

**Identifying children who may be cognitively gifted:  
the gap between practical demands and scientific supply**

STEFANA HOLOCHER-ERTL<sup>1</sup>, KLAUS D. KUBINGER<sup>2</sup> & CHRISTINE HOHENSINN<sup>3</sup>

**Abstract**

When it comes to high cognitive ability assessment, traditional “IQ-diagnosis” has not proven to be particularly helpful. Psychological assessment aimed at promoting the development of gifted individuals requires a scientifically based theoretical model that identifies which cognitive strengths are necessary and which weaknesses can be compensated, and that takes the moderating effects of personality and environment into account when describing the interplay between ability and achievement. While such models – including the one described in the following paper – do exist, they currently lack an adequate theoretical foundation or at least a convincing empirical validation. Science still stands before the challenge of offering appropriate psycho-diagnostic instruments to measure model components while fulfilling practitioners’ requirements. The following work describes a prototypic example of how such requirements might be met for ability testing. Yet in terms of personality and environmental variables, particularly caregiving, currently available methods are wholly unsuitable for meeting intended goals. Systematic behavioral observation offers a possible solution. Its validity, objectivity, comprehensiveness and efficiency in terms of high ability testing – as well as that of interview guides – must, however, be further explored.

Key words: high ability assessment, intelligence test-battery, adaptive testing, multifunctional testing, behavioral observation

---

<sup>1</sup> Stefana Holocher-Ertl, M.Sc., Center of Testing and Consulting, Psychological Assessment and Applied Psychometrics, Faculty of Psychology, University of Vienna, Liebiggasse 5, A-1010 Vienna, Austria, Europe; email: stefana.holocher-ertl@univie.ac.at

<sup>2</sup> Klaus D. Kubinger, Ph. D., Chief of the Division of Psychological Assessment and Applied Psychometrics, Center of Testing and Consulting, Faculty of Psychology, University of Vienna, Liebiggasse 5, A-1010 Vienna, Austria, Europe; email: klaus.kubinger@univie.ac.at

<sup>3</sup> Christine Hohensinn, M.Sc., Center of Testing and Consulting, Psychological Assessment and Applied Psychometrics, Faculty of Psychology, University of Vienna, Liebiggasse 5, A-1010 Vienna, Austria, Europe; email: christine.hohensinn@univie.ac.at

## Introduction

Concerning the question of identifying cognitive gifted and talented individuals, there is a discrepancy between psycho-diagnostics as a scientific discipline and the practical application of psychological assessment. Years of experience assessing high cognitive ability at the University of Vienna's *Center of Testing and Consulting* have shown that while scientific concepts and scientifically based psychological tests provide the basis for diagnosis, practical demands are currently not, or are only unsatisfactorily, fulfilled. This applies both to the professional demands placed on the assessing psychologist, and to the client-centered demands for comprehensive information, consultation and recommendations for subsequent courses of action. After a traditional "IQ-diagnosis," a dedicated psychologist can often not help feeling that the completed assessment has essentially helped neither the tested child, nor its parents. This situation is indicative of a challenge facing science today: both to derive a theoretical model of factors causing and interdependently affecting high achievement and to provide informative and meaningful psychological tests.

The following article presents an experience-based but nevertheless theoretically founded psychological model of essential conditions for high cognitive performance; it also develops a concept for testing a broad range of abilities while taking practical demands and modern test theory into account. Both these aspects are illustrated with an example.

## Criticism of traditional "IQ-diagnosis"

The traditional assessment of cognitively gifted individuals considers giftedness as equivalent to having a high level of "intelligence," in the sense of Spearman's *g*-factor. The first definition was coined by Terman (1925, as cited in Lens & Rand, 2002), who considered giftedness to be "... a degree of brightness that would rate them well within the top one per cent of the population." Since then, the scientific community has largely agreed on the definition of giftedness as having a minimum IQ of 130 (cf. e.g. Rost, 1993). This corresponds to the upper 2.2 % of the (IQ-)distribution of the standardization sample (97.8<sup>th</sup> percentile). Though a convention, this criterion is, however, simply an arbitrary cutting point. It accomplishes no more than any other attempt at classification, for instance using the ICD-10 (*International Statistical Classification of Diseases and Related Health Problems – Tenth Edition*, World Health Organization, 2004) manual. The day-to-day treatment of individuals gains almost nothing through this classification alone. The problems that this approach presents for the practice of psychological assessment are obvious:

- Depending on intelligence test (and the underlying concept of intelligence), the test results of a single child may vary dramatically; a child classified as gifted by one psychologist may be classified completely differently by another.
- Establishing a minimum IQ of 130 as the sole criterion for giftedness in no way justifies the assumption of a "qualitative jump" in thought processes or information processing, i.e. the assumption that a child with an IQ = 130 should be capable of qualitative achievements, of which a child with an IQ = 125 is not also capable.
- The calculation of an IQ (as the mean of all subtest scores) assumes a compensational effect of individual skills which, on examination, seems highly unrealistic. While a "flop" in one subtest can be arithmetically compensated by a "top" in another subtest, no

practitioner would argue that an extremely high performance in figural perception, for instance, could compensate extremely low performance in abstract-logical thinking in terms of meeting the demands of life or even of school.

- Using this criterion, generally gifted children with a separate, easily treated specific learning disability fail to be classified as gifted.

