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EDITOR : Jarmila KOTÁSKOVÁ

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RESULTS AND IMPLICATIONS OF THE MUNICH STUDY OF GIFTEDNESS

CH. PERLETH, K.A. HELLER

Abstract

The Munich Longitudinal Study of Giftedness (Heller & Hany, 1986), was carried out from 1985 to 1989. The study is based on a multidimensional giftedness concept. Performance behaviour is considered as a product of the predictors giftedness, personality characteristics, and environmental conditions. Giftedness, academic and non-academic achievement as well as non-cognitive personality characteristics are considered to be multidimensional. The intellectual, creative, social, musical, and psychomotor domains were under investigation.

Starting from a large multiregional sample, Heller & Hany (1986) used a two-step identification process: Firstly, teachers were asked to nominate the more and most gifted students from their classes. Secondly, approximately the top 30 percent of the original sample were measured by tests and questionnaires in order to find the top two or five percent in each domain of giftedness.

In the longitudinal phase following the identification steps (1986 to 1988), developmental aspects and achievement analyses were the focus of the study:

- Evaluation of the predicitive validity of the used tests.
- Evaluation of the typological concept of giftedness.
- Evaluation of the effects of personality and environmental factors on the performance of gifted students.
- Description and analyses of the developmental course of gifted children and adolescents (cognitive and non-cognitive domains).
- Analyses of the interaction between giftedness, achievement, personality, and environment.

In the frame of this presentation only a rough overview on important results is given. Some findings concerning personality characteristics of (highly) gifted students are displayed a little bit more in detail. The results are discussed with emphasis on possibilities for guiding and nurturing gifted students.

From 1985 to 1989, the Federal Ministry for Education and Science in Bonn (Federal Republic of Germany) sponsored an educational-psychological research project with the title "Forms of Giftedness in Children and Adolescents - Identification, Development, and Achievement Analysis". This project was carried out at the University of Munich (see Heller, 1992, for a detailed research report; in the the frame of this contribution we can only give a rough overview of some important results).

1. Theoretical and methodological approach

In the framework of the Munich Study of Giftedness performance behavior was considered as a product of the predictors giftedness, personality characteristics and environmental conditions (see Figure 1). Giftedness, academic and non-academic achievement as well as non-cognitive personality characteristics were considered to be multidimensional.

Giftedness dimensions in the study were intellectual, creative, social, musical, and psychomotor abilities. Academic and nonacademic achievement were observed in corresponding different areas (e.g, science, arts, social relationships, music, sports, and so on). Personality traits under investigation were achievement motivation, working styles, (test) anxiety, stress, etc. Concerning environmental variables, the main focus was on family and school. One of the hypotheses was that gifted students distinguish form average students by forming different typologies of giftedness.

Figure 2 shows the complete sample design of the study (for more details see Heller, 1992; Хеллер, Перлет & Сиервальд, 1991; Perleth, 1992; Perleth & Heller, 1993). According to Heller & Hany (1986) a two-step identification process was employed in the first phase of the study:

1) The teachers of 26000 students form 1st to 11th grade were asked to nominate the more and most gifted students from their classes (according to the five dimensions of the study's giftedness model). Approximately 30 percent of the sample was preselected on the basis of these teachers' ratings.
2) The preselected 30 percent of the original sample were measured by aptitude tests and questionnaires in order to find the top two or five percent in each domain of giftedness, who corresponded, in each dimension, to the top 10 percent of the preselected sample.

2. Goals and results from the first phase of the study

The goals of the first phase (1985/86) of the study were a) the development and evaluation of a differential battery of tests and questionnaires for the identification of gifted students and b) testing aspects of the giftedness model underlaying the study, above all examination of the independence of the domains of giftedness under investigation. Important results from this first phase of the study were (e.g. Hany, 1987, 1992; Heller, 1991, 1992; Perleth & Sierwald, 1992; Perleth & Heller, 1993; Heller, 1992).

1) The instruments used to measure cognitive and non-cognitive (especially motivational) personality traits of the gifted as well as relevant conditions of the social learning environment are sufficently reliable.
2) The five factors of the Munich Longitudinal Study of Giftedness could be proven to be independent dimensions of giftedness. Thus the hypothesis of domain-specific forms of giftedness can be considered as having been confirmed.
3) Significant differences could be found between the highly and average gifted students in each domain of giftedness and between the various types of giftedness. For example, the intellectually (or academically) gifted were especially characterized by better school grades, the creative were in some aspects more active and more successful in artistic and literary areas, the socially gifted in social areas, and so on.
4) Multiple or many-sided gifted were to be found relatively seldom. From the methodological point of view, this finding is not very surprising, but nevertheless, it gives a hint that the diagnosis of giftedness should not follow single dimensions.
5) Particularly capable students distinguish themselves from the others in personality characteristics (motivational variables).

