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ABSTRACT

This literature review is divided into sections describing studies that answer specific questions about reading and gifted children. Among the issues mentioned are the personality traits and attitudes of gifted children; their sex difference and environmental influences; the effect of early school admission; types of gifted programs; the relationship between IQ and reading ability; the attitudes of administrators, legislators, and teachers toward gifted children programs; and a series of questions on creativity.

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A REVIEW OF RESEARCH ON
READING AND THE GIFTED

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What are some of the personality traits and attitudes associated with gifted children? Steele, House, Kernis (1971) found gifted classes to be superior on all dimensions of higher thought processes, classroom focus, and classroom climate. Positive correlations were obtained by Elliot (1971), between the manipulation of ideas and the handling of conflict-associated material perceived at a level below conscious recognition. Hofset (1971) revealed no significant differences in achievement in classes with many gifted pupils than in classes with few. Research by Daurio and Webb (1975) indicated that high ability in children over the age of eleven years does carry over into formal operations; but that bright children under eleven years of age demonstrate a low rate of precocity in formal operational ability, with exception of the pendulum problem. Jacobs (1972) studies revealed that gifted children showed greater self reliance and needed less adult approval and greater sensitivity to their individual environment. Torrance (1971) found a shift from parents and teachers to peers as sources of encouragement and validation of original ideas in the fourth grade. Research reviewed by Gaier and Dellas (1972) showed that creative children need psychological safety and that their basic problem might be his alienation from teachers and classmates. Schauer (1975) results showed that gifted children with IQ's at or above 125 were found to have significantly more positive Coopersmith Self-Esteem Inventory scores than gifted children below 125 IQ and children not identified as gifted. Rader (1976) showed the simulation to be more effective in creating a more positive attitude concerning the use of multiple criteria when identifying the gifted and talented. In a study by Week (1974) certain strategies for language acquisition were different or more extreme than other children's. All students in Rolland's study (1972) revealed favorable attitudes toward report cards and felt that gifted students should be present when their parents and teachers confer about their progress. Calvin (1976) showed a significant inverse relationships were found for anxiety with intelligence, achievement, some specific self concept items, and a few divergent production and other personal characteristics; and that there were no significant differences between the number of boys and girls recommended or not recommended for gifted testing and between those subsequently identified gifted/not gifted. A study by Klein and Cantor (1976) indicated that intellectual giftedness did not necessarily lead to high self esteem and that more gifted children in kindergarten than their nongifted kindergarten schoolmates manifested poor self esteem. Neurosis in precocious children may be caused by the child's ego being overwhelmed by information he is too immature to understand was concluded by Keiser (1970). Research by Koukeyan (1976) showed significant gains were obtained in arithmetic achievement and attitude towards arithmetic at the fourth grade level. Research by Landau (1976) showed children's questions were divided into three subject areas; quality of life, faith in man's potential, and individual responsibility for mankind's fate. A study

by Painter (1975) showed greater variations in levels of attainment and in width of interests for the gifted as compared with the control group. Jensen (1973) studies found the superior group scored higher on fluency and grammatical control. In a study by Bernal (1974) results indicate that nine items had high discriminate powers, including high grades in school, large vocabulary for students age, and ability to learn indicate. Results indicated by Pumire and Farrer (1972) that children getting more individualized attention helped to maintain self-concepts and achievement. Bachtold (1976) found the only behaviors rated among the highest ten by teachers, parents, and talented students were sense of humor, consideration of others, health, and self confidence. Curiosity and courageousness were found more highly desirable by teachers and parents than by the children. Analysis by Bernal and Reyna (1973) revealed that Mexican Americans gifted use imagination freely, being more active and aware, and associating more with adults. Runyon's (1969-1970) findings show that attitudes of interage children toward school were more favorable than children placed in traditional class. No significant difference was seen in self-concept nor creative thinking for the two groups of gifted subjects.