Consulting psychologists are particularly interested in those factors that inhibit, protect or stimulate the development, the differentiation and the structuring of personality – i.e. risk factors, protective factors and factors that facilitate development (Teichmann, Meyer-Probst & Roether, 1991). An IQ-oriented classification, however, gives no indication of how resources can be tapped or how deficits can be evened out. On the contrary, case studies often show that classification as gifted-yes *vs.* -no is even contraindicated (Dahme, 1985; Robinson, 1986; Kubinger, Holoher-Ertl & Frebort, 2006). Two recurring examples from the counseling context illustrate this problem. The first example is children who have, because of their assumed giftedness, received an excess of academic and extracurricular advanced training, but who are barely able to stand up to the pressure to perform that their social environment thereby places on them. If, in the course of psychological assessment, these children are in fact diagnosed as being gifted, subsequent recommendations still would not include a more intensive training program. On the contrary, the goal would rather be to reduce this pressure on the child. The second example is children who come to be psychologically evaluated because of conspicuous emotional and social behavior. Parents are often hopeful that their child's behavior can be explained by giftedness. If the psychological assessment actually does uncover such giftedness, necessary interventions concerned with social and emotional competence are often overlooked by the parents in favor of cognitive training. The classification as "gifted" thus simply masks the actual problem, and an improvement of the child's symptoms is unlikely.

### **Theoretical models of giftedness**

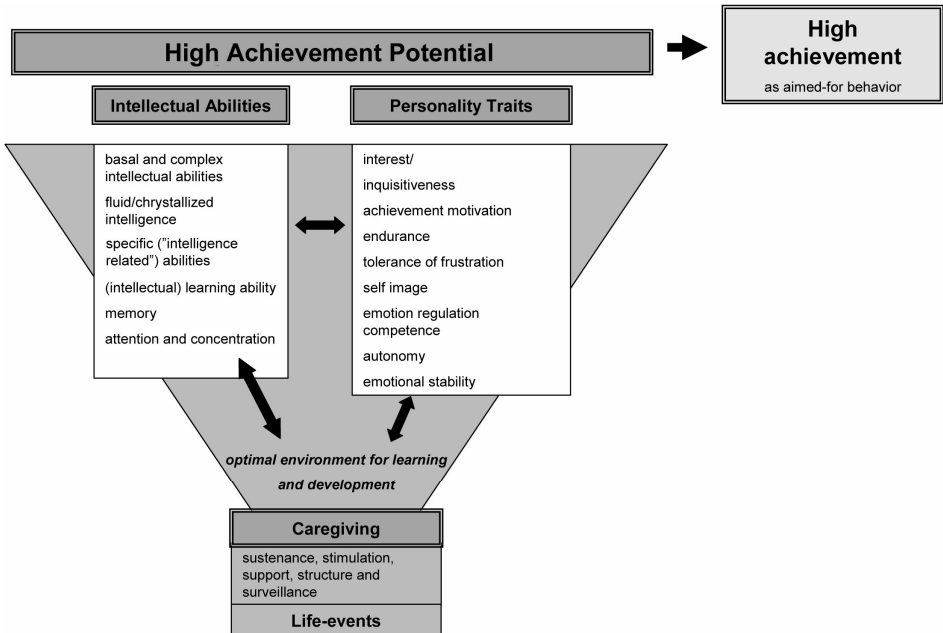
The possibility of a child's skipping a grade or beginning school early, as well as academic and social problems, including psychosomatic ailments, are some of the issues that bring parents to psychological consulting institutions with the desire to have their child tested for giftedness (cf. Robinson & Robinson, 1992; Stapf, 2006). Counselling and recommendations require, however, more than just an IQ-value; they require the identification of cognitive strengths and weaknesses of a child as well as the assessment of his or her personality and social environment. So-called "multidimensional" models of the assessment of gifted individuals provide a good scientific basis for meeting this challenge. Supported by a multitude of empirical results (cf. e.g. Bloom, 1964; Heilmann, 1999; Heller, 2000; Subotnik & Arnold, 1994), these models postulate a number of personality and environmental factors as integral moderators between cognitive factors (primarily intelligence) and manifest performance. Two models that should be mentioned here are the "Munich model for giftedness" (Heller, 2005) and the "Differentiated model of giftedness and talent" (Gagné, 2004).

A newer model is the "Viennese diagnostic model of high achievement potential" (Holoher-Ertl, Kubinger & Hohensinn, 2006). Given the shared conceptual basis, this and other "multidimensional" models are not mutually exclusive, but the Viennese model has

grown “dialectically” from the interplay between theory and practice, and has proven its worth in the course of practical application. Based on concepts taken from the field of developmental psychology, this model focuses on all risks and resources to be found in cognitive areas, in personality, and in the social environment, which may explain exceptional academic and non-academic cognitive achievement. The goal of psychological assessment concerned with promoting development is to adopt measures which minimise recognized risks and strengthen recognized resources. Assuming an implementation using available psychological knowledge, this will ideally allow any existent cognitive talent to manifest itself in high academic achievement.

The “Viennese diagnostic model of high achievement potential” is a compensation model. According to this model, there is no need for a child to score highly on every basic and complex cognitive ability dimension in order to be identified as having a universally high cognitive achievement potential. It is merely necessary to prove that any intra-individual handicap (in ability or in personality) is compensable by some other strength or can easily be counteracted by specific interventions. As seen in Figure 1, the model focuses on intellectual abilities, personality, and interests, as well as on stimulating, supporting, and well-regulating environments.

A child’s cognitive abilities as well as his or her performance-related personality traits, meaning any disposition which helps to translate ability into performance (e.g. achievement motivation, frustration tolerance, endurance, commitment), can only unfold in an optimal



**Figure 1:**  
The “Viennese diagnostic model of high achievement potential”

learning and developmental environment (“caregiving”). Consideration of how this occurs will be discussed below. In this process, the development of caregiving, of cognitive abilities, and of personality all influence one another reciprocally, meaning that all three areas must be assessed as conditions for exceptional performance. Any IQ which could be calculated is, therefore, of minor relevance.

