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Report

Perspectives on the Diagnosis of Giftedness*

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Central topics in the diagnosis of giftedness are discussed. It is argued the concept of “giftedness” be conceptualized not only as a disposition but also as a dynamic potential. It seems questionable to distinguish between intelligence and creativity when formulating a concept of “giftedness”; for many reasons giftedness can be viewed as a hierarchical concept of differential ability and creativity constructs.

Three task areas in the diagnosis of giftedness are discussed: (1) individual case diagnosis as the basis for counseling intervention as well as for educational and psychological prevention, (2) talent searches as a way of encouraging giftedness, (3) the identification of the gifted as a research contribution. The goals of giftedness diagnosis are not only dependent on the individual application of diagnostic data, they must also be viewed as being interdependent upon the model of giftedness that is being used. Relevant methodological questions, ranging from problems of measurement with regard to indicators, the product-versus-process-analysis controversy, to decision strategies in giftedness diagnosis, are discussed. The article concludes with a discussion of future research goals and recommendations for the practice of diagnosis of the gifted.

Conceptual Considerations for the Diagnostic Topic of “Giftedness”

One must first obtain an understanding of the topic in order to consider questions in the diagnosis of giftedness. The frequently encountered yet naive notion that giftedness *simply exists* is, from a scientific viewpoint, untenable. Through the observation of individual differences in achievement behavior and through the solving of especially challenging tasks we can conjecture that what we collectively call giftedness comes about from differences in individual competencies. While such an explanatory hypothesis is quite plausible, it is still a matter of debate whether giftedness is determined more by cognitive and/or motivational or sociocultural factors. A main difficulty in so-called hypothetical constructs is addressed by this.

* This report is a slightly modified version of the author's contribution as guest editor to the special issue on “Diagnosis of Giftedness” for the journal *Zeitschrift für Differentielle und Diagnostische Psychologie* published in September 1987 by the Hans Huber Verlag (Bern, Switzerland). The English translation was completed by Dipl.-Psych. Colleen S. Browder, University of Munich.

It is therefore occasionally suggested that the use of the dispositional concept giftedness be completely renounced, and that a behavioral concept such as high performance, excellence, or something similar be employed instead; or rather to equate giftedness on the whole with performance criteria. As will later be demonstrated, this tactic certainly has not done justice to important functions of giftedness diagnostics. It is necessary to view the diagnostic topic of "giftedness" differentially, whereby a distinction should be made between descriptive and explanatory concepts. Using *descriptive concepts*, the phenomenon of giftedness is defined here as mathematical, technical, linguistic, or musical talents, etc.; or as all-round, multiple versus one-sided forms of giftedness ("talent" in the literal sense). This corresponds to the cognitive or knowledge-psychological paradigm of the differentiation between universal basic thought processes and domain-specific skills or knowledge (cf. also Schneider, 1988). In the Terman tradition, the accepted notion was that giftedness was largely identical with general high intelligence (g-factor). Today, however, the predominant view is one of differential or multidimensional concepts of giftedness (cf. Sternberg & Davidson, 1986). Thus, the Munich Study of Giftedness (Heller & Hany, 1986) is based on a classification approach with the dimensions of intelligence, creativity, psychomotor ability, social competence, and musical skills (cf. also Gardner's "theory of multiple intelligences," 1983). *High ability* or *giftedness* is thus defined as the individual cognitive, motivational and social possibility of achieving optimal performances in one or more areas such as in mathematics, languages, or artistic areas with regard to difficult theoretical vs. practical tasks.

In addition, the definition of giftedness is dependent on the intended use, for example, from the goals and type of support program, from scientific goals, but also, as Tannenbaum (1983) pointed out, from social considerations and norms. The definition of giftedness will also be determined by the choice of measurement instruments (i.e., by the operationalization of the experimental variables examined). (We return to this in the discussion of the indicator problem in the Methods section below.) Questions about the decision algorithm are also connected with the above which could illuminate the interdependence between subject matter and methodology in definition attempts.