3. The longitudinal phase of the study

3.1 Goals

In the second phase of the project (longitudinal phase), developmental aspects and achievement analyses were the focus of the study. Essential goals of this second phase were:

1) The evaluation of the prognostic validity of instruments employed during the 1st (1986), 2nd (1987), and 3rd (1988) measurement periods for identifying gifted students (1st to 11th graders).
2) Evaluation of the validity of the typological concept of giftedness and relationships between various types of giftedness and performance.
3) Evaluation of the effects of personality and environmental factors on the performance of gifted students.
4) Description and analysis of the developmental course of gifted children and adolescents as it is related to changes in cognitive and non-cognitive characteristics.
5) Analysis of the interaction between giftedness, achievement, personality, and environment.

3.2 The prognostic validity of the test battery

Multiple regression analysis showed for primary school pupils that our giftedness tests, especially the used intelligence test, were able to predict academic achievement in a middle degree over periods of one and two years. Quite surprisingly, the tests were superior to teacher judgements especially in the main subjects German language, mathematics, and nature. For the primary school age, the need for psychological diagnosis of giftedness could therefore be impressively demonstrated. This finding is particularly interesting for Germany, as the decision about the school career is based on teacher judgement and is already made after grade 4.

The used creativity test, which was the Completion of Figures subtest of the Torrance Creativity Test, was - in contrast to the teachers' check lists - not a good predictor of arts und music in primary school, although its face validity seemed to be given. Concerning non-academic achievement in different areas, tests and teachers judgements showed both substantial roles in predicting different achievement levels.

The predictive validity of our tests seemed to be a little smaller in secondary school, decreasing a little from cohort to cohort, so that the teachers' ratings played a more important role here. The increasing influence of the knowledge base in this age could plausibly explain this finding. Especially for the most important school subjects, the used intelligence test nevertheless turned out to be a good predictor. In contrast to the results reported for primary school children, the creativity test (Unusual Uses) showed some predictive validity for arts in secondary school children.

Concerning non-academic areas, teachers' ratings played a much smaller role in predicting activities and achievement. Quite surprisingly this held true also for activities in natural sciences and technics. The inclusion of motivational variables in the regression analyses increased the portion of captured variance especially in non-academic domains. The quest for knowledge played a special important role in the prediction of activities and achievement in natural sciences and technics.

All in all, the analyses confirmed our model of giftedness: Domain specific giftedness tests are best appropriate to predict domain specific achievement. Identification of (highly) gifted students should therefore not refer only to simple intelligence tests.

3.3 Results concerning the typological concept of giftedness

During the first phase of the project (identification phase), cluster analyses which included factors based on many tests and questionnaires showed cloudy results so that no clear types of (highly) gifted students could be identified. This was one reason why we decided for multiple cut off as selection strategy for putting together the sample for the longitudinal phase. The finding of no clear giftedness types fortified the hypotheses that the different giftedness domains are relatively independent.

In the course of the longitudinal phase of the project some more attempts were started to analyse types of giftedness and their stability over the course of time. As special types of (highly) giftedness could not be found, we asked whether gifted students may show such individual structures of giftedness that they distinguish from normal students by the fact that they cannot be grouped. Therefore we used Bergman's (1987) program MPREP to identify a residuum of possibly "singular types" of giftedness. Unfortunately, the resulting residuum did not contain gifted students with special combination of giftedness factors but rather extreme cases of low gifted pupils. Cluster analyses with the cases not in the residuum again showed no clear giftedness types. In addition the types were not stable for the course of two years. All in all, the results supported the point of view that in our sample there were no qualitative differences between gifted and average students in typological terms.

3.4 The influence of environmental factors on the performance of gifted students

Environmental factors as measured by questionnaires of critical life events, family and school climate did not show great influence on the performance of gifted and

average students, especially in the older cohorts. Interpreting this, it should be taken into account that these results are based on group statistics. We also conducted an interview study which showed the important role of environmental factors for the development of single highly gifted students. The need for guidance and nurturing of the gifted became clearly obvious from this single case study. If one regards the whole sample, however, influences from environment seem to be of minor importance. Especially in the older cohorts, these influences seem to become less significant in comparison with self controlled planning of life.