The explanation of exceptional achievement is best begun with the consideration of theories of intelligence. These cover a wide spectrum, from *Spearman’s* general or two-factor theory, to *Cattell’s* Gf-Gc intelligence theory, to multidimensional models like *Thurstone’s* primary-ability-model, *Jäger’s* Berlin model of intelligence (1984), and the *Cattell-Horn-Carroll* theory of cognitive abilities (cf. Alfonso, Flanagan & Radwan, 2005). Yet it is necessary to consider which of these models are appropriate for use in a practical context concerned with promoting development. *Cattell’s* Gf-Gc theory seems particularly helpful, as it allows for a distinction between the intellectual potential described as “fluid intelligence” and that “crystallized intelligence” developed through socialization and academic training. This, in turn, allows for an appraisal of how much of a child’s intellectual potential has already unfolded through appropriate academic training, and to what extent he or she has had to do without this training. It is true that “fluid intelligence” has only been empirically shown as a cause and prerequisite for “crystallized intelligence” among middle-class children (Schmidt & Crano, 1974), but *Cattell’s* model has, at the very least, considerable heuristic value. The most current model attempts to integrate *Spearman’s* general or two-factor theory, *Cattell’s* Gf-Gc theory and *Thurstone’s* primary-ability-model into the *Cattell-Horn-Carroll* theory of cognitive abilities (“*CHC* model”; Alfonso, Flanagan & Radwan, 2005). The highest hierarchical level, “general intelligence,” is made up of ten second-order factors (*fluid intelligence, quantitative knowledge, crystallized intelligence, reading and writing, short-term memory, visual processing, auditory processing, long-term retrieval, processing speed, and decision/reaction time*), which in turn result from over 70 basic skills. This approaches the so-called “pragmatic” theory of intelligence underlying several intelligence test batteries. Going back to Wechsler (1939), the goal of these batteries is to measure as many (complex and basic) skills that lead to “intelligent” behavior as possible.

In terms of moderating personality traits, gifted children’s self concept of ability and the learning and work habits it produces are of particular interest. In this context, Dweck’s (1975) use of the concept of “helpless-reaction vs. mastery-reaction” to explain possible deficits in academic and extracurricular achievement is especially relevant. The concept postulates a tendency to show one of two typical kinds of work and learning behavior in situations where achievement is important: a *mastery-reaction* or a *helpless-reaction*. “Mastery motivation is viewed as a multifaceted, intrinsic, psychological force that stimulates an individual to attempt to master a skill or task that is at least moderately challenging for him or her” (Morgan, Harmon & Maslin-Cole, 1990, p. 83). When solving problems, children who react in this way stay focused on the task at hand and expend a great deal of effort in attempting to come to a solution (cf. Diener & Dweck, 1978). Failure is not attributed to a lack of skill (cf. Ziegler, 1996), a fact which precludes negative emotions (Elliott & Dweck, 1988). In contrast, children who show a tendency toward the *helpless-reaction* avoid all challenges. When confronted with continual failure, their performance worsens (cf. Dweck & Leggett, 1988), even if their achievement level is initially equivalent to that of other children. Their achievement decreases when they are presented with overly difficult tasks; they may even attempt to avoid the situation by diverting their attention to other things (cf. Diener

& Dweck, 1980; Licht & Dweck, 1984). For them, failure results in negative emotions (Dweck, 2000) and helplessness, and they explain failure as being caused by their own lack of ability. Ultimately, they expect to fail. In this way, they miss out on many of the chances for learning, which children with a *mastery-reaction* use in order to tap their own achievement potential. Because self concepts of ability are modifiable (e.g. Dweck 2000), an appropriate diagnostic clarification is particularly important for estimating a child's potential for exceptional achievement.

Caregiving has been investigated with respect to a variety of different conceptual and organizational schemes (cf. Bloom, 1964; Bornstein, 1989; Bromwich, 1976; Scarr, 1984; Wohlwill, 1983). It is defined as „a set of environmental actions performed by a caregiver or environmental conditions arranged by a caregiver which assists or impedes the child carrying out his/her own functions” (Bradley & Caldwell, 1995, p. 40). Of particular interest is the classification model of caregiving acts and conditions, developed by Bradley & Caldwell (1995). That model is based in particular on three areas: 1) *stimulation*. This refers to the cognitive und motivational stimulation of the child as a basis for cognitive development and enhancement. There is an abundance of both psychological theories and empirical data that emphasize the significance of stimulation for cognitive, psychomotor and social development (Horowitz, 1987). The best development is shown to occur when a moderate amount of stimulation is presented in a variety of forms (Kagan, 1984; Elardo, Bradley & Caldwell, 1975). Too much or too little stimulation can adversely affect a child's development (Wohlwill, 1974). In practice, the truth of this can often be seen among children who are possibly gifted. Children may become “under-achievers” when they are challenged beyond their abilities, but also when they are not challenged enough (cf. Seely, 1993). 2) *support*. This refers to the social and emotional support the child receives. An optimal environment is responsive and rewarding; it supports goal-directed (positively motivated) behavior. In practice, lack of this kind of support – the inability of a (perhaps) gifted child's environment to respond to his or her social and emotional needs – may lead to a failure to achieve. Even when they receive plenty of support in developing their cognitive skills, these children nevertheless may fail due to emotional and social deficits. 3) *structure* and *surveillance*. This refers to giving a child the structure he or she needs in order to feel oriented and grounded, but also providing an environment that continually adapts to new challenges. Each of these areas may be based on a variety of sources (cf. Kuhn, 1992), that is the actions and conditions of caregiving are related to the following four sources: a) *persons*, b) *objects*, c) *settings*, and d) *events*. The classification system also utilizes common designations of modality: i) *visual*, ii) *verbal-auditory*, iii) *physical-tactile*, and iv) *motor-kinesthetic*. As a whole, psychological assessment of possibly gifted children should also aim to characterize a child's caregiving environment using this system.

### **Psychological tests for high ability assessment**

Of course, in using psychological tests within high ability assessment, it is necessary to apply pertinent quality criteria such as those given by the *Standards for educational and psychological testing* (American Educational Research Association, 1999) and the German standard DIN 33430's *Requirements for proficiency assessment procedures and their implementation* (DIN Deutsches Institut für Normung e.V., 2002), which are currently the starting

point for some ISO-standardization – for DIN 33430, see for instance Kersting and Hornke (2006). In this context, the questions of objectivity, reliability, validity, standardization, fairness, etc. take on particular importance. On the one hand, intelligence tests, probably some specific achievement tests like alertness tests, and maybe even personality questionnaires meet these quality criteria. On the other hand, projective techniques and interviewing methods usually do not fulfill such standards.