Explanatory concepts regarding giftedness are hardly less problematic. These concepts differ from one another in the significance they attach to personality and/or socio-cultural determinants in the structure of giftedness versus their manifestation in exceptional aptitudes (e.g., Renzulli, 1978; Tannenbaum, 1983; Gagné, 1985; Mönks, 1985). The development of giftedness presents a special problem that can be examined using process analysis or status diagnosis (as an interaction product; cf. Csikzentmihalyi & Robinson, 1986; Haensly, Reynolds, & Nash, 1986; or Stapf & Stapf, 1988). Their supplementary role is expressed in the contrast of cognitive or thought processes and psychometric or trait-based approaches. In order to obtain a better understanding of the previously presented comments, a few models of current research on giftedness are briefly presented. Although Terman continued to emphasize almost to the very end of his research that giftedness was the same as extreme intelligence—in 1954 Terman conceded that non-cognitive per-

sonality variables and social environment have a stimulating effect with respect to gifted *performances*—today it is seldom claimed that intelligence is the same thing as (high) giftedness. Thus, high giftedness comes about from the well-known *three-ring model* from Renzulli (1978; cf. also Renzulli, Reis, & Smith, 1981), i.e., as a “happy arrangement” of (a) above-average intelligence, (b) creativity, and (c) task commitment. This trait, or better, person-centered, concept of giftedness was enlarged upon by Mönks (1985) in the form of a *six-factor model* encompassing the (d) social setting, (e) school, and (f) peers. Both models have in common that the development of giftedness and gifted achievements is a product of interactions (of three or, respectively, six components/conditions).

The recent differentiation of “schoolhouse giftedness” and “creative-productive giftedness”, which is generally characteristic of creative-productive performances in adulthood (Renzulli, 1986), disqualifies the ability-oriented form of giftedness as compared to the creative-productive form. It also—implicitly—casts a doubt on the Guilford threshold hypothesis with regard to the connection of intelligence and creativity. This differentiation (of schoolhouse and creative-productive giftedness) is both problematic and interesting not only in this light, but also with respect to the trait-versus-cognitive-psychological approach to the diagnosis of giftedness. The two levels of giftedness are, therefore, the topic of several contributions to the previously referred to omnibus volume from Sternberg and Davidson (1986).

Siegler and Kotovsky (1986, p. 419) point out the following differences: *Schoolhouse giftedness* appears primarily in childhood and adolescence. Acquiring knowledge is in the foreground, and gifted students are distinguished by outstanding performances. The time necessary for goal attainment is more or less brief (minutes to months), creativity being frequently unnecessary, and variable performance motivation and variable self-concept also being sufficient. On the other hand, *creative-productive giftedness* surfaces mainly in adulthood and is characterized by independent discovery learning. The performance levels of such people are profound, and the exertion time to goal attainment extends mostly over a longer period (months to years). Creativity is essential here. In addition, confirmed (high) achievement motivation and a firm self-concept are important prerequisites of creative productivity. At the same time, the authors stressed a fit between the intellectual and motivational personality characteristics on the one hand, and on the other hand, between the individual and (necessary) achievement domain.

The prominence of both forms of giftedness imply the following diagnostically relevant questions:

- 1) *What is the relationship between so-called school achievements and creativity?* Although a general loose relationship is assumed, it is still unclear according to the present empirical reports (Siegler & Kotovsky, 1986, p. 420).
- 2) *What is the relationship between the creativity in childhood and adulthood?* The relevant research also provides no clear answer to this question. Thus, Tannenbaum (1983, 1986) surmised that true creative performance is only possible in adulthood. Feldhusen (1986) points out that there was no clear proof from the information about the validity of creativity tests for a correlation of test predictor in childhood and creative production in adulthood. At the least, a (quasi-)experimental design is needed for this—within the framework of a longitudinal study. The available results could mean that the tests in question do not provide an

adequate diagnostic instrument or that there is no systematic relationship between the creativity in childhood and that in adulthood.

3) *Similarly, the relationship between school achievement and aptitude eminence in adulthood must be investigated.* Critics of the psychometric skill-orientation view quickly refer to the unsatisfactory predictor-criterion correlations. It is often disregarded, however, that relatively close relationships could be proven on the basis of psychometric foundations, as was shown by Jäger (1984), Siegler and Kotovsky (1986), and Trost (1986). Yet this does not solve the problem of long-term valid prognoses. But how meaningful is such a claim in the light of the expectation that—at least during childhood and adolescence—skills and creative features develop (i.e., change), and in view of the fact that education should influence development in a positive manner? Before we go into further detail, the following expansion of the giftedness model described above is proposed (Figure 1).