Are there sex difference in the preformance of gifted students? Research by Hilliard (1975) indicated that there was no significant interaction between the ability and the sex of the fifth-grade subjects. Results indicated by Qsen (1973) that no significant differences were found between the achievement of males and females within each IQ range at each grade level studied. Research by Solano (1976) show a negative stereotype of gifted boys among educators that dissipates on contact, while there is a positive stereotype of gifted girls that disappears after working with them. Research by Milgram (1977) showed the relationship with sex role followed a consistent pattern for boys and girls combined, of which the following are examples; male activities such as sports with scores on the masculine scale, female activity such as dance or art with scores on the feminine scale, and sexually indeterminate activities such as drama or social leadership with scores on both scales. Bachtold (1971) found that boys scored higher in fluency and flexibility on tasks requiring divergent thinking and girls scored higher in fluency and flexibility on the tasks requiring evaluative thinking. Lazar (1972) showed that young gifted boys closely related their normative counterparts, while the young gifted girls scored higher than their counterparts, although not significantly so. No differences occurred in any meaningful pattern between gifted boys and girls in perception. Sex differences were found by Groth and Holbert (1970). More gifted girls were concerned with self-actualization than gifted boys. Gifted boys showed greater concern for security and for self-esteem. Both showed concern for love and belonging. Godman (1970-1971) found that sex was the most important single factor in choosing companions, race was the next most important factor, intelligence was the least. Walker (1971) found that gifted girls performed better than boys on Vocabulary Posttests.

What are some of the environmental factors that influence gifted children? Fish and Others (1976) found that perinatal factors and medical complications did not affect the intellectual status of children with superior intelligence. Willerman and Fiedler (1977) findings were that these children were not generally advanced as infants; that parental education correlated substantially with the IQ and achievement scores of boys; and that among girls parental education tended to correlate only with achievement scores. Watkins (1975) showed that the children in the sample population were intellectually able; that the children walked and talked earlier than the average child and were in good physical health and had good sleeping and eating habits. A study by Groth (1975) showed that gifted students tended to come from smaller rather than larger families. Aldous results (1974) showed family size was negatively related to originality with the highest scores in one and two child families. Research by Moreno (1976) indicated that neither race nor social class level affected the child's ability to increase these skills, in creative thinking and problem solving. Naumann and Piper (1974) results showed a positive significant correlation between IQ and intellectuality in the home. Barbe and Horn found, in their comparison of moderately and highly gifted elementary students, that the highly gifted group came from more affluent backgrounds, had more highly educated parents, and rated higher on creativity measures. Both groups were well adjusted, and there were no outstanding differences of physical development.

What are some of the common procedures used to identify gifted students? Kincaid in (1971) stressed the importance of early identification. Research by Sbornone (1976) found that the use of nonverbal learning tasks may facilitate identification of capable pupils outside the mainstream culture. It was discovered by Horan (1972) that certain demographic, personnel, and philosophical variables are related to the kind of provision made for gifted students. In a study by Ciha (1974) show parent and teacher nominations were compared with students' standardized test scores, results indicated that parents were more able than teachers to assess their children's abilities at the kindergarten level. Stewart's (1975) findings showed teachers and administrators use three techniques (intelligence tests, achievement tests, and judgement) when identifying and selecting students for gifted and talented programs. Granzin and Granzin (1970-1971) states that both gifted and nongifted pupils were able to distinguish traits of giftedness that agreed significantly with teacher rankings. Research by Ryan (1975) indicated that identification is more difficult at kindergarten than at third grade, that teacher nomination was found helpful in screening, and that information provided by parents can be useful in identification. A field study was developed by Resource Management Systems, Inc. (1974) which showed the FKSN (an instrument used to identify gifted students) was a good system to fill the gap between children already referred and children in need of special services, and to free special education staff from psychometric duties for more support to regular class teachers. Bruch (1972) demonstrated the need to consider the disadvantaged gifted utilizing Meeker's method of interpreting Stanford-Binet Intelligence Scale. Chen and Goon (1976) in a study of

disadvantaged Asian children found that incidence of giftedness in sixth grade Asian ranged from 11.8 to 26.9%; that teachers' and guidance counselors' descriptions of a gifted child presented a wide variation of both personality and intellectual dimensions. Webber (1975) shows that using the SIT cut-off score of 130 increased the effectiveness of the screening procedure to 97.2% effectiveness and the efficiency to 48.1%. Gear (1975) found that attitudes were not affected but training improved identification effectiveness. The conclusions of Lynch's and Edward's study (1974) proved that creativity in adults when judging is unrelated to identification of children.

What is the effect of early admission to school for the gifted? Results of Klindova's study (1973) show the possibility of identifying, at an early age, several types of intellectual ability. Birch (1970-1971) states that early admission to school for the mentally advanced children did not cause them any sociometric problems and that they did as well in academic work or better than older classmates. No significant differences were found by Braga (1970-1971) between early admit group, normal admit group, late admit group. Klein advocates early admission produced educational, social and emotional impairment in many children.