Regarding intelligence tests (or rather: intelligence test-batteries), several may be considered when high ability assessment is the question. However, from a practitioner's point of view, there are again some prerequisites. Apart from the exception of using a test-battery in some kind of large scale assessment (for instance as a screening test), individual consultation generally requires that a test-battery be created for individual – not group – testing. This is because group tests are usually unsuitable as (not speeded) *power* tests or for a free response format. For practical reasons, group tests often have to be set with a time limit and with a multiple choice format. Both these aspects are quite problematic in terms of diagnostic theory (cf. Kubinger, 2006), especially in the context of resource-oriented high ability assessment. In a practical sense, the important aspect of this assessment is not to determine that a child can complete difficult tasks quickly, but whether he or she can complete them at all. Speed-and-power tests may fail to identify gifted children whose work pace is average to slow or who (to bring achievement-related personality variables into the equation) prefer a reflexive to an impulsive way of working. Similarly, it is less interesting to determine whether a child can simply recognize a given solution to a task – as the multiple choice format requires – than to determine whether he or she can also actively produce that solution – as can only be measured with a free response format. Additionally, individual tests have the great advantage of allowing special materials to be used, without which some specific intelligence factors could not be measured – for instance manual-creative abilities.

The inventory of scientifically constructed psychological tests does, in fact, include several appropriate instruments. Of primary importance here are the so-called *Wechsler* tests – particularly the original children's version for 6 to 16 year olds (*WISC-IV, Wechsler Intelligence Scale for Children – Fourth Edition*; Wechsler, 2003) – and the *Wechsler*-based intelligence test-battery AID 2 (*Adaptive Intelligence Diagnosticum – Version 2.1*, Kubinger & Wurst, 2000), which contains thematically similar subtests. The main advantages of the WISC-IV are that it has been standardized in many languages and that it embodies the *CHC* model of intelligence quite well. It is, however, the AID 2 as a prototype that shows more clearly the extent to which intelligence test batteries are appropriate for the assessment of giftedness. Its only drawback is that German (original test version) is the only language in which the test is currently on the market. All the same, the AID 2 is conclusive with respect to several issues. Firstly, it is explicitly based on the pragmatic concept of measuring as many cognitive skills as possible, and its directions for interpreting the resulting cognitive profile are specifically geared toward psychological assessment aimed at promoting individual development. The exact operational definition underlying each subtest and auxiliary test facilitates this interpretation. Secondly, an essential aspect of the AID 2 is that all its tests have been shown to measure only one dimension (most of the subtests and auxiliary tests are calibrated according to the Rasch model). This guarantee of psychometric quality is not shared by the original WISC; on the contrary, Kubinger (1998) showed that several WISC subtests are systematically affected by additional (achievement-related) abilities other than those which that subtest aims to measure. Thirdly, the advantage which the AID 2 hereby

gains is compounded by the resulting possibility for adaptive testing. This is an optimal strategy in terms of test theory (cf. van der Linden & Glas, 2000), and has not been implemented in any other non-computer-administered, published test. Following a sophisticated branched structure, each child is administered a series of small sets of items. The choice of a particular item set depends on the child's responses on the previous set; sets are chosen to contain items whose difficulty most closely matches the child's ability. In this way, measurement accuracy can be increased while presenting a relatively small number of items (cf. Kubinger, 2003). By ensuring smaller confidence intervals for each subtest score, this allows for an interpretation of the resulting test profile; bear in mind that low or medium measurement accuracy entails large confidence intervals for the scores, and therefore hardly justifies the interpretation of most score differences. Additionally, gifted children are spared the (motivationally questionable) presentation of the many items that usually precede those items which they actually find challenging. Of course adaptive testing presupposes an appropriate item pool – one which includes items for individuals with extremely high or extremely low performance. Only then does high ability assessment avoid the risk of being undermined by ceiling effects.<sup>4</sup> If giftedness is interpreted as being ahead of one's age group, then the branched structure of the AID 2 can be optimally adjusted for high ability assessment: a child may begin the test with an item set intended for an older age group. As soon as evidence exists that the child's achievement does not exceed his or her age level, test administration could be terminated. Because the test is calibrated according to the Rasch model, the resultant score would nevertheless be comparable to that of other children, even those who began the test with age-appropriate items. Only the accuracy of measurement would change.<sup>5</sup> Forthly, an important advantage of the AID 2 is one with particular practical relevance, especially in the context of the "Viennese model for the assessment of high achievement potential." The individual test profile makes it possible to use the AID 2 to screen for special developmental disorders or learning disabilities. This screening identifies certain combinations of subtests where intra-individual low scores indicate certain handicaps, namely in a hierarchical manner with respect to perception, retrieval, and utilization (for more details, see Kubinger, Litzenberger & Mrakotsky, 2006). This provides the opportunity for identifying a child with high achievement potential even though he or she suffers from a specific cognitive disorder. Such identification can be valuable, as experience has shown that specific intervention programs often very quickly level out certain disorders, particularly if the child is talented at compensating handicaps. Relying mainly on *Cattell's* polarization of fluid and crystallized intelligence, the AID 2 also offers the possibility of comparing two groups of subtests to determine whether a child has lived in an (intellectually) stimulating environment or

---

<sup>4</sup> A pilot study tested twelve previously identified gifted children with the AID 2 and with the WISC IV (using that test's German version, the HAWIK IV; *Hamburg Wechsler Intelligenztest für Kinder-IV*; Petermann & Petermann, 2007). The latter test showed considerable ceiling effects, particularly for 13 to 16 year olds in the subtests *Block Design* and *Comprehension*: all the children solved all of these items. Furthermore, across all age groups and almost all WISC-IV subtests, at least the first half of the presented items was solved by all children without difficulty.