3.5 Changes in cognitive and personality characteristics

Differentiated analyses for the subsample of gifted primary school children showed that intelligence seems to be a relatively stable trait. To avoid misunderstandings we have to state that we investigated the relative positions of the childrens in our sample but not the developmental function of intelligence. So the finding of stability of interindividual differences does not mean that there is no increase in intelligence in the primary school age. With respect to creativity, the results indicated that the measured variable was quite unstable. We cannot decide whether this is due to the lacking reliability of the used test (Completion of Pictures) or due to the unstability of the measured trait. Including other results and also similar findings of other studies (e.g. Sefer, 1989) there is much reason to doubt about the quality of the used type of test.

Concerning intelligence, the results in secondary school students were similar to those of primary school age. The interindividual differences in the used German Cognitive Abilities Tests (Heller, Gaedike & Weinläder, 1985; see also Аверина, Щебланова & Перлет (1991) turned out to be so stable that it was not possible to analyze - as intended - the simultaneous influence of more than one of the variables sex, constellation of siblings, or level of intelligence at first point of measurement. The creativity test used in secondary school students (unusual uses test) turned out to have better characteristics than the creativity test used in primary school children. But although the examined interindividual differences were more stable, the use of such an instrument for important, not correctable selection decisions seems, from our point of view, to be neither possible nor justifiable.

In secondary school students we were also able to study developmental functions of the speed of information processing (Number Connection Test, i.e. German trail making test). The findings indicated that the performance in this task increases between grade 5 and grade 10/11 and are about the same for elder students of grade 11 to 13. This finding is in accordance with the results of the authors of the test (Oswald & Roth, 1978). Interindividual differences were extremely stable in this test.

Many results reported until now indicate that most interindividual differences in giftedness domains are quite stable. What about the stability vs. development of personality characteristics? Let us present just one hypotheses as an example. In 9th graders, we analysed the interrelation between motivation (here quest for knowledge and hope for success) and academic achievement in science (mathematics and physics) by a structural model (see Figure 3). The hypotheses was, that motivation and achievement are to a certain degree stable constructs (arrows between the latent "Mot"- and "Ach"-variables). Motivation should influence academic achievement (one year later), while an impact of achademic achievement on motivation should only be found in average but not in (highly) intelligent students. But when interpreting the

attained coefficients we had to state that both motivation and achievement were stable characteristics in both groups that influences each other only a little.

3.6 Personality characteristics of gifted secondary school students

In our sub-samples of 7th to 11th graders, we found no differences between the gifted and other pupils in curiosity and motivation, which was a most striking result for us. While it is plausibe that intelligence has no effect on the curiosity concerning domains of science and technics, we were surprised that the means of hope for success and fear of failure also did not differ over groups of different levels of giftedness. But taken into account that all the students in our sample had been preselected by teachers and selected by a test battery, the "non-gifted" of the sample are not really representative of the general population. Our selecting procedures and the study as a whole might rather have choosen motivated and conforming pupils.

The second interesting result was that on the whole, the groups considered creative did not distinguish in personality characteristics from the other groups. Interpreting this, one should be aware of the fact that nearly all of our variables of anxiety, coping with stress, self-concept and learnig styles are based on items that deal with situations in school or when doing homework and preparing for tests.

The most obvious and consistent result when investigating intelligence groups, was the higher academic self-concept of the gifted and highly gifted students. There were no differences in general or non-academic self-concept. No differences were found on the variables of anxiety, but there seemed to be a slight trend that the more gifted one is, the lesser are the anxiety scores. According to this, stressful situations in tests etc. do influence the quality of thinking of the gifted to a smaller extent than lower gifted pupils. The gifted of our sample also tended to explain succes and failure less by external causes when compared with non-gifted students.

We also found interesting differences between gifted and non-gifted regarding learning styles: While the non-gifted and the moderately gifted do not differ, the highly and extremly highly gifted do, to a considerably lower extent, use simple learning techniques such as making a plan for homework, or doing homework before playing. It seems as if older highly and extremely highly gifted have no problems with homework and thus do not need simple techniques for successful homework management.

In addition, we found that the older gifted students prefer working alone and do not like to cooperate in groups of pupils in their classes. You should not interpret this by saying that gifted do not want to work with other students at all, only the other, in most cases not as gifted, members of the classes are meant. Moreover, you cannot conclude from this fact that gifted are socially isolated because the character of the items of the scale used was rather school-work related.

