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ABSTRACT

This examination of the international state of giftedness research outlines two competitive paradigms (the psychometric paradigm and the paradigm of cognitive science) and argues that the paradigms should be regarded as complementary. The neglect of social psychology in the conceptualization of giftedness is decried, and applied and basic research are contrasted. Research projects, conferences, and cross-cultural studies carried out in Germany on giftedness and talent are described. A list of research needs is presented. Organizational measures are cited for improving the structure of the support of the gifted in Germany, especially in view of the cooperative efforts between the recently combined East and West Germany. Perspectives are offered on an all-German responsibility for the future support of the gifted. (Includes approximately 45 references.) (JDD)

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STATE OF THE ART OF GIFTEDNESS RESEARCH AND THE GERMAN PART OF EDUCATION OF THE GIFTED AND TALENTED YOUTH

by

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The international state of giftedness research

The current situation of the research of giftedness and talent is characterized by two competitive paradigms: the psychometric, on the one hand, and the paradigm of cognitive science, on the other hand. This observation is especially applicable with regard to basic research. Both paradigms however, should be regarded less antithetically but rather in their complementary function (cf. Carroll, 1983; or Steinberg, 1985).

In the paradigm of cognitive science, Waldmann & Weinert (1990) expect to obtain important knowledge especially from the differential psychology of thinking for the theory formation on giftedness and talent. But double danger arises from the extreme inter and intraindividual variability of behavioural characteristics of gifted persons: unjustified generalisations vs. inflationary model formations, for example for explaining the problem-solving behaviour of gifted persons.

The attempt to isolate task-invariant and area non-specific

performance predictors, an experiment which has been dominating research tradition for a long time, is made more difficult by the enourmous number of empirically identified cognitive processes; in view of the learning of theory, a number of transfer problems are connected with this. More recent research results indicate a high degree of flexibility in (more advanced) problem-solving processes where compensatory effects were often observed between different cognitive determinants. Invariant ability patterns which are independent of the level of giftedness thus seem to be extremely vague. The assumption that higher cognitive competences are to be made responsible for outstanding performances seems more plausible. Thus, it would be logical to examine specific structural and procedural characteristics of the learning and performing behaviour of talented persons.

Similarly, it has been proved in more recent creativity research (for example Facaoaru, 1985) that divergent as well as convergent thought processes are necessary for creatively solving complex, difficult problems; in other words, the simultaneous use of both components - with sufficient area- specific basic knowledge - increases the productivity of solving. Apart from a high level of intelligence and flexible knowledge, spontaneity and quick thinking together with persistence and intrinsic achievement motivation favour creative problem-solving in advanced achievement situations which challenge the individual. With the aid of the Chance Configuration Theory by Simonton (1988), this empirical finding can be explained: Through combination or re-combination of available modules, i. e. elements of a problematic

area, cognitive variability is created, resulting in new configurations. In the experimental diagnostics of intelligence on the basis of item analysis (Klix, 1983) when examining area-specific, complex processes of problem-solving or the construction of new types of excercises of average difficulty (for example Sternberg, 1985; Dörner et al., 1983), such new models can be tested and developed further. A systematic combination of general and differential psychological research attempts would be especially promising, according to Waldmann & Weinert (1990).

Under the aspect of developmental psychology, it is especially interesting in the context of this topic how more or less area-specific knowledge can be established apart from relatively general competences of ability. The learning processes involved can cover many years and are also subject to various internal (for example, motivational) and external conditions (i. e. socialisation and situation context variables). For this reason and also because of possible compensatory effects, long-term prognoses of excellent performance in childhood are rendered very difficult. In addition, the relative significance of general intelligence potentials for explaining the performance variance decreases with progressing age, whereas elaborated area-specific basic knowledge for explaining expertise is becoming increasingly more powerful. Reliable individual achievement prognoses are thus only possible to a limited degree in childhood and early adolescence, namely in comparable situations of demands and developmental processes which can be extrapolated (cf. Mönks et

al., 1986; Trost, 1986; Heller & Hany, 1986; Heller, 1991).