<sup>5</sup> This is not only a theoretical approach. The empirical results of a recent essay showed that the correlation between the ability parameter calculated on the basis of a standard presentation of items to 50 possibly gifted children and the same parameter calculated as though the children had begun testing with an item set meant for older children (thus answering fewer items) was as high as expected. The correlation coefficients for the AID 2 subtests of interest were: .987, .988, .997, .981, and .983.



in a more (intellectually) deprived environment. This is possible because the three subtests *Everyday Knowledge*, *Producing Synonyms*, and *Social Understanding and material Reflection* are shown to predominately reflect abilities easily trained in an intellectually stimulating environment, while the other subtests do not. And AID 2 additionally offers a checklist that supports retrospective observation of behavioral “fits” and “misfits.” This checklist deals with a child’s attitude and willingness to work, as well as his or her communication skills. Of primary interest within high ability assessment is the child’s endurance, accuracy, work pace, independence/autonomy, self-evaluation, tolerance of frustration, task criticism, prevailing mood, and drive. Recently, an additional possibility of assessing a child’s non-intellectual abilities with the AID 2 was suggested: By repeatedly asking the child after each administered set of items whether he or she would prefer to be subsequently tested with easier, equivalent, or more difficult items, his or her tendency toward a *mastery-* or a *helpless-reaction* could be identified (cf. Titscher & Kubinger, in print). In addition the non-verbal introduction that exists for some of the subtests can be used for testing highly gifted migrant children. Particularly in Europe, multi-cultural globalization has given this aspect great importance. Furthermore, there is now a Turkish version of the AID 2 for children living in German-speaking countries (cf. Kubinger, 2008). Each subtest can be administered in German or Turkish, depending on which language the child finds it easier to work in. This means that children whose native tongue is Turkish can be tested fairly, and that even children with a handicap in one or both languages can be potentially identified as gifted. Last but not least, the parallel forms offered for most of the subtests of the AID 2 allow for follow-up testing – for example to evaluate an intervention.

While the practical demands of high ability assessment seem to be met – as far as intelligence tests are concerned – by scientific research and even by the application of modern test theory, the possibilities for assessing personality and environmental factors (caregiving) are disappointing.

Of course, personality questionnaires are the most objective means for personality assessment. However, this self-report based sampling of information concerning personal thoughts and feelings, temperament and interests has inherent limitations: children are, in general, unlikely to reflect on their own behavioral dispositions or to be able to accurately evaluate their academic, cognitive, and motivational state through a comprehensive self-report instrument (cf. Lachar & Gruber, 2003). Therefore, this approach does not satisfy a practitioner’s need to fully and validly identify the variables that are causing, supporting and maintaining high achievement.<sup>6</sup> Nevertheless, many facets of personality are of vital interest, at least as far as the “Viennese model for the assessment of high achievement potential” is concerned. These include: achievement motivation, tolerance of frustration, endurance, emotional stability, self image, autonomy, emotion regulation competence and interests. As a consequence, projective techniques are widely used, as well as some interview guides. The former, however, do not remotely fulfill psychometric criteria and thus serve only – like interview guides – to generate hypotheses of interdependencies between personal needs and stress on the one side and surrounding risks and resources on the other side (cf. Knoff, 2003;

---

<sup>6</sup> At the *Center of Testing and Consulting*, we sometimes apply the personality questionnaire PFK (Seitz & Rausche, 2004), which is standardized for the ages of 9 to 14, though there is only a German language version at the psychologist’s disposal. In English, the PIC-2 (*Personality Inventory for Children*; Lachar & Gruber, 2001) and the SIP (*Self Image Profiles*; Butler, 2001) seem comparably fitting.

Rollett, 2003). Using these instruments, of course sometimes specific hypotheses occur – for instance in accordance with the *Murray-TAT*'s need for achievement, a child's extraordinary general motivation to be the best. In this sense, projective techniques can be used as more than ice-breakers within psychological investigations. In terms of interview guides, the situation is similar, though perhaps slightly better, as the guides may be conceptualized systematically in advance in order to generate or exclude pertinent hypotheses. While an interview with a child can be useful because of the information it provides about the child's personal point of view, this approach also suffers from limitations. Again, children might not be able to adequately reflect on their own behavioral dispositions. Additionally, most interviews take place in an artificial context and are conducted by an unfamiliar person. Yet interviews with parents are not necessarily objective. This dilemma has no apparent solution, though practitioners would need any.<sup>7</sup>

All of the issues which arise in measuring personality must also be considered in terms of measuring caregiving. Again, questionnaires would be one option – and in terms of a systemic approach, there indeed are some possibilities (cf. *FACES IV, Family Adaptability and Cohesion Evaluation Scales*; Olson, Gorall & Tiesel, 2004; *FAM-III, Family Assessment Measure – Version III*; Skinner, Steinhauer & Santa-Barbara, 2005). But once more, questionnaires are problematic, particularly for younger children. Projective techniques and interview guides are of course, as previously mentioned, psychometrically restricted – though there is an instrument bearing a resemblance to projective techniques that only aims at measuring cohesion and hierarchy within family systems: *FAST (Family System Test*; Gehring, 1999). Based on behavioral observation is the inventory *HOME (Home Observation for Measurement of the Environment Inventory*, Caldwell & Bradley, 1984), which aims for parental responsivity, physical environment, learning materials, active stimulation, encouraging maturity, emotional climate, parental involvement, and family participation; that is, it covers some important achievement determinants due to the family environment. At any rate, information about a child's social and emotional surroundings – particularly information including the child's relationships with peers and teachers – cannot yet be gathered in a way that both satisfies the practitioner and meets psychometric quality standards.

## Discussion

Because of the discrepancy between theory-based psycho-diagnostics and the practical claims of consulting, this paper dealt with theoretical models of factors of causing and inter-dependently effecting high achievements on the one side and with informative and meaningful psychological tests on the other side.