Comparing the gifted academic achievers and underachievers in our samples, we found many of the differences reported in literature. Because of low case numbers you should not overinterpret the results, but nevertheless they can be a hint to important facts: Underachievers tend to be more anxious, their thinking is more disturbed by stressful situations, they attribute more externally, they have a lower academic self-concept and their motivational structure tends to be disadvantageous.

Some two-way ANOVAs were computed to investigate the influence of specific personality characteristics and intelligence on academic and non-academic achievement. On the field of academic achievement, intelligence has the most important impact, but also effects of anxiety, stability of thinking, external attribution and academic self concept played important roles. About the same held true for leasure time activities and non-academic achievement on the science domain. The influence of stress resistance was above all obvious in highly intelligent students while average and moderately gifted students did not differ.

On the domain of literature and arts no significant effects could be found, on the field of social activities the will to cooperate with peers and high self concept seemed to be advantageous, while intelligence showed a slight negative (but not very strong) influence. This means that more intelligent students engage less in social activities.

In students who visited grade 5 to 7 (only Gymnasium students) during our study, no influences of personality characteristics on the development of achievement could be found, but in contrast to (highly) gifted students, the school marks of average students decreased during this period of time. Between grade 7 and 9 (only Gymnasium students), intelligent students with high academic self concept and high stress resistence could improve their school marks while all other groups achieved worse results. In students who visited grade 9 to grade 13 (only Gymnasium students) in the period of time under investigation, none of the analyzed effects was significant.

So all in all we can say, that at the beginning of the Gymnasium, intellectually gifted students do better satisfy the new tasks in the subjects German and English language and mathematics. In grade 7 to 9, personality characteristics gain more influence as mediators between giftedness and achievement. In these grades students have to learn a second foreign language, physics starts, there are some new subjects as history and social sciences and there is also more stress from outside school (puberty!). After this period, changes in interindividual differencies in academic achievement can, along to our results, not be regarded as actual consequences of personality characteristics.

3.7 Results from the interview study

The above research has been done by statistical analysis of test and questionnaire results of large samples. We were also interested in looking behind these statistical findings and obtaining information about intellectually gifted pupils who seemed, according to their scores in tests and questionnaires, to suffer from high test anxiety, low stability of thinking, low self-concept, high fear of failure, unfavorable causal attribution, or who were underachievers. We also included pupils in the interview study who explicitly wished psychological counseling. All in all, however, we did not find too many highly gifted pupils with this criteria.

The interviews showed a great variety of interactions between intelligence, personality characteristics, environmental variables and achievement. Therefore a systematic summary of the results of the interview study is hardly possible. Nevertheless, let us cautiously try to outline some constellations which seemed to be typical.

We found highly gifted students who were underachievers, who regarded this as a problem, and who were helpless. Because of impulsiveness, for example, they could not control careless mistakes. Other students saw their underachievement in a positive

way: Underachievement was preferred to "learning senseless things". These students seemed to be sure of their ability to get good grades saying "if I wanted to, I could get better grades". Therefore they did not experience helplessness. It was interesting that some of these students were willing to improve their grades for the matura (their high school diploma) and were convinced of reaching that goal.

It is important to know that West German Gymnasiums (this is the school type with the highest level that leads to university admittance) have a course system, where during the final two years every single mark is a part of the average grade of the diploma. Since you are only allowed to study some subjects at university if you have a certain average grade on your diploma, this is quite important.

These students began to place more effort on improving academic achievement at the beginning of grade 12 (they say "now, I'm studying a lot"). If underachievement, as in these cases, comes along without helplessness, we have to question whether this sort of underachievement is really a cause for counseling. A follow up study is planned to examine whether these students could indeed increase their academic achievement.

A similar situation to underachievement was found concerning the variables of anxiety. There were pupils who had physical symptoms of test anxiety and worry about school grades only during the time before the respective test. In these cases, anxiety seemed to have no negative influence on the achievement. In other students, anxiety appeared also during the test itself, sometimes only in certain subjects. A typical statement was: "If I see that I can't manage the last problem which is the most difficult, I can't concentrate any longer, even on the easiest problem". These were the pupils who received low scores on scales as stability of thinking. These pupils regarded their test anxiety as a problem. Some seemed to have developed coping strategies: They consciously spoke to themselves during the test to stay calm, or, as in the above mentioned case, ignored the problems not yet worked on.