Apart from a few exceptions (e. g. Tannenbaum, 1983), aspects of social psychology have so far been neglected in the conceptualisation of giftedness and talent and similarly hypothetical constructs. This theoretical deficit is linked to the psychometric research tradition according to which test scores (e. g. IQ scores) determined from status diagnoses are regarded as invariant measures during the life span relative to the (age) reference group. Even the modern cognitive component attempt is affected by this individualistic false conclusion. The culture-comparative research of cognitive psychology, however, furnished the evidence that individual personality characteristics are always to be regarded as an interaction product of individual and socio-cultural determinants.

If a psychological description of this interaction process were attempted, even social components would have to be taken into account apart from cognitive and noncognitive (motivational) components of the individual . It is these competences which enable an individual to activate (cf. Mönks, 1985) his ability potentials in the right social settings (especially of the family, school and the group of friends). On the other hand, these activities are influenced by the stimulating quality of socialisation authorities. To develop and empirically examine corresponding system-theoretical models of giftedness would be an additional worthwhile task of the basic research in the field of cognitive competences.

From methodological points of view, culture-comparative longitudinal studies deserve outstanding significance in the context of the giftedness research.They are expected to yield important knowledge about social and cultural influences on the development of cognitive competences as well as beneficial vs. unfavourable socialisation conditions. Culture-comparative studies are also essential for examining the generality demand of many theories. For increasing our explanatory knowledge conncerning interindividual differences in the field of cognitive competences, (quasi-)experimental studies would finally be required e.g. for throwing light upon observed sex-specific differences in talent and performance in childhood, adolescence and adulthood. In many cases, the social scientific research attempts will not be sufficient interdisciplinary co-operation.

Applied research differs from basic research especially in its aims and less in its methods - as long as real experiments (as often is the case in social sciences) are ruled out. In the context of giftedness and talent research, applied research, for example, concentrates above all on improving the practical possibilities of identifying and stimulating talented children and adolescents. Applied research is based on more or less substantiated knowledge in basic research which, however, is often insufficient. Therefore, applied research is often subjected to a "pressure to act" on the part of real life. To reduce this should be an important matter of concern for close co-operation of basic resesarch scientists and applied researchers.

In view of the improvement of our knowledge of diagnoses in the context mentioned, particularly multidimensional study attempts would be required. For analysing individual learning and achievement competences, preference should be given to process diagnostic instead of status diagnostic methods.
The improvement of development and achievement prognoses depends on a) sufficiently reliable and valid indicators of giftedness, i. e. of individual cognitive competences, b) the quality of the measurement of criteria and c) the prediction model, which should also consider moderators, critical events in life and random influences in the predictor-criterion reference. Furthermore, it would be necessary to pay attention to nontrivial competence indicators (cf. Berg & Sternberg, 1985; Klix, 1983; Stevenson & Newman, 1986).

The knowledge of explanations and changes is of direct significance for optimizing practical instruction and education measures, the development of competence-related aid programmes or also for interventions in individual cases. Finally, another field of application related to real life is mentioned with the (formative and summative) evaluation.

Results of the more recent research of giftedness and talent in Germany and consequences for more efficient aid

Since the beginning of the 80s, far more research projects have been planned and carried out in Germany on the topic "Giftedness and Talent." Especially the Federal Minister of Education and