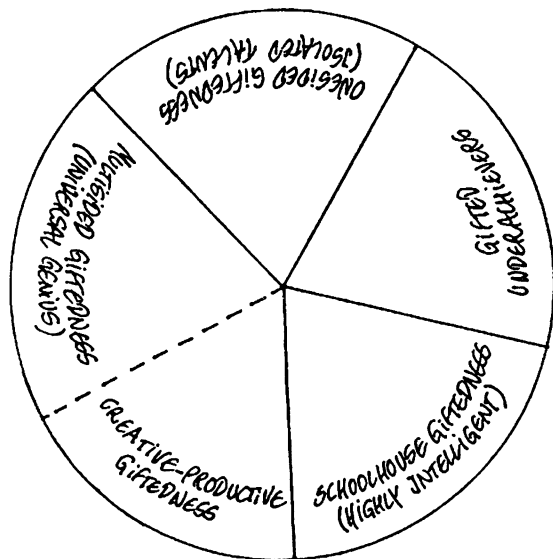


Figure 1. Relevant diagnostic forms of giftedness in childhood and adolescents versus childhood.

In my opinion this (heuristic) model more closely approaches reality without relinquishing the fruitful tension between intelligence and creativity. Furthermore, the problem of underachievement can be considered, as well as the fact that besides universal talents there are also various one-sided forms of giftedness which are taken into consideration by theories of multiple giftedness (e.g., Gardner, 1983; Tannenbaum, 1983; Heller & Hany, 1986; Hany, 1987). At the same time, one must be aware of the danger of inflationary factor theories which assume “everybody is gifted.” Among the creative-productive gifted, one finds not only successful researchers, artists, and students, but also less successful individuals. Because of the great amount of overlapping characteristics, the dividing line between all-round

gifted individuals and the group of creative pupils is depicted as a dotted line in Figure 1. Likewise, underachievement in gifted adults can occur, for instance, in the form of “unrecognized genius” or also inactive aptitude potential. The (heterogeneous) group of gifted underachievers in school children requires special attention from school counseling and educational systems. Essentially all forms of giftedness are relevant to the diagnosis for gifted programs, whereby the creative-productive gifted adolescent who does not achieve the expected school performances should receive special attention. As useful as the performance-oriented models of giftedness are for research purposes, they reach their limits when considering the identification of those gifted individuals (sub species skills or creativity potential) who—for whatever reason—have not always been able to perform exceptionally. Based on pedagogical reasons of giftedness nurturance, this postulate is valid even when development is considered as an interactional product.

This is not the place for a detailed description of giftedness theories, especially since there are already complete works available on this subject (e.g., Hany, 1987; Heller & Feldhusen, 1986; Sternberg, 1982, 1985; Sternberg & Davidson, 1986; Tannenbaum, 1983; Wolman, 1985). Instead, to conclude this subject, a few central problems from current research are described:

- 1) The departure from global measures, such as IQ, to *differential constructs of giftedness* is overdue. Even though a vast international concensus prevails in theoretical discussions about this, the practice of giftedness identification is still repeatedly oriented toward a single quantitative predictor (IQ score).
- 2) Good intellectual *and* creative talent potencies (convergent *and* divergent thinking operations in the sense of Guilford) or cognitive skills in a broader sense are at least necessary for the conceptualization of the so-called academic giftedness form. In my opinion, Guilford’s threshold hypothesis concerning the relationship of intelligence and creativity has not yet convincingly been refuted. This means that exceptional creative production is very improbable without above-average intellectual abilities, however, the reverse is conceivable, i.e., high intelligence in combination with moderate characteristics of creativity.
- 3) Analogous to Jäger’s most recent assessment of research on intelligence (1986, p. 286), one could conceptualize giftedness as a “*hierarchy of correlated but clearly differentiable ability constructs*” and *flexible creativity potential*. In this manner, the g-factor, i.e., so-called general intelligence (as is expressed in IQ) could, as the highest hierarchy level, possibly act as mediator between the position of the generalists on the one hand and the structuralists on the other.
- 4) In any case, it seems important to achieve a balance between the tendency toward increasingly differentiated giftedness concepts with somewhat inflationary tendencies, as was clearly expressed by Taylor (1978), and the integration of skill- and/or trait-based versus cognitive or thought process theoretical approaches.
- 5) In my opinion, the popular question of whether the construct of giftedness can be better viewed as a static disposition (trait) or as a dynamic (achievement) process only *seems* to be a problem, whereas in reality it is not. Aside from the fact that

such a differentiation is hardly more than a division into various aspects of the topic, seen methodologically, it does not fulfill the expectations set. Viewed closely, all process diagnostic procedures (for example, learning tests) yield solely *intermittent* results which permit only indirect conclusions about the interim events in the pretest-treatment-posttest design or in time-sequence analyses. The fact is that learning tests, when compared to traditional (status-diagnostic) test predictors, generally did not bring about the desired big breakthrough. This is probably due less to frequently mentioned methodological drawbacks in so-called process-diagnostic methods than to the fact that (reliable) results acquired intermittently in a status-quo test include more dynamic power than stubborn advocates of process diagnostics would like to believe. The advantage lies perhaps less in the direct contribution to the formation of constructs than in the improvement of construct validation as well as information about situational and social influences on the development of giftedness and socialization conditions of gifted individuals, that is, in the context of preventative or interventive questions from developmental and counseling psychology.