Other students considered their problems "normal"; they judged, for example, their trembling as not being dramatic. They were convinced that their achievement were not affected because anxiety wears off as soon as they start working on a problem. These pupils seemed not to place too much importance on a possible failure because they were sure to be better the next time. Furthermore, these students seemed to be anxious in the social domain to a lesser extent. They did not judge it as very problematic to confess a failure to their comrades or their parents. Where anxiety existed about reporting bad marks to parents, friends or teachers, it seemed to be especially unfavourable for concentration during examinations.

While respective studies (e.g., Pekrun, 1983) academic and general self-concept correlat, we found a gap between academic and general self-concept in strongly achie vement oriented pupils in the interview study. There were students who had a high academic self-concept because of good marks, while they had a low general self-concept. These seemed to be pupils who have few social contacts. This is not surprising because we know from developmental studies that peers are important for the formation of self-concept. Aside from this, pupils with few social contacts have less opportunities to compare their achievement with each other, so they develop much too high standards for themselves. In one girl these high standards were seen in her role-models who were "non-existant fantasy persons". This distance from reality could be seen as another hindering factor in making close friends.

Furthermore, highly gifted students seemed to set high standards for themselves outside school, too, because they were used to achieving brilliantly in school. That means that students with very good marks are quite vulnerable concerning criticism outside school. They did not yet learn to cope with failure. Other students who had

much social contact but nevertheless had a low self-concept and at the same time did not consider themselves as deviating from average, seemed to be bothered to a lot less extent. They did not have the drive to change themselves.

We cannot answer the question why some highly gifted students had a low general self-concept and were also failure orientated. As one girl who was failure orientated in the domain of school and profession expressed, she was "rather a bit pessimistic" and believed to have inherited this from her mother. However, the explanation of all personality characteristics can and should not be our task in the frame of this contribution. Regarding the psychological and educational work, it should be important to us to help these students attain a realistic view of their own potentials and abilities. Whether a student, nontheless, remains "rather a bit pessimistic" or not, must be up to him or her.

In some cases pupils suppressed their potential to do well in order not to be a pushy person in the eyes of their peers. Negative consequences for their development followed, above all if a student had no chance to pursue his/her interests outside school. Some went to adult education centers, for instance, but that is not possible everywhere, especially in rural areas. More individual centered lessons could prevent understimulation with all its negative impacts in highly gifted students.

Students who attracted attention by outstanding abilities, for example by mastery of mental arithmetic, were not regarded as pushy by their peers. Other good pupils who did not show such outstanding skills developed social problems if they were particularly hard workers in classes with a low achievement orientated class climate. Pupils who were able to compensate this lack of social acknowledgement due to high achievement were not bothered so much by this. Some students found that they were only of interest to their comrades because of their knowledge. They may indeed have contact in class, but, according to their statements, only the academically weaker pupils invite them over in order to profit for their own school achievement. This seemed to be unfavorable to the general self concept.

4. Discussion and consequences

If you have a look at the regular West German school system of the 80ies you will realize that in our country there are rarely elective courses that do not belong to the official curriculum. All learning seems to be influenced by competition. Pupils get grades for all achievement. Consequently, intrinsic motivation or individual interests play a small role at school. Especially extracurricular courses and forms of learning that are based on creative learning are not offered in all German states. As for example Hany & Bittner (1989) demonstrated, such courses and forms of learning can support intrinsic, interest related learning and achievement motivation. At the same time such offers could prevent some of the negative developments found in the framework of the interview study. Sometimes even some additional tasks for a understimulated student can have a positive effect on his (not only academic) behaviour.

In our opinion it would be good, if students could follow their interests and intrinsic motivation in a free and easy atmosphere in courses outside the official curriculum as were offered in some German states in the last time. In this way especially students who do not have opportunities for extracurricular support, e.g. pupils from low social classes, could convert their giftedness into achievement, could have success in a free and easy atmosphere, and could experience failure without negative consequences. As

mentioned above, we could see from our interview study that pupils are not disturbed by failure in school so much if they have success outside of school, maybe in self-created hobbies, maybe in musical or sport activities, or courses at adult education centers.

Before we formulate some concrete demands for guiding gifted pupils in school, we want to stress that our ideas certainly do not fit to every socio-cultural background or the educational system of every country. The guidance model we suggest has been constructed from the experience of our studies and the characteristics of the actual German school system.