Science (BMBW) in Bonn has funded works on the development of measuring instruments for identifying gifted children and adolescents, on the testing of domain-specific vs. non-specific aid concepts inside and outside school, on the extension of promoting competitions, advisory services, etc., and also on analysing individual developmental processes and their social conditions of the learning environment and of sex-specific differences in giftedness (especially in mathematics, natural sciences and technology). With the support of the Federal Minister of Education and Science (BMBW), national and international conferences and symposia on research of giftedness and on the support of the talented took place; cf. Cropley et al. (1986), Heller & Feldhusen (1986), Wagner (1990 b), Wieczerkowski & Prado (1990), etc. Furthermore, the Third European Conference on High Ability (ECHA) will take place in Munich in 1992. In the fields of technical creativity and technology assesgsment, empirical field studies and also individual (methodological) and educational psychological laboratory experiments are presently being funded by the Federal Minister of Research and Technology (BMFT) in Bonn and by the Founders' Association for German Science. Other more basic research projects deal with problem-solving strategies and cognitive competences of the gifted, their metacognitive development, learning and memory strategies, knowledge acquisition, structure of expertise and similar questions of cognitive psychology, and also with the basic neuroscientific and philosophical principles of cognitive competences. These projects are closely linked with the quasi-experimental intervention studies on changing unfavourable styles

of causal attribution and motivation (e.g. with highly talented girls in the fields of natural sciences and technology), and on the general stimulation of metacognitive competences, or even with neuroscientific study attempts, e.g. on "residual competences" and their substitution in the field of cognitive achievement in the case of brain injuries, etc. These and similar studies which are presently taking place are funded mainly by the German Research Society and the VW Foundation. Finally, some cross-cultural studies are to be mentioned, such as the German / Chinese comparative study on the development of technical creativity (funded by the VW Foundation) or the study on building up technical knowledge as a condition of creative problem solving, involving the participation of colleagues from the United States, Canada, Israel, Japan, and China; this study is funded by the Federal Minister of Science and Technology (BMFT). Although the overall view of this topic has to remain incomplete - due to lack of space - it does provide, however, a more or less representative picture of the current research of giftedness and talent in Germany, starting with the studies conducted at university and research institutes (e.g. the Max Planck Institutes). Other projects in the field of applied research especially aim at developing and testing academic and extracurricular aid programmes, talent-specific counselling concepts, carrying out competitions (e.g. the Olympic Games in mathematics), summercamps or qualification measures for questions concerning talented individuals in the course of an in-service training programme, etc. Research projects on formative and summative evaluation, oriented to scientific standards are,

however, relatively rare, e.g. Birx (1988), Hany & Bittner (1989), Engel (1990), Wieczerkowski & Jansen (1990).

The overall view so far should not hide the fact that despite an obvious increase in research activities over the last ten years, many topics could not or only insufficiently be dealt with scientifically . The following research desiderata seem urgent to me with regard to their expected use in supporting the talented in Germany (cf. Heller, 1990b, p. 283 f.):

- development of instruction concepts of talent didactics
- curricular development for special academic courses, special classes or even special high schools for certain acceleration groups and for enrichment courses on the extracurricular support of the gifted, including their (formative and summative) evaluation (sensu Scriven, 1967; cf. also Scriven, 1980, 1983; Brandtstädter, 1990; Thierau & Wottawa, 1990);
- the construction of process diagnostic identification instruments and the testing of successive decision strategies vs. cluster analytic procedures, multidimensional clas-ification models, etc.;
- construction of area-specific counselling tests for talented adolescents;
- longitudinal studies of developmental psychology with the gifted including analyses of the living environment over a whole life span;
- study of leisure-time activities of talented adolescents and their influence on the individual personality development;

- career problems of talented girls and women, especially in the fields of mathematics, natural sciences and techology;
- analyses of cognitive psycology for metacognition, causal attribution (achievement motivation), control of actions, etc. or on the self-concept of talented adolescents, including sex-specific differences and problems, e.g. regarding situation orientation vs. action orientation sensu Kuhl (1981, 1987), self-evaluation of heuristic competences sensu Dörner et al. (1983);
- quasi-experimental (controlled) intervention studies for counselling and supporting gifted children and adolescents, etc.