What is some evidence in support of special programs for the gifted? A study by Khatena (1975) showed significant improvement in verbal originality and figural flexibility in students who participated in Project Talented and Gifted. Also, students improved in the areas of self strength and individuality; and compared to students' self perceptions significantly improved in environmental sensitivity, initiative, self strength, individuality, and intellectually. Khatena (1974) reported that students improved significantly in verbal originality in the special program. Renzulli (1976) through an analysis of performance test results, found classroom atmosphere, parent questionnaires, interviews, creativity test scores, sociometric data, and art and creative writing product showed the program, Project Gifted, to be highly successful. In a study by Callahan (1972) results showed that the experimental group did achieve higher mean scores on the Torrance Tests of Creative Thinking. Teachers and students responded positively to the program, New Directions in Creativity. A study by Cross (1975) showed that the special program did not make a significant difference in the educational attainment and financial success of the 1958 group, but there was a significant difference in favor of the experimental groups of 1964 and 1965 in academic achievement. In comparing different approaches for educating young gifted children Karnes and Zehrback (1974) found a mean gain in IQ scores of four points with no significant interaction found among the class model or between high and low socioeconomic students. It was found by Steele (1971) that gifted classes were superior in emphasizing higher thought processes, classroom focus, and classroom climate but not lower thought processes. No significant differences were found by Bachtold (1974) in Fluency, flexibility, or originality in the different learning settings nor were their differences between gifted fifth and sixth graders significant. There were no significant differences between subjects who took part in non-structured experience and controls in problem solving in

science or language arts as shown by Winston (1970-1971). Special classes for gifted is supported by Wilhoit (1971). He found a statistically significant upward deviation and those students under guidance of sensitive teacher produced better than expected. Hampton (1970) stated that only in the academic areas did results generally favor the gifted who received special summer training. Bent (1970-1971) concluded that gifted children equalled surpassed the controls in academic achievement when specially grouped. Gifted children enrolled in a special program for gifted since third grade did significantly better than did controls in paragraph meanings, arithmetic applications, science, critical thinking, leadership, and social relationships were results found by Alam (1969). After an eight week training program for highly intelligent children, Hampton (1969-1970) found no significant differences in academic achievement except in library research and critical thinking. Kyte and Forwalt (1969-1970) suggest that because superior students gained mastery of multiplication of factors in about half as many days as normal students, teachers divide classes and allotments of time to each group be adjusted. In a study by Painter (1975) the majority view of 80% of the Head Teachers was that gifted children had special needs that could be catered for in primary schools. Gotkin (1970-1971) confirmed that significant gains were made by fourth and fifth graders on programmed material developed for eighth grade, but not as great as eighth graders. Sands (1969-1970) concludes that units developed for self-instruction show significant gains for the gifted. Gold notes little difference between subjects and controls on gains made in academic achievement, study skills, and divergent thinking ability when involved in self-directed learning situations. Personal and social adjustment appeared to be favorably affected when self direction was used. In a study by Jackson (1977) results indicated that parents of intellectually advanced children are legitimately concerned about the lack of appropriate educational options for their children. In Jackson's study (1977) a provision of more readily available counseling services to parents of intellectually advanced children is recommended. Passow and Others (1977) found more similarities than differences between Astor children and non Astor children.

What are some of the administrators and legislative attitudes toward gifted students and their programs? Gail (1976) concluded that one factor is essential for the planning and amnagement of a successful program. It is a high degree of agreement between the authorities and the administrators. Curtis (1971) stated that gifted programs occur more frequently in larger more wealthy districts. Itinerate teacher programs and partial segregation were the most popular administrative techniques. Bush (1972) showed significant differences between the underachieving and achieving groups, there appears to be enough evidence to recommend that administrators should schedule modules of time for remediation of underachieving children and youth. As stated by Keaster (1969) the stimulus provided through legislation and special aid funding has had a major impact on programs for mentally gifted pupils. Press (1969) revealed that in 1969, fourteen states gave financial support for programs for the gifted. Superintendents

generally regard other educational programs as having a higher priority for their limited funds where special funds are not available. Stewart (1972) established that Superintendents have positive attitudes toward the initiation, and expansion of programs for gifted children, and that the lack of financial funding was cited as one factor that has hindered its growth. It was concluded by Feldman (1971) that communities should be informed of the implications of various selection techniques so that each may be judged on its merits when establishing special programs for talented students. It was suggested by Hampton (1971) that schools are not doing, all that could be done to help children achieve their potential. Plantec studies (1972) showed failure of the schools to identify giftedness or program for it.