---

<sup>7</sup> At the *Center of Testing and Consulting*, we regularly use some projective techniques as ice-breakers; however, we will not offer any advice as to which of the many possible approaches is preferable. Science has still failed to deliver any empirical evidence about which of these techniques is best for joining with a child. We also sometimes use a systemic-based interview guide in addition to a state-of-the-art inquiry of relevant facts; this guide is intended for 6- to 16-year olds who suffer from learning difficulties, noticeable behavioral or educational problems, as well as many other such problems, and it has been empirically shown to be more valid and more economical than any unstructured, more intuitive approach (cf. Kubinger, Wiesflecker & Steindl, 2008).

Regarding theoretical models, it is to be concluded that multidimensional models are of convincing plausibility but suffer from a lack of empirical evidence concerning the relative importance and weighting factors of all their components. Several vital questions remain unanswered: Which – or which specific configuration – of these components ultimately determines high achievement? Which components are likely to be compensated by which other components under which circumstances? Though a corresponding examination of the “Viennese model for the assessment of high achievement potential” is in progress, the same questions hold for this model. Ultimately, fundamental research on psycho-diagnostics is necessary to understand all the interdependencies which are relevant in practical consulting.

As far as psychological tests – or more accurately, psychological assessment methods in general – are concerned, the situation regarding intelligence test (batteries) is adequate. The test-battery AID 2, at least, allows for high ability assessment that both fulfills high psychometric standards and meets many of a practitioner’s requirements as well. This is achieved mainly through its design as an adaptive test. This test-battery also offers a modern “multi-functional” testing approach (cf. Wagner-Menghin, 2006), which allows not only the measurement of multiple cognitive achievement dimensions, but also the evaluation of a specific behavioral disposition. At the same time, this instrument is no more than a prototype; it has neither been adapted for worldwide use, nor does it take every possible language handicap into account. Above all, the conceptualization of the subtests’ tasks is at least 25 years old and should be critically revised. This is to say that psychological scientists (and publishers) still stand before the challenge of offering more adequate tests. With respect to personality and surrounding variables, in particular caregiving, the situation is, however, frustrating. Scientific research does not seem to ever solve the problems of personality questionnaires and projective techniques. Perhaps an alternative approach, *Cattell’s* objective personality tests (cf. Cattell & Warburton, 1967), may be successfully implemented some day. Although recently Nieszner (2008) proved that this approach is feasible for children over eight years old, extensive research is needed before the approach can be established; in a first step, its validity must be deliberately confirmed. At the moment, interview guides have to be enough. But again, as this topic is hardly dealt with in a focused research program, fundamental research showing to what extent this method is comprehensive, valid, and objective is still missing. Perhaps systematic observation methods could master the problem. For instance, the HOME inventory is capable of providing some relevant information within the context of high ability assessment. Yet such an approach requires an exorbitant effort while presenting the same problem of unproven validity. To summarize, the lack of systematic, theory-based, and objective means by which to collect the necessary information on personality and surrounding variables is obvious; psychological scientists’ challenge is to provide such means of measurement for the future.

## References

- American Educational Research Association (1999). *Standards for educational and psychological Testing*. Washington: APA.
- Alfonso, V.C., Flanagan, D.P. & Radwan, S. (2005). The impact of the Cattell-Horn-Carroll theory on test development and interpretation of cognitive and academic abilities. In D.P.

- Flanagan & P.L. Harrison (Eds.), *Contemporary intellectual assessment. Theories, tests, and issues* (2<sup>nd</sup> ed., pp. 185-202). New York: Guilford.
- Bloom, B.S. (1964). *Stability and changes in human characteristics*. New York: Wiley.
- Bornstein, M.H. (1989). *Maternal Responsiveness: Characteristics and consequences*. San Francisco: Jossey-Bass.
- Bradley, R.H. & Caldwell, B.M. (1975). The relationship of infants' home environment to mental test performance at fifty-four months: A follow-up study. *Child Development*, 47, 1172-1174.
- Bradley, R.H. & Caldwell, B.M. (1995). Caregiving and the Regulation of Child Growth and Development: Describing Proximal Aspects of Caregiving Systems. *Developmental Review*, 15, 38-85.
- Bromwich, R. (1976). Focus on maternal behavior in intervention. *American Journal of Orthopsychiatry*, 46, 439-446.
- Butler, R.J. (2006). Development of the Self-Image Profile. *European Journal of Psychological Assessment*, 22, 52-58.
- Caldwell, B. & Bradley, R. (1984). *Home Observation for Measurement of the Environment (HOME) - Revised Edition*. University of Arkansas, Little Rock.
- Cattell, R.B. & Warburton, F.W. (1967). *Objective personality and motivation tests*. Urbana (IL): University of Illinois Press.
- Dahme, G. (1985). *Giftedness, creativity and high intelligence as seen by teachers*. Paper presented at the 6<sup>th</sup> world conference on Gifted and Talented Children in Hamburg, Germany.
- Diener, C.I. & Dweck, C.S. (1978). An Analysis of Learned Helpless: Continuous Changes in Performance, Strategy and Achievement Cognitions Following Failure. *Journal of Personality and Social Psychology*, 36, 451-462.
- Diener, C.I. & Dweck, C.S. (1980). An analysis of learned helplessness: the processing of success. *Journal of Personality and Social Psychology*, 39, 940-952.
- DIN Deutsches Institut für Normung e.V. (2002). *Anforderungen an Verfahren und deren Einsatz bei berufsbezogenen Eignungsbeurteilungen*. [Requirements for proficiency assessment procedures and their implementation]. Berlin: Beuth.
- Dweck, C.S. (1975). The role of expectations and attributions in the alleviation of learning helplessness. *Journal of Personality and Social Psychology*, 31, 674- 685.
- Dweck, C. S. (2000). Self-theories: Their Role in Motivation. *Personality and Development*. Philadelphia: Psychology Press.
- Dweck, C.S. & Leggett, E.L. (1988). A Social-Cognitive Approach to Motivation and Personality. *Psychological Review*, 95, 256-273.
- Elardo, R., Bradley, R.H., & Caldwell, B.M. (1975). The relation of infants' home environments to mental test performance from six to thirty-six months: A longitudinal analysis. *Child Development*, 46, 71-76.
- Elliott, E.S. & Dweck, C.S. (1988). Goals: An Approach to Motivation and Achievement. *Journal of Personality and Social Psychology*, 54, 5-12.
- Gagné, F. (2004). Transforming gifts into talents: the DMGT as developmental theory. *High Ability Studies*, 15, 119-147.
- Gehring, T.M. (1999). *Family System Test (FAST)*. Göttingen: Beltz.
- Heilmann, K. (1999). *Begabung Leistung Karriere* [giftedness achievement career]. Göttingen: Hogrefe.
- Heller, K.A. (2000). *Begabungsdagnostik in der Schul- und Erziehungsberatung* [Ability assessment in school- and education counselling]. Bern: Hans Huber.