In this justified matter of concern for the outlined topics, the main function of the research on giftedness and talent should not be forgotten under the aspect of application: individual support as a contribution of society to the personality development of the gifted, on the one hand, and the social responsibility of this support for the society, on the other hand. Personal responsibility develops from special abilities and competences to appropriately contribute not only to one's own benefit, but also to the efficiency of the social net and its national economic basis. Differentiation and integration are thus complementary principles. Frictions are inevitable where this connection is denied. The national opportunity of a united Germany and its integration into the European - and non-European - international community will only then lead to a satisfying result, if the mental resources of our young people can be

successfully motivated. This humanistically and also economically important aim is increasingly gaining world-wide acceptance and this leads us on to the next point.

Deficits in the identification and support of talented children and adolescents

Problems in the diagnostics and support or counselling of the gifted have to be regarded as a functional unit. Apart from high risk groups, e.g. disabled talented girls or foreign children, the difficulty of differentiation in irstruction and education requires special attention. Despite a number of useful attempts - which have been developed over the last years - to identify and support talented children and adolescents, there is lack of convincing evidence of the validity of many techniques, especially those which experts estimate as innovative. Here, the requirement-oriented diagnosis and support concepts (cf. Heller, 1984) could also lead on, especially when they are reasonably linked to the more recent results of applied problem-solving research and knowledge psychology. On the other hand, psychometric possibilities of identification, as e. g. in the aptitude testing paradigm, which Trost (1990) recently pointed out, have by no means been exhausted. A considerable discrepancy can often be observed between the theoretical (multidimensional) reference model of giftedness and practical (one-dimensional) identification and stimulation strategies. As to the current discussion, please refer to Rost (1991), Hany & Heller (1991) and Mönks (1991). Independent of such controversies, the

following topics for improving identification and support can be regarded as urgent (Heller, 1990b, p. 282 f.):

- advisory aid for talent-orientated education, especially at pre-school and primary school age;
- advisory concepts for talented students, their parents and teachers;
- early identification and support of the talented disabled;
- identification and support of gifted girls (especially in the fields of mathematics, natural sciences and technology);
- identification and support of gifted underachievers;
- didactic possibilities of differential, i.e. talent-oriented, instruction regarding cognitive instruction / learning contents;
- academic stimulation of creativity - in general and area-specific;
- general vs. area-specific thought training programmes;
- work training programmes (e.g. for gifted underachievers), etc.

If support of the gifted is extensively seen as individual development aid, then satisfactory results are often to be expected in an interdisciplinary attempt. An important guiding role is attributed to empirical psychology (e.g. in planning the curriculum and developing instruction concepts) and to psychology (especially developmental and educational psychology as well as differential and diagnosic psychology) without wanting to narrow the value of the contributions made by science and humanities or specialized and didactical fields.

Organisational measures for improving the structure of the support of the gifted in Germany

Compared internationally, it is striking that the need of special steps for supporting the talented has - as a rule - been recognized earlier in countries with established uniform school systems than in countries with traditionally structured secondary schools. This observation also applies to postwar Germany where certain groups of gifted adolescents (e.g. in mathematics or physics, but also in sports or music) were often more intensively supported in the former German Democratic Republic despite an official uniform school ideology than in the Federal Republic of Germany. Especially the Lander of the Federal Republic, which are governed by the Christian Democratic Union, the Christian Social Union and the Free Democratic Party, have increasingly committed themselves to supporting gifted students of secondary schools since the beginning of the 80s although they clearly favour the tripartite secondary school system. In contrast, the Lander of the Federal Republic which are governed by the Social Democrats react rather reservedly as to the question of supporting the gifted in public schools. In this respect, the public opinion on supporting the gifted in Germany is still influenced by the education policy, i. e. it is often more oriented to party policies than to relevant requirements. This is especially obvious where (with the exception of the need for special education) all students of the same age group attend the same type of school e.g. the obligatory elementary school or the optional comprehensive school from the fifth grade onwards. Here,

opposition is at its strongest, at least against external differentiating measures, although the contrary could be expected from academic experiences.