What specific areas might be included in a program for the gifted? Karnes (1969-1970) assessed the usage of typing in creative writing and thinking. He found that the use of typing was not harmful to areas such as work-study, reading, and spelling. The experimental group showed significantly greater gains in creative writing and thinking. It was concluded by the Toronto Board of Education (1971) that discussion groups, whether they are oriented toward group member feelings and interpersonal problems or toward academic matters, promote psychological adjustment and academic achievement. Major evaluation results of Neff (1973) are given to indicate that a supervision system of off-campus instruction by parent-teacher teams is effective and worthwhile. Results indicated in Touchton's Study (1972) that a program of enrichment with some type of extra-curricular or segregated activity for gifted children should have excellent results. Hennes (1969-1970) finalized his report on three series of televised enrichment programs for the gifted by stating that significant improvement in learned context occurred in all three series and that creativity aptitude had little bearing on success. Independent study ability was related to success. Dallenback and DeYoung (1971) results indicated on four posttests, certain subgroups of students exposed to the T.V. programs showed greater average gains than the control students, while in five instances, certain categories of the experimental students made smaller average gains. Schrock's (1973) enrichment program that critical thinking skill activities were rated good as were social awareness skills. Needs of programs for the gifted found by Bixler and Cowan included guidance and counseling services, school and home work together, enrichment, care taken with problems of emotional and social adjustments, early identification of underachievers, and new procedures for school reports, and grading. Holt suggested programs for gifted students start at fourth grade level. Programs should include acceleration, enrichment, and remediation in the standard core program. The ability of gifted children to conserve can be aided by carefully planned education of observation and discussion as stated by Roeper and Sigel (1969-1970). Werblo and Torrance (1969-1970) stated that after historiography experience, resulted in greater accuracy of self-evaluation. It was found by Steele (1971) that gifted classes were superior in emphasizing higher thought processes, classroom focus, and classroom climate but not lower thought processes. Walker

(1970) found that gifted students performed better after special training in reading rate increase.

What are some of the interrelationships found in testing with gifted children? Namy's comparison of gifted and pseudo-gifted students showed that the gifted did significantly better on WISC information, comprehension, similarities, vocabulary, picture completion, picture arrangement, and block design subtests. The two groups did not differ markedly on arithmetic and coding subtests. Gifted students were superior in defining words, making generalizations, and choosing synonyms. Teacher grades were related only for English grades to the WISC score and higher than pseudo-gifted. Machen (1973) results showed that moderate correlations were found between WISC verbal and SIT IQ and between WISC full scale and SIT IQ at all levels. The SIT was shown by Machen (1973) to be a reliable and valid instrument for use by school personnel in the identification of gifted children. Doughty's (1972) results indicated that the three best devices for tests of mental maturity are: a standardized test of academic achievement, a test of personality, and a self-concept inventory, all of which are easily administered, scored, and interpreted. Effects of Web's study (1974) showed of possible relationship Piagetian and psychometric measures of intelligence. In a study by Miligram and Miligram (1976) results showed group administration exercised an adverse effect on creativity in nongifted children, producing creativity scores which were confounded with intelligence and lower than scores obtained in individual administration. Form of administration had no effect on the creativity-intelligence relationship or on the level of creativity scores of gifted children. Results suggested a requirement of average intellectual ability for the production of creativity distinct from intelligence in individual administration and a requirement of above average intellectual ability in group administration. Interrelationships among student and teacher ratings of each others performance was studied by Roweton (1975). Results indicate that (a) girls were superior to boys on most indices, (b) teacher and students judged artistic and academic creativity similarly, (c) the most pervasive associate of classroom product fluency and elaboration was student-teacher ratings, and (d) performance on the Torrance subtests was not highly indicative of either student ratings or classroom product fluency and elaboration. When analyzing the subtests performance by gifted students on the Stanford-Binet Intelligence Scale (1960 Form L-M) Sheverbush (1974) found that compared to the average group, a greater percentage of the gifted group passed a proportionally higher number of subtests classified into the language and vocabulary areas; that gifted students rated unsuccessful by their teachers did better at the very highest levels of the test, while those rated as successful did better on subtests in the middle range; and that the gifted male group had a higher rank difference on subtests classified into the reasoning category and the female group had a higher rank difference on subtests classified as verbal. In a study by Rasbury and Others (1977) the Data, analyzed by a linear regression analysis, showed that the WISC-R Verbal, Performance, and Full Scale IQs could be predicted with a reasonable degree of accuracy. An attempt to place the identified factors into a psycholinguistic model by Wisland

and Many (1971) was not successful for the majorities of the factors identified. Sheverbush (1975) study compared the average group and gifted group and found the gifted group passed a proportionally higher number of subtests of the Stanford-Binet IQ Test.