- Heller, K.A. (2005). The Munich Model of Giftedness and Its Impact on Identification and Programming. *Gifted and Talented International*, 20, 30-36.
- Holocher-Ertl, S., Kubinger, K.D. & Hohensinn, C. (2006). Zur Definition von Hochbegabung ist die Höhe des IQ zwar Konvention, aber völlig ungeeignet: Ein neues Diagnosemodell im Spannungsfeld von Hochbegabung und Hochleistung [The definition of high ability according to the IQ is conventional but useless: A new assessment model with respect to high ability and high achievement potential]. In B. Gula, R. Alexandrowicz, S. Strauß, E. Brunner, B. Jenull-Schiefer & O. Vitouch (eds.), *Perspektiven psychologischer Forschung in Österreich. Proceedings zur 7. Wissenschaftlichen Tagung der Österreichischen Gesellschaft für Psychologie* [Perspectives of psychological research in Austria. Proceedings of the 7<sup>th</sup> meeting of the Austrian Psychological Society] (pp. 444-451). Lengerich: Pabst.
- Horowitz, F. (1987). *Exploring developmental theories: Toward a structural/behavioral Model of Development*. Hillsdale, NJ: Erlbaum.
- Jäger, A.O. (1984). Intelligenzstrukturforschung: Konkurrierende Modelle, neue Entwicklungen, Perspektiven [Research on the structure of intelligence: concurrent models, development and perspectives]. *Psychologische Rundschau*, 35, 21-35.
- Kagan, J. (1984). *The Nature of the Child*. New York: Basic Books.
- Kersting, M. & Hornke, L.F. (2006). Improving the quality of proficiency assessment: the german standardization approach. *Psychology Science*, 48, 85-98.
- Knoff, H.M. (2003). Evaluation of projective drawings. In C.R. Reynolds & R. Kamphaus (Eds.), *Handbook of psychological and educational assessment of children: personality, behavior, and context* (2<sup>nd</sup> ed.)(pp. 91-158). New York: Guilford Press.
- Kubinger, K.D. (1998). Psychological assessment of high ability - world-wide used Wechlers' intelligence scales and its psychometric shortcomings. *High Ability Studies*, 9, 237-251.
- Kubinger, K.D. (2003). Adaptives Testen [Adaptive testing]. In K.D. Kubinger & R.S. Jäger (Eds.), *Schlüsselbegriffe der Psychologischen Diagnostik* [Keynotes to psychological assessment] (pp. 1-9). Weinheim: Beltz/PVU.
- Kubinger, K.D. (2006). Psychologische Diagnostik – Theorie und Praxis psychologischen Diagnostizierens [*Psychological assessment – theory and application*]. Göttingen: Hogrefe.
- Kubinger, K.D. (2008, in print). *Adaptives Intelligenz Diagnostikum - Version 2.2 (AID 2) samt AID 2-Türkisch* [Adaptive Intelligence Diagnosticum, AID 2-Turkey included]. Göttingen: Beltz.
- Kubinger, K.D., Holocher-Ertl, S. & Frebort, M. (2006). Leistungsprobleme von Kindern und Jugendlichen: Indikation Familientherapie laut Systemisch Orientiertem Erhebungsinventar [Achievement problems of children and adolescents: The indication of family therapy according to a systemic-based interview guide]. *Psychotherapie in Psychiatrie, Psychotherapeutischer Medizin und Klinischer Psychologie*, 11, 47-53.
- Kubinger, K.D., Litzberger, M. & Mrakotsky, C. (2006). Practised intelligence testing based on a modern test conceptualization and its reference to the common intelligence theories. *Learning and Individual Differences*, 16, 175-193.
- Kubinger, K.D., Wiesflecker, S. & Steindl, R. (2008). A systemic-based interview guide: Its validity and economy in comparison with an unstructured interview approach – Experimental results. *Journal of Psychoeducational Assessment*, 26, 54-68.
- Kubinger, K. D. & Wurst, E. (2000). *Adaptives Intelligenz Diagnostikum – Version 2.1 (AID 2)* [Adaptive Intelligence Diagnosticum]. Göttingen: Beltz.
- Kuhn, D. (1992). Cognitive Development. In M.H. Bornstein & M.E. Lamb (Eds.). *Development Psychology: An advanced textbook* (3<sup>rd</sup> ed.)(pp. 211-272). Hillsdale, NJ: Erlbaum.