Functions of the Diagnosis of Giftedness

Wieczerkowski and Wagner (1985) expound on two different procedures: the *individual case diagnosis* and the *talent search*. In the first case, generally a personal counseling reason results in a corresponding aptitude diagnosis; the talent search, on the other hand, aims at recruiting suitable candidates for specific support programs. To the extent that one would like to attempt a conceptual differentiation between the *diagnosis* of giftedness and the *identification* of giftedness (which currently occurs in the literature, but is not intended here), one should reserve the term "identification" for talent searches. Since individual case diagnoses and talent searches are normally the basis of different diagnostic decision strategies, this conceptual differentiation is warranted. However, this does not by any means include all educational psychological functions of giftedness diagnosis. The following tasks are emphasized here:

Diagnosis of Giftedness as an Aid in Prevention and Intervention

Individual case diagnoses as the basis for counseling serve the purpose of providing information about prevention in individual behavior and performance problems, social conflicts, education and (general) social problems in as far as giftedness can—directly or indirectly—be made responsible for them. Corresponding assumptions are to be confirmed diagnostically or repudiated before the planning and realization of rationally founded educational decisions, counseling, or intervention measures take place. Meanwhile, it has been adequately proved that a continual lack of challenge (due to giftedness not having been recognized), pressure to conformity (e.g., based on the fear of negative labeling effects), insecurity of adults in connec-

tion with their dealing with exceptionally gifted children and youth, and feelings of threat and envy could lead to behavior problems and conflicts between gifted individuals and their social environment.

It is possible that frequently ignorance of gifted individuals is more to blame than "evil" intentions. If expert estimations are correct that the number of unidentified gifted individuals is approximately 50%, then it is easy to judge which omissions—at least in relation to an individually appropriate nurturance of development—are caused by doing without diagnoses of giftedness and development. This fear is especially valid for members of so-called high-risk groups (cf. Feger, 1987).

Even when one considers that methods of critical analyses (e.g., Czeschlik & Rost, 1988) in the research literature available on psychosocial adaptation problems in highly gifted children and adolescents do not justify overdramatizing the problems mentioned, it is also impossible to overlook the numerous counseling situations that have to do with the development of giftedness and corresponding socialization problems (e.g., Freeman, 1979; Webb, Mechstroth, & Tolan, 1984; Heller, 1985, 1986, 1987; Lehwald, 1985, 1986, 1987; Mönks, 1985, 1986, 1987; Stapf & Stapf, 1987, 1988).

Talents Searches as Means to Nurture Talent

The search for talents for particular support programs is legitimized (a) through the right of every individual to receive optimal nurturance of talents and development, (b) through the societal demands on each individual, as well as on the gifted, to make an appropriate contribution for others. In connection with this, it is also occasionally pointed out that the gifted have a duty to make special accomplishments that result from the needs of society. In the realization of this postulate, it is necessary to ensure that individual and societal demands are reasonably balanced, and that the individual's freedom of choice is not infringed upon.

Regarding the function of talent searches in diagnosing individuals, it is necessary to be aware that the individual prerequisites or the "structural developmental position" ("sachstruktureller Entwicklungsstand"), in the sense of Heckhausen (1968, p. 193), and the demands of the new learning contents in the advancement program for individual candidates should "fit" together. Talent search in this sense means individual developmental help. Actually pure success criteria is often in the foreground of the selection which has inadmissibly shortened the evaluation problematic. A comprehensive, differential evaluation of supportive measurements should, therefore, be an indispensable component of every talent search (cf. Hany, 1988).

Identification of Giftedness as a Contribution to Research (for example in an expert-novice paradigm)

In this research approach, (pure) knowledge interests and/or problems of applied talent research move to the forefront. Although one can also expect to help the

group of gifted individuals with this method, participation in such inquiries can usually only be justified on a voluntary basis. This means that in empirical (field) studies, specific sampling problems are bound to occur which accordingly can have an effect on the investigation's results. This makes it especially difficult on longitudinal studies conducted over a longer time period. The quality of the results of such research is, however, again dependent on the reliability and validity of the identification of the gifted for the corresponding investigation samples.

This, certainly still incomplete, list of functions requires differential measurement instruments and well-harmonized decision strategies. These questions will be discussed in detail in the following.