What does research show when comparing gifted, normal, and/or retarded students? Williams and Tillman (1969-1970) concluded that a regular sequence of development is followed in association of selected form classes regardless of intelligence group. In comparing slow-learners, average, and gifted students, Friedrich (1974) found experimentally induced rehearsal and clustering strategies facilitated the performance of all students. Self-pacing produced superior results than did experimenter pacing of successive object presentation. Students provided with the overt shadowing rehearsal strategy training reached criterion in fewer trials than other students. Students performed better on concrete than on abstract short-term memory concept tasks. Within concept latency, suggesting that all Students used a clustering strategy. The high significance found by Herrick (1970) supports the hypothesis that retarded children perceive and act on symbols in essentially the same manner as do gifted and normal children. Blake and Williams (1970) state that groups equated for MA did not differ in rote learning groups equated for CA did differ with the superior group exceeding the others. Subjects using the whole method responded most adequately. Williams and Blake (1970) concluded that superior subjects did not respond differentially to the two types of grouping criterion of categorizing object-level words on the basis of first order concepts, and grouping object level words on the basis of initial letters. In the equal CA comparisons, the superior group exceeded the others and the normal group exceeded the retarded on both variants. No relationship was found by Brison and Bereiter (1969-1970) between general intelligence level and intuitive concept formation. The presence and differentiation of normative and asperational perceptions were demonstrated by Harris (1969-1970) to be present in the writing behavior of all intelligence groups. In a study by Pugliese (1976) results showed gifted children employed more advanced superordinate grouping strategies. Duncan (1969) compared gifted and average students' rates of tapping, walking, reading, answering, and calculating. She found that the gifted as a group performed significantly faster. House (1972) studies showed significant differences in the degree of emphasis in gifted and average classes-average classes emphasized two or less thought processes. Glenn (1978) reported that gifted students were found to have lower task structure needs than the average student. Kosc (1970) found statistically significant correlations in the representative group. In the extreme groups, mathematically gifted and mathematically gifted and mathematically deficient, there is greater variability of score than the normal population. Questionnaires reviewed by Warner (1973) showed that gifted children were more acceptable of EMR students than were students of average intelligence. Painter (1975) found was that for many of the comparisons, the levels of attainment of the control group and the low IQ subgroup, relative to their measured ability, were greater than those recorded for the gifted groups.

Shock (1970) established that incentive motivation reduces the range and variety of stimuli to which an individual responds. Carrier (1971) found only weak support on isolated measures for intelligence-task motivation, emotional tension-performance (negative), and motivation-performance (positive).

Does geographic location affect test scores of the gifted child? In general Oppen (1972) found the same stages of development and types of reasoning were found to occur in both rural and urban children for all tests, although the frequencies of occurrence sometimes differed between the urban and rural Thai children. In a study by Schena (1977) it was found that average students attained significantly higher scores, indicating better futuring ability, than gifted students when the total groups were compared. Heterogeneous average rural students scored significantly higher than heterogeneous gifted rural students. No significant differences were found between other groupings of gifted, average, rural or urban students. Possible reasons for the unexpected findings include the possibility that gifted or urban children are more conscious of a wider range of future options and less likely to "strongly agree" with specific goals or future projections.