- Lachar, D. & Gruber (2001). *PIC-2. Personality Inventory for Children* (2<sup>nd</sup> ed.). *Standard Format and Behavioral Summary manual*. Los Angeles, Ca: Western Psychological Science.
- Lachar, D. & Gruber, C.P. (2003). Multisource and multidimensional object assessment of adjustment: the personality inventory for children, second edition; personality inventory for youth; and student behavior survey. In C.R. Reynolds & R.W. Kamphaus (Eds.) *Handbook of Psychological and Educational Assessment of Children: Personality, Behavior, and Context* (pp. 337-367). New York: Guilford Press.
- Lens, W. & Rand, P. (2002). Motivation and Cognition: Their Role in the Development of Giftedness. In: Heller, K.A., Mönks, F.J. & Sternberg, R.J. (Eds.), *International Handbook of Giftedness and Talent* (pp. 346-363) Amsterdam: Elsevier.
- Licht, B.G. & Dweck, C.S. (1984). Determinants of academic achievement: the interaction of children's achievement orientations with skill area. *Developmental Psychology*, 20, 628-636.
- Morgan G.A., Harmon, R.J. & Maslin-Cole, C.A. (1990). Matery motivation: definition and measurement. *Early Education and Development*, 1, 318-339.
- Nieszner, G. (2008). Eine Machbarkeitsstudie: Ein Objektiver Persönlichkeitstest für Kinder [A feasibility study: objective personality tests for children]. Unpubl. Master Thesis, University of Vienna.
- Olson, D. H., Gorall, D. M., & Tiesel, J.W. (2004). *Family Adaptability and Cohesion Evaluation Scales (FACES IV)*. St. Paul (MN): University of Minnesota
- Petermann, F. & Petermann, U. (Hrsg.) (2007). *HAWIK-IV. Hamburg Wechsler Intelligenztest für Kinder – IV. Übersetzung und Adaptation der WISC-IV® von David Wechsler* [The German WISC-IV]. Bern: Huber.
- Robinson, A. (1986). The identification and labeling of gifted children. What does research tell us? In K.A. Heller & J.F. Feldhusen (Eds.), *Identifying and Nurturing the Gifted* (pp. 103-109). Toronto: Huber
- Robinson, N.M. & Robinson, H. (1992). The use of standardized tests with young gifted children. In P.S. Klein & A.J. Tannenbaum (Eds.), *To be young and gifted* (pp. 141-170). Norwood (NJ): Ablex Publication Corporation.
- Rollett, B. (2003). Projektive Verfahren [projective technique]. In K.D. Kubinger & R.S. Jäger (Eds.), *Schlüsselbegriffe der Psychologischen Diagnostik* [Keynotes to psychological assessment] (pp. 340-348). Weinheim: Beltz & PVU.
- Rost, D. (1993). Lebensumweltanalysen hochbegabter Kinder [Analyses of the environment of gifted children]. In A. Knapp & D.H. Rost (Eds.) *Ergebnisse der Pädagogischen Psychologie* [Results in educational psychology], *Volume 11*. Göttingen: Hogrefe.
- Scarr, S. (1984). *Mother Care/Other Care*. New York: Basic Books.
- Schmidt, F.L. & Crano, W.D. (1974). A test of the theory of fluid and crystallized intelligence in middle and low socioeconomic-status children: A cross-lagged panel analysis. *Journal of Educational Psychology*, 66, 255-261.
- Seely, K. (1993). Gifted students at risk. In L.K. Silverman (Ed.), *Counseling the gifted and talented* (pp. 263-275). Denver: Love.
- Seitz, W. & Rausche, A. (2004). *Persönlichkeitsfragebogen für Kinder zwischen 9 und 14 Jahren – 4., überarbeitete und neu normierte Auflage*. Göttingen: Hogrefe.
- Skinner, H.A., Steinhauer, P.D. & Santa-Barbara, J. (2005). *Family Assessment Measure, Version III (FAM-III)*. Lutz (FL): Psychological Assessment Resources.
- Stapf, A. (2006). *Hochbegabte Kinder – Persönlichkeit, Entwicklung, Förderung* [High gifted children – personality, development, advancement]. Munich: Beck.
- Subotnik, R.F. & Arnold, K.D. (1994). *Beyond Terman: contemporary longitudinal studies of giftedness and talent*. Norwood (NJ): Ablex Publication Corporation.

- Teichmann, H., Meyer-Probst, B. & Roether, D. (Eds.) (1991). *Risikobewältigung in der lebenslangen psychischen Entwicklung* [To master risks in life-long psycho-development]. Berlin: Verlag Gesundheit.
- Titscher, A. & Kubinger, K.D. (in print). Novel method for testing children's achievement-related reactions: recording helplessness with the intelligence test-battery AID 2. *School Psychology International*.
- Van der Linden, W.J. & Glas, C.A.W. (Eds.) (2000). *Computerized Adaptive Testing: Theory and Practice*. St. Paul (MN): Assessment Systems Corporation.
- Wagner-Menghin, M.M. (2006). Spezielle Multifunktionalität am Beispiel des Lexikon-Wissen-Tests [Multifunctional testing – the Encyclopaedian Knowledge Test]. In T.M. Ortner, R.T. Proyer & K.D. Kubinger (Eds.), *Theorie und Praxis Objektiver Persönlichkeitstests [Theory and practice of objective personality tests]* (pp. 204-209). Bern: Huber.
- Wechsler, D. (1939). *The measurement of adult intelligence*. Baltimore: Williams & Wilkins.
- Wechsler, D. (2003). *WISC-IV. Wechsler Intelligence Scale for Children – Fourth Edition*. San Antonio: Psychological Corporation.
- Wohlwill, J. (1974). *Environmental stimulation and the development of the child: How much and what kind?* Paper presented on the Conference on Environment and Cognitive Development, Arad, Israel.
- Wohlwill, J. (1983). The concept of nature: a psychologist's view. In I. Altmann & J. Wohlwill (Eds.). *Behavior and the natural environment* (pp. 5-38). New York: Plenum.
- World Health Organization (2004). *ICD-10: International statistical classification of diseases and related health Problems - tenth edition*. Geneva: World Health Organization.
- Ziegler, A., Heller, K.A. & Broome, P. (1996). Motivational preconditions for girls gifted and highly gifted in physics. *High Ability Studies*, 7, 129-143.