Methodological Questions

Measurement Problems

The stereotypical belief that giftedness may be conceived of as a single IQ-value must now be refuted following the previous discussion. Beginning from a multidimensional standpoint then, it is necessary to consider as investigation variables a number of *non-cognitive* characteristics (such as motivation) and sufficiently differentiated *social* developmental conditions (cf. Mönks elaborated Renzulli model with three settings), in addition to various *cognitive* personality characteristics. These can be characterized in three large variable groups, namely, (1) the person-related talent indicators or predictors, (2) the (achievement) criteria, and (3) the (socio-cultural) condition variables.

Figure 2 illustrates the relationships based on the case of the diagnosis-prognosis approach to giftedness diagnosis.

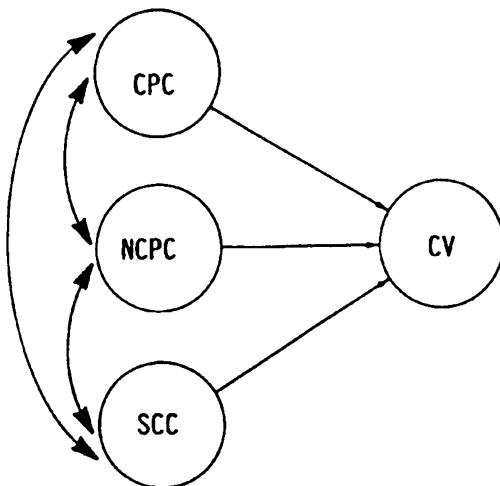


Figure 2. Causal model of performance behavior in the gifted. CPC = Cognitive personality characteristics or traits of gifted individuals (predictors). NCPC = Non-cognitive personality characteristics or traits of gifted individuals (predictors) SCC = Sociocultural condition variables CV = Criterion variables (of achievement behavior in gifted individuals)

The following skill concepts are psychometrically relevant as *cognitive personality characteristics* of gifted individuals:

- intelligence in the sense of differential abilities (verbal, quantitative, nonverbal, technical, etc.) or convergent thought processes in the sense of Guilford (1967);
- creativity in the sense of divergent thought processes in Guilford's sense or divergent-convergent problem-solving styles according to Facaoaru (1985);
- psychometric/practical intelligence according to Jäger (1985);
- self-concept, locus of control, etc.

In contrast, the following process variables (in the sense of *metacomponents of cognitive control*) are appropriate for cognitive psychological approaches:

- problem sensitivity;
- planning and selection criterion for goal-oriented solution and action steps (during the solution of demanding, complex thought problems);
- attention;
- action control, etc. (cf. Facaoaru & Bittner, 1987; Putz-Osterloh & Schroiff, 1987).

The following *non-cognitive personality traits* need to be mentioned:

- interests, task commitment, and so forth;
- thirst or drive for knowledge and achievement motivation (hope for success vs. fear of failure);
- study and work strategies and strategies for coping with stress;
- learning style, strategies of working memory, etc.

The following should, for example, be considered in giftedness diagnosis to be *sociocultural conditions of the learning environment* or ecopsychological determinants of the development of talent and the achievement behavior of gifted children and adolescents:

- quality of stimulation and expectation pressure of the social environment;
- reaction of peers as well as teachers, parents, siblings to successes or failures of gifted students;
- socio-emotional climate in the family and at school;
- sociometric peer status, teaching and instructional style (Mönks et al., 1986);
- incidental factors, critical life events, etc. (Tannenbaum, 1983; Heller & Hany, 1986).

Finally, the following variables come into question as *criteria* in gifted diagnosis—depending on the goals and/or purposes of the study:

- school grades or other achievement indicators (test results, teacher evaluation, ratings);
- success criteria related to a specific program for especially capable students (achievement variables);
- indicators of subjective personal gains, satisfaction with the support program, etc.

If at all possible, life-data, questionnaire data, and test data (according to Cattell) should be employed in the diagnosis of giftedness. However, the different scale qualities must be considered in the data analysis. Among other authors, reference should be made to Feger (1980), Davis and Rimm (1985), Wiczerkowski and Wagner (1985), Heller and Feldhusen (1986), Hany (1987), and Heller (1987) as individual information sources and measurement processes that are usually used in the identification process. Special problems such as ceiling effects in psychometric measurement or the bandwidth-fidelity dilemma as well as test criteria are discussed there so that it is not necessary to go into detail about them here.