Are Piagetian theories applicable to the gifted? Keating (1973) found that students who scored higher on psychometric measures of intelligence were also developmentally advanced in Piaget's sequence of cognitive developmental stages. The finding did not contradict Piagetian theory since out-of-sequence successes were not observed. In a study by Webb (1974) research showed all students passed the concrete/operations problems including measures of conservation of volume, but only four of the oldest students passed the formal operations tests. In comparing Piagetian assessment conservation skills between gifted and average first graders, Rader (1975) found the gifted group performed significantly higher; most of them "ceilinged" on the test, thus masking more significant differences. When examining the empirical relationships among Piagetian tasks, psychometric assessments of intelligence, and school achievement DeVries (1974) indicates that the Stanford Binet is a poor predictor of performance on most of the Piagetian tasks, and that the theoretical differences between Piagetian and psychometric intelligence do seem to correspond to real differences in cognitive measurement. Additional analyses by DeVries (1974) among all tests indicated that no overlap exists between knowledge on Piagetian tasks and school achievement knowledge as measured by the MAT. Results were supported in DeVries findings which state that Piagetian tasks do appear to measure different aspects of cognitive functioning than do psychometric tests and that there exist specific differences between the two in general perspective and method of assessment. On a visual-term memory task, Friedrich (1974) found that students of all ability levels performed better on concrete than on abstract short-term memory concept tasks.

Is there a relationship between IQ and reading ability? Sedarat (1969) concluded that intellectually superior reading achievement is not a function of need for achievement, ego strength, or consentuality of word associations. Reading disabilities of the highly intelligent is more often functional and less organic than those of the average and

slow-learners was concluded by Krippner (1969-1970). Research by Wolf (1976) showed the findings that combined peer/adult modeling was somewhat more effective in influencing reading selections of gifted subjects than was an adult modeling procedure alone. In a study by Rubin (1975) comparing the level of assigned reading with measured reading ability data showed that the greatest lag in the implementation of individualized instruction lay in the education of pupils whose development was accelerated rather than in the education of pupils whose development was slow. Osen (1973) proved that average reading achievement increased in direct relationship to IQ. The Harris formula examined in Osen's study (1973) predicted actual reading achievement most accurately and it could be useful in identifying remedial readers among the gifted population. Research by Price (1976) indicated that most of the students received instruction in phonics; and the majority could read when they entered school, except those whose parents deliberately postponed teaching reading. Durkin (1971) discovered that early readers tended to maintain their lead in achievement throughout school. An important finding of Durkin's study (1971) is that parents of early readers showed greater willingness to give early help. Durkin (1971) found no simple connection between early reading and socioeconomic status.

What are some of the teacher attitudes and characteristics of gifted children? Teacher attitude as measured by Jacobs (1972) revealed to be negative toward the gifted child and they found their inquisitive behavior to be unacceptable. Cantrell and Cantrell (1976) found students differed significantly in achievement score changes as a function of the availability of support teachers to the classroom teacher. Brown (1975) found that teachers who favors productive goals for gifted children are more characterized by intelligence than by empathy. Research by Sutherland and Goldschmid (1974) indicate no linear relationship existed between teacher expectation and IQ gain scores either with or without the partialing out of initial IQ scores. A significant relationship was found between negative discrepant teacher expectation and IQ change in children with superior intellectual potential. McNary (1972) conclusions showed that teacher characteristics do influence significantly the growth of fourth, fifth, and sixth grade self-contained classes with a mean IQ of 120 or better. Other teacher characteristics of McNary's study (1972) demonstrated that no single teacher characteristic was significantly related to all areas of convergent and divergent growth in the children's scores than were the other variables study. In general McNary's research (1972) indicated that the teacher who appeared to have most significantly influenced growth in the convergent area was submissive, dependent, cheerful, alert, not a staunch guardian of moral, and manners with a natural warmth and liking for people. With respect to teacher techniques and characteristics Belland's (1972) experimental students indicated a preference for teachers who ask many questions. Sutherland and Goldschmid (1974) research showed no linear relationship existed between teacher expectation and IQ gain scores either with or without the partialing out of initial IQ scores. Coletta (1975) showed that the didactic style is the predominant teaching mode. Findings in Callahan's study (1974) revealed a highly influential

teacher variable in the creativity training program.

Are gifted students able to generalize across subjects? Research by Krutetski (1976) shows that three stages of mental activity are seen to be involved in solving a mathematical problem: gathering the information, processing the information, and retaining the information. Capable students are reported to exhibit unusual abilities in generalization, flexibility in seeking methods, reversibility, and the ability to reach an "elegant" solution. Rosenfield and Houtz (1977) found problem-solving skill grew steadily from grade two through grade six. Also gifted students were about two years ahead of nongifted students. Gardner and Bernard (1970-1971) stated that Intelligence is a determinate of person perception. Gordon's findings (1970-1971) support the hypothesis that students taking foreign languages (Russian) improve in their regular classroom work and behavior.

