate since the correlations with a questionnaire for the same construct can be interpreted in different ways. Thus, in most cases a more experimental verification of the validity (*e.g.*, by including psychophysiological measures) is needed.

In Schmidt (1975) as well as in the cited literature there are many suggestions of tests suitable for use in clinical and non-clinical contexts. There is still some work to be done in the further development and evaluation of this new generation of objective personality tests, such as the deduction of specific intervention strategies from the inventories (as discussed in Nelson-Gray and Farmer, 1999 for the behavioral assessment of personality disorders), or their relation to subjective measures of similar traits in other assessment methods (*cf.* Cattell, 1990; Cattell and Kline, 1977; Kubinger and Littenberger, 2003; Skinner and Howarth, 1973). However, there is a lot to discover for researchers and practitioners interested in using behavioral data and in psychological assessment beyond the use of questionnaires.

Finally, the authors would like to emphasize the need for a multi-method approach in psychological assessment. The combination of data from different sources (self-report, observation of behavior, nonverbal tests, semi-projective tests, structured interviews, to name a few) is probably the best way of providing a detailed picture of a client's personality profile.

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