Product Analysis versus Process Analysis in the Diagnosis of Giftedness

While psychometric (trait-oriented) approaches are indispensable in the diagnosis of giftedness for the identification of worthy or needy children and youth, in the cognitive-psychology-oriented analyses, one hopes for important discoveries about the type of learning and thought processes used by gifted students. Corresponding models primarily aim at proving surmised qualitative differences between gifted and non-gifted pupils, especially with regard to information processing during the solving of difficult, complex problems. In contrast to the restrictive problem-solving situation of many skill-based tests (in the psychometric paradigm) which is seen as disadvantageous, open and less structured tasks are attempted. Such research designs, especially when they are reproduced in the experimental design, should allow not only for product analysis (as is customary in the psychometric tradition), but also make process analysis possible. Undoubtedly, this is a desiderata regarding, for example, the measurement of *creative production* (see Figure 1). Beyond this, one hopes for insights into those learning and thought processes that are responsible for the development of expertise, beneficial versus inhibiting conditions in the development and socialization of gifted students, or information about provisions necessary for the furtherance of development or its efficiency. Weinert and Waldmann (1985) have impressively documented that such knowledge could finally be advantageous for school-related and extracurricular (cognitive) nurturance of *all* children and youth (see also Weinert & Waldmann, 1987; Schneider, 1988). Without a doubt, these goals justify the attempted efforts in this field during recent

years. To prevent unpleasant disappointments in the diagnostic practice, a few weak points should not be overlooked.

The—temporary—account balance concerns primarily the following critique points of cognitive psychological or process diagnostic approaches within the framework of giftedness diagnosis:

- 1) The main goal of understanding the learning and thought *processes* has technologically still not, or at least not satisfactorily, been accomplished. The exact extent to which computer assistance (e.g., in the recording of problem-solving processes, computer simulation, etc.) can bring about real progress in the diagnosis of giftedness remains to be seen. This should be more intensively tested. The incredibly quick developments in the PC-marketplace should open new possibilities.
- 2) An additional problem lies in the previously inadequate validation of these new test diagnostic procedures, e.g., the TZRA (*Test der Zahlenreihen und -analogien*, Test of Number Series and Analogies) or TRE (*Test des räumlichen Einrichtens*, Test of Spatial Design) from Facaoaru (1985, 1987) or the QI tests from Ruppell (1987).

QI refers to the quality of “human information processing.” With the QI-scales, more concerted action during the mastery of complex problem situations was to be measured. The coordination of different intellectual operations, flexible structuring skills and insight into the hierarchical structure of minor goals, capacity management of the working memory are included in this (Ruppell, Hinnersmann, & Wiegand, 1987, p. 183–184).

It is possible to research without empirical proof of validity, though not in the practice of gifted diagnosis. This is the most important methodological postulate (cf. Jäger, 1986).

- 3) In addition, the hope that, with the help of cognitive-psychological approaches, *qualitative* differences (e.g., in knowledge acquisition and usage) between gifted and non-gifted students could be measured, has not yet been fulfilled (Siegler & Kotovsky, 1986). This could, of course, be due to the fact that such qualitative differences do not actually exist, but rather only psychometrically provable ones do (i.e., quantitative differences), in the form of accelerated development or reduced learning times.

Even this short summary indicates that no equivalent substitute for the psychometric procedures of giftedness diagnosis will be available in the foreseeable future.

Solely the better, even if not completely satisfactory, construct and criteria validation (prognostic validity) of available diagnostic methods make this—temporarily—essential. However, the particular weakness, the absence of explanatory power of psychometric measures, underscores the importance of new diagnostic methods. The hope remains that this direction of research will be forced, and that suitable instruments will soon be available in the practice.

Decision Strategies and Their Difficulties

In the literature dealing with the problems of data combination and decision strategies in the area of giftedness diagnostics, practically only suggestions about *identification* strategies are made. Since these should be familiar to the reader, it will be sufficient to answer a few fundamental questions at this point.

The identification of gifted children and adolescents generally occurs in a procedure involving several steps. First, there is usually a screening process, perhaps on the basis of teacher nomination of students or parent nominations for preschoolers. Occasionally older students are requested to nominate themselves. The most common method is probably teacher or parent checklists (with or without rating scales) which are based on the operationalism of behavioral characteristics of giftedness. In this way, as broad as possible range of (cognitive and motivational) behavior traits is determined which provides information about the presumed giftedness of the child or adolescent. Since ratings and other "soft" data can be assumed to be less accurate than test data, the screening should attempt to "lose" as few gifted candidates as possible (e.g., candidate for a gifted program or a research sample). This occurs through the conscious inclusion of none-too-small "false hits." It will not be until the second or third selection step—with the aid of more accurate diagnosis instruments that are, however, more limited in breadth—that a final selection can be made (cf. Feger, 1980; Wiczerkowski & Wagner, 1985; Heller & Hany, 1986; Hany, 1987 a, b).