In the old as well as in the new Lander of Germany, the efforts to support in the sense of the enrichment principle are predominant (e.g. the Baden-Württemberg extracurricular study groups for supporting especially gifted and interested secondary school students with now more than 3000 participants annually, the Bavarian plus courses, holiday or summercamps), etc. However, support attempts in the sense of the acceleration principle are much more rare than those of the enrichment principle; they can still be found in mathematics (e.g. in Berlin, Rostock, Hamburg, and Ulm), and also occasionally in languages or music and sports. Academic organisational acceleration measures are reflected in the recently re-discovered possibility of shortening the duration of studies at school and university (e.g. the Rhineland-Palatinate model with "fast-train classes", and other variants such as lift courses) or the eight-year secondary school with special requirements (for gifted students) in Baden-Württemberg from 1991/92 onwards as well as the programme for university graduates (post-graduate students and graduates admitted for habilitation) which has been funded jointly by the Federal and the Lander Governments since 1990 with the aim of supporting the new generation of scientists at university. In this case, too, the shortening of the duration of studies at university for especially gifted graduates apart from other special qualification requirements is emphasized. In the academic area, it was the private Christophorus-Schule (secondary school), with

a boarding school, in Braunschweig which was the first school to gain nationwide significance. The documents by Weinert & Wagner (1987) and Wagner (1990a, 1990b) give a more detailed description of the situation of the support of the gifted in Germany.

For the past few years, re-discovered topics of the support of the gifted have also included sex-specific differences of giftedness and performance especially in the fields of mathematics, natural sciences and technology (Wieczerkowski & Prado, 1990; Beerman, Heller & Menacher, 1991). In this context, the discussion on coeducation has become a current topic again which is also to involve proposals for certain quota rules for increasing female interests - in this case, in science and research. I am very sceptical whether this and similar planning measures will really bring about the expected success. From the point of view of cognitive psychology, this must be questioned as long as talented girls and women in contrast to comparatively talented male adolescents more often show deficits in different traits of achievement motivation and attribution, in the control of actions and in other self-concept related variables which are made psychologically responsible for activating individual talent potentials. In other words: Organisational measures for the structural improvement e.g. in a study and vocational situation, must accompany individual commitment and personal willingness to change unfavourable patterns of motivation and causal attribution. Otherwise there is even the danger that aid (being non-supportive of self-esteem) "from outside" involves more danger than benefit by provoking helplessness reactions which are detrimental to self-esteem rather than enhancing individal

competence through self-esteem. An efficiency control of the measures of supporting the gifted including undesired side effects thus seems to be important just as the creative development of concepts and structure-improving measures are for increasing competence which benefits the development personality.

In contrast to external measures of talent differentiation, inner-academic and instructional measures of differentiation were hardly criticized in Germany. Despite broad consent in this respect, especially of many teachers, the difficulty in realizing a differentiation concept appropriate for all levels of talent in a class of heterogeneous performance should not be underestimated. More recent empirical studies on this topic seem to support the presumption according to which the more capable students, in particular, are supported to a lesser degree in a study group of heterogeneous performance than in one of homogeneous performance (Treiber & Weinert, 1985; Helmke, 1988; Weinert et al., 1989, 1990). In general, the analysis of the learning environment of gifted children and adolescents is an important research task. For this reason, a study (Rost, 1989) has been funded for elementary schools by the Federal Minister of Education and Science since 1988. Important knowledge is imparted by the Munich longitudinal study on the development of giftedness (Heller, 1990a, 1991) as well as by the evaluation study - running since 1986 and intended until the year 2000 - on the Baden-Württemberg support of gifted students from secondary schools (cf. Hany & Bittner, 1989).