Research centers (universities and scientifically guided and evaluated counseling centers for the gifted), school psychologists, other counseling and guidance institutions, as well as teachers, school counselors, social workers and tutors in school are included in the model (see Figure 4). By "tutors" we are thinking, for example, of a) older students who work with younger ones or b) experts from outside the schools who pass on their experiences to the students.

Research should consider the problems and situations that arise in school, namely the practical aspects. That way, school psychologists and researchers can work together very closely. Scientifically guided counseling centers could, in our view, improve such cooperation.

Psychologists working in the field should hand out information about giftedness to the school staff, prepare them for working with gifted students and supervise them. The leaders of the courses, on the other hand, should inform the psychologists about the success of the courses and other activities. Aside from curriculum development and information flow to teachers and parents, counseling is an important tasks for school psychologists in this model.

In many cases parents seem to be more ambitious than their children gifted. Therefore, it is really an important task for school psychologists to give the parents information about the field of giftedness and all related problems and also about worthwhile ways of nurturing children. The aim should be to turn unreal expectations in every respect into realistic ones. This holds partly true for teachers as well. School psychologists should increase teachers' sensitivity towards different symptoms of (high) giftedness and possible problems and disorders of the gifted.

Furthermore we would argue that schools should give much more support to students in the domain of extracurricular activities in spare time. School should provide more opportunities especially for pupils who come from underprivileged families. Also in the face of the increasing number of single parents who do not have time to nurture their children in the afternoon, there is a danger that students who are members of such incomplete families will be strongly disadvantaged. School should also support interests and hobbies of students that cannot be financed by their parents.

We would prefer more extracurricular courses as opposed to special classes and schools for the gifted. Of course you have to weight the advantages and disadvantages of such guidance in every single case but we think that, in general, the disadvantages concerning social development and the possible reduction of intrinsic motivation to competitive behavior would cover or balance the positive effects.

We surrounded the counseling centers for the gifted with a dashed line because we do not think that we need such centers as permanent institutions spread all over the

country. Their specific tasks should be to develop and evaluate strategies for counseling, curricula and methods on courses, and trainings for teachers. We think that special centers for gifted pupils would either be placed too far from the affected persons or - given a dense net of such institutions - would not have enough to do. We see it as much more urgent to spread the net of school psychologists. But we think, of course, that scientifically directed counseling centers are valuable for the development of guidance methods and preventive strategies.

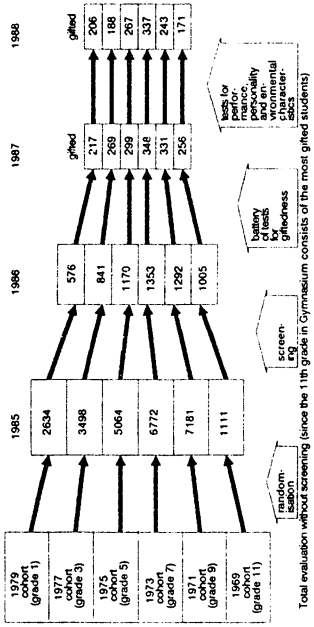

Figure 2

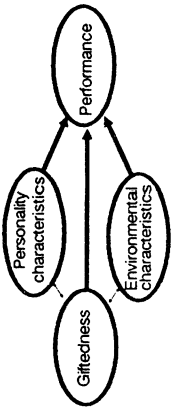

Figure 1

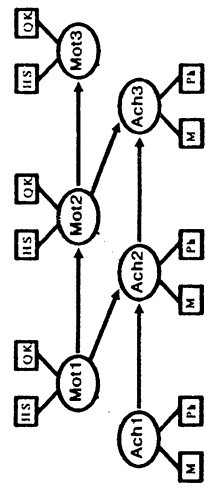

Figure 3

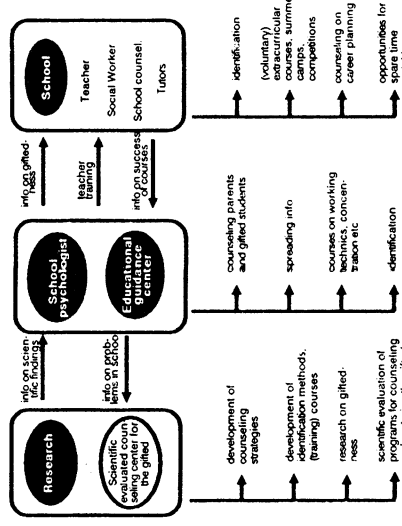

Figure 4