Using the strategy described, one runs into the bandwidth-fidelity dilemma as it is constantly encountered in personnel decisions (Cronbach & Gleser, 1965). One is also faced with the question of which type of error is more tolerable. It is well known that all selection decisions are fallible, so that one can only attempt to choose the lesser evil in the concrete decision situation. The risk of *type I errors* (alpha errors) exists here in identifying someone as gifted although they are not. The risk of *type II errors* (beta errors) occurs here in failing to identify someone as gifted although they indeed are. The first type of error can be reduced by making the criteria more rigid, the second by making them less strict. But simultaneous reduction of both types is not possible. In order to maximize the *individual* usefulness, for example, in a gifted program, one decides to minimize the beta error. Occasionally, for example, in determining a sample for a study (of course, with voluntary participation), it is justifiable and sensible to settle on the first error. One should carefully consider whether the research questions could not be served as well using a *classification strategy* instead of the *selection strategy*. More discussion of the decision paradigms mentioned here and elsewhere is given in Cronbach and Gleser (1965), Wiggins (1973), Pawlik (1976), Wiczerkowski and zur Oeveste (1978), Wiczerkowski and Wagner (1985, 1987), and Hany (1987 a, b). Finally, the regression effect of retesting should be mentioned, which needs to be watched for in successive identification procedures.

The quality of such an identification strategy can be evaluated on the basis of Pegnato and Birch's (1959) suggested criteria of effectivity and economy. The *effectivity* is considered to be the percentage of those students correctly identified

as gifted during the screening. The *efficiency* or economy can be considered as a measure for the effort necessary for the total identification process. When trying to find all gifted persons, one would set one's priorities on the first criterion (effectivity). For a discussion of the problems with these quality criteria, see Hany (1987 a, p. 113–115). Special questions arising in the identification of gifted children and adolescents from so-called high-risk groups are found in Feger (1987).

Research Desiderata

There are a number of problems bound up with the diagnosis of giftedness which I would like to summarize briefly here. These are questions concerning the conceptualization of giftedness constructs, problems of identification and measurement, procedural questions and decision paradigms, validation problems, and last but not least, evaluation problems. In order to solve these problems, not only is differential and diagnostic psychology called upon, one also expects important contributions from the fields of developmental and educational psychology, social and clinical psychology, and (empirical) pedagogy. Without claiming to be a complete list, the necessity of an interdisciplinary cooperative problem-oriented effort should be emphasized. From this we can expect decisive progress to be made in the near future. The following *research tasks* seem to be the most pressing.

- 1) The elaboration and increased precision of differential diagnostic instruments for determining various forms of giftedness. This should include both psychometric (skill-based) and cognitive psychological approaches from experimental diagnostics. The argument of whether the support of giftedness should be more related to general cognitive competencies and general thought processes or to specific skills and abilities (knowledge competencies) naturally influences the operationalism of the giftedness construct. If one concurs with the investment theory from Cattell (1971), according to which the crystallized intelligence (in this instance, knowledge acquisition) benefits from the fluid intelligence (i.e., general thought processes) or is—partially—dependent on it, the solution of this problem is only to be found in the inclusion of *both* approaches. In this sense, Ruppell, Hinnersmann, and Wiegand (1987, p. 187–188) call for a revision of traditional intelligence test items not by giving up the ability concept, but by including additional demands. This would be, for example, test items for problem-solving in “microstructural analogies of processes like invention and discovering”. This addresses a further problem: the alternative of status diagnosis vs. process diagnosis.
- 2) With regard to optimal identification results, one should give preference to process diagnosis over status diagnostic methods. Naturally, one is confronted with the previously unsolved problem of actually obtaining processes analyses and not only (once again) product analysis results. The process-oriented giftedness diagnosis is in an analogous—and just as dissatisfying—situation as learning test diagnosis. Developmental diagnostics are no less deficient. Within the context of

individual giftedness support, interesting tasks have emerged in this area (cf. Bamberger, 1982, 1986; Feldman, 1982, 1986; Horowitz & O'Brien, 1985; Csik-zentmihalyi & Robinson, 1986; Lehwald, 1986, 1987; Stapf & Stapf, 1987, 1988). The fact that longitudinal studies are urgently needed has been emphasized several times (e.g., Heller & Hany, 1986; Heller, 1987; Mönks et al., 1986; Zha, 1986).