Finally, there is the task of psychological counselling in

schools of gifted children and adolescents as well as their parents and teachers. So far, the Federal Minister of Education and Science has funded two model projects: an advisory centre in Hamburg, with emphasis on diagnosis of individual giftedness and individual counselling and an advisory centre in Munich which offers individual counselling as well as programmes for special courses especially for technically creative students. Moreover, corresponding advisory services are offered to parents seeking advice for their gifted children on the basis of private initiative (e.g. at the University of Tübingen) or by individual regional associations of the German Association for the Gifted Child (now for the whole of Germany); the work is done mostly on an informal basis and without sufficient protection by the institution. In contrast to the evaluated model projects in Hamburg and Munich, the initiatives just mentioned are hardly scientifically accompanied or even evaluated. An objective assessment of these advisory activities is not possible especially as there are hardly any publications.

Perspectives of an all-German responsibility for the future support of the gifted

The conference "Research of Giftedness and Talent and Support of the Gifted in Germany 1980-1990-2000" (Wagner, 1990b), organized by the Society of Education and Giftedness in Bonn, attempted not only to give an overall view of the 80s and an outlook of this decade but, for the first time, also made it possible for a larger number of colleagues from East Germany to exchange current

information with their colleagues from the West and to discuss future tasks in the united Germany. There was agreement in the intention of closer co-operation in the future, in research as well as in the practical field of supporting the gifted. In both cases, however, nsiderable difficulties emerge and it will still take some time to overcome them.

The study on metacognition, which has been jointly conducted by psychologists of the University of Leipzig and the University of Munich (and funded by the VW Foundation) since 1990, could be an example of other German-German co-operation projects. This study is about the examination of developmental conditions of metacognition and metamemory as well as the corresponding influential possibilities of the social learning environment (metacognitive environment). Regularly conducted (annually two one-week) workshops of both project teams have proved worthwhile. They do not only serve the co-ordination of the project work but also the imparting of modern research technologies. An open exchange of information and experience makes it easier to solve the technical research problems which are presently existing in the new Lander; these problems involve questions on financing the research, applicational procedures regarding financial support from third parties, etc. which should be solved all at once and are a load on everybody. Apart from structure-improving measures, especially new research projects should be planned and be defended in front of experts from the German Research Society and other sponsors, e.g. the VW Foundation, the Federal Minister of Science and Technology, the Federal Minister of Education and Science, etc.

In view of the fact that, in the field of research of giftedness and talent, independent basic research was hardly possible and freely applied research was not at all possible in the former German Democratic Republic, especially younger colleagues from East Germany are confronted with the pressing problem of being integrated into the international standards and research strategies as quickly as possible. This seems to be specifically a German task - of course not only in the context of research on giftedness. The postgraduate project for the qualification of especially gifted scientists of the newer generation (graduate students studying for a doctorate and postgraduates), recently brought to life by the Federal and the 16 Lander Governments, can take over an important function also regarding all-German responsibility.

Similar possibilities for the research of the gifted should be fathomed out in secondary schools. Apart from existing aid projects (especially for the financial support of the gifted) and different programmes (e.g. competitions organized by the Lander and Federal Governments in different disciplines, summer academies or summercamps, etc.) the main focus of attention for future tasks should lie in the development of talent-specific curricula and a broad pedagogic-psychological advisory service. Finally, the primary structure-forming requirements include advanced training of teachers, counselling teachers, school psychologists, course and vocational advisors for qualifying questions concerning giftedness, and above all the recognition and individual support of gifted children and adolescents. Specifically German problems arise in view of the necessary new

orientation of the school system in the five new Lander. For coping with these and other tasks, close and trusting co-operation of all those in the reunited Germany is required. Many problems, however, will not only be solved on a national level. Especially in view of the research of the gifted, the European and international opening is essential - from the point of view of theory substantiation as well as under practical considerations regarding usefulness. Finally, this workshop (this conference) could be an important contribution.

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