Since gifted individuals exhibit various characteristics both in the developmental process and in achievement behavior, these must all be considered in the diagnostic process. Multivariate classificatory approaches to the determination of specific configurations of giftedness are supplemented by idiographic approaches (e.g., biographical analyses; cf. Bloom, 1985). A systematic determination of counseling situations specific to the gifted as a basis for intervention and prevention is just as desirable as the development and testing of appropriate continuing education measures for counselors (Heller, 1985, 1987, 1988). Although many approaches exist that could be used in the counseling of the gifted, these are frequently not very well known and are seldom part of the curriculum for psychologists and educators/ teachers, at least in Germany. The situation in the USA is much better (e.g., Feldhusen, 1985; Gallagher, 1985, 1988).

- 3) The greatest challenge probably lies in the establishment of interaction diagnostics and in its validation. In connection with this, additional evaluation problems and—indirectly—concept problems are virulent. It would appear that the topic of “giftedness” is being rediscovered as a research task (cf. Stern 1916) and receiving increasing interest worldwide.

Practical Recommendations

Despite numerous conceptual and methodological deficiencies, a few recommendations for the practice of giftedness diagnosis may be formulated. Not only the utility aspect is to be included in these considerations, but also the possible disadvantages—and consequences of doing without diagnostic aids. The following comments were part of a recently written professional opinion (Heller, 1987, pp. 118–120).

- 1) In single-case diagnoses, especially in talent searches, a *step-by-step* procedure is most effective; this best meets individual needs. A sequential decision strategy reduces the danger of incorrect diagnoses by minimizing the bandwidth fidelity dilemma. Since more recent theories of giftedness almost always evolved from complex and hierarchical constructs, *multidimensional measurement methods and classificatory approaches* (to data analysis) are to be recommended over traditional one-dimensional (IQ cut-off scores) methods. But as long as elaborated typologies—as is being studied in the Munich longitudinal study (Heller & Hany, 1986; Heller, 1987)—do not exist as technical aids, one can proceed status diagnostically, for example, using the revolving-door approach (Renzulli, 1984) to develop a talent pool. The students can then be supported

individually, based on needs and wants, in voluntary work or study groups according to the Baden-Württemberg model (cf. Bittner & Hany, 1987; Hany, 1988). Following the learn-test paradigm, one proceeds later in a more process-diagnostic manner (cf. Wiczerkowski & Wagner, 1985). Analogously, one would attempt a step-by-step confirmation of the giftedness diagnosis in the single-case evaluation, whereby the uniqueness of the individual must be the center of the identification process. Therefore, detailed *biographical analysis* should always be included if possible.

Despite their measurement inadequacies, one would not want to do without many informal diagnostic instruments such as parent and teacher nominations or checklists, behavioral observations and diagnostic interviews. In individual cases, self-nominations and competitions can play an important part with older adolescents, although the self-selection limits many diagnostic procedures. Combined with *formal* methods (e.g., intelligence and creativity tests), they provide an important information basis for planned programs or counseling situations. One must be careful during the selection of ability and—generally—of achievement tests that they do not produce a ceiling effect or fail to differentiate adequately in the upper ranges. Differential tests are usually more appropriate for the diagnosis of giftedness than tests of general intelligence.

- 2) If one contrasts the advantages of giftedness diagnosis with the possible disadvantages, then the advantages clearly outweigh the disadvantages. Neither the feared labeling effects (Dahme, 1985; Robinson, 1986) nor unusual personality or social conflicts from the diagnosis of giftedness have been proven. The fact that such undesirable effects can occasionally occur should lead to their being dealt with by accompanying counseling measures and not by doing without (useful) diagnostic information (cf. also Lehwald, 1985, 1986). One also finds the results of *diagnostic omissions* on the education and upbringing or personality development of the children and youth in the literature, and these are felt to be much more serious. The diagnosis of giftedness is frequently an essential element of individual development chances. Feger (1987) and Mönks (1987) suspect that many gifted individuals are presently not being recognized. Primarily these are the so-called high-risk groups (gifted girls, handicapped, and foreign children, but also underachievers, delinquents, etc.). Thus, in many instances, a continual diagnosis of giftedness which begins at an early age is essential as a prophylactic measure.
- 3) The success of such identification attempts depends on *general conditions and educational provisions*. The preparedness of parents and teachers as well as school counselors to deal with the task of identifying and nurturing the gifted without fear or prejudice is a main concern. This challenge can be everything but easy. The diagnosis of giftedness fulfills not only an important function with regard to (cognitive) personality development, but also serves as a prevention and intervention measure in crisis situations.

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