What does research show about gifted students and career education? In a study of career education Ellis (1976) showed interaction between educators primarily concerned with career education and educators primarily concerned with educating the exceptionally gifted and talented students is insufficient to achieve cooperative programs or integrate their efforts. Moisiar (1972) showed evidence that there were no significant differences between occupational goal of gifted and average children. A significant difference between the occupational goals of gifted children and those goals set by the parents in Moisiar experiment (1972). Kincaid's (1970) finds of a study of 561 gifted pupils showed girls career preferences were social service, art, and science; for boys, science, social service, and mechanics.

Other interrelated research on the gifted included the following two studies. In a study by Simonton (1976) Cox's states that there is a correlation between intelligence and ranked eminence. In a study determining the extent of sampling bias in L. Terman's Genetic Studies of Genius by Keating (1975) results showed deviations from theoretical statistics; with IQ scores clustered about a mean significantly higher than projected, indicated that the sample size was too small.

What are the personality traits of creative people? In investigating the degree of association between the manipulation of ideas and the handling of conflict Elliot (1971) found positive correlations when the Creative Thinking Test scores were compared with the total number of non-dichotomizing solutions offered to social conflict situations and with the preponderance of nondichotomizing over dichotomizing solutions offered. Galvert's (1969) study of humor and creativity shows that cartoon humor is more highly appreciated by the "creative" group as a whole. Capacity rather than motivation appears to be responsible for individual differences in creativity was stated by Ward, Kogan, and Parkove (1970). Maw and Law (1970) found that high-curiosity subjects showed significant positive loadings for creativity on the general restrained creativity and the impulsive creativity factors. It was concluded by McHenry and Shooksmith (1970) that by the nature of the creative process, creative people are suggestible. Ward suggested that creative subjects differ solely in personality and

motivational characteristics.

What are some environmental factors that affect creativity? Balagtas (1969) found a negative relationship between parental attitudes and children's creativity. A positive relationship was found between the democratic attitude of mothers and their children's creativity. Singh (1970) hypothesized that there would be significant differences in measures of the components of creativity between advantaged and disadvantaged children, regardless of culture. Her hypothesis was partially substantiated. Karnes (1969-1970) states, that disadvantaged children of higher potential who were free from punishment scored higher on creativity than did extrapunitive or intrapunitive children. In social situations Jacobs and Cunningham (1970) possession of both high intelligence and creativity lessened a child's desirability as a companion when compared to a child who is high in only one. Bachtold's (1973) results indicated that most individuals are still rewarding behaviors not facilitative of creative productivity. The results of Stern's study (1974) were interpreted as a serious warning that current television programming is detrimental to children's creativity. Conclusions in Stern's study (1974) showed that children watching dramatic shows increased in creative performance, while those watching cartoons and educational programs had depressed creative scores. Gowan (1971) found a trend for highly creative children to have a background suggesting more early enrichment and stimulation.

What are some of the relationships between creativity and mental ability? It was concluded by Williams (1971) that while a relationship was established among several measures of creativity and with a standardized measure of arithmetic achievement, no strong relationship exists between the latter and dogmatism. Schulman (1969-1970) suggested that creativity presupposes openness in perception, but not the reverse. Rosenfield and Houtz (1977) found creative thinking increased from grade two through four, with no significant increase thereafter. Jacobs and Cunningham (1970) concluded that both high intelligence and high creativity interacted significantly with peer acceptance. Torrance's study (1973) revealed that the most successful approaches to creativity involve cognitive and emotional functioning, provide adequate structure and motivation, and give opportunities for involvement, practice, and interaction with teachers and other students. Guilford and Christensen (1974) results did not support the threshold hypothesis that below an IQ of 120 there is some correlation between IQ and creative potential, and above 120 there is not correlation. Martindale (1975) showed that creative people have higher resting levels of brain wave activity which may explain their oversensitivity to stimuli.

What are some of the programs designed for creative children? Johnson (1969) states that significant gains were made in creative writing and verbal intelligence after special training in tasks developed in the Torrance Tests of Creative Thinking. No sex differences emerged. Kvašček and Stankov (1970) found that after training in creativity, common variance of the Hidden Figures test decreased while the Alternate Uses and Possible Jobs Test tended to form group factors usually known as semantic spontaneous flexibility.

Creativity training reduced overall conformity for the low IQ subjects but not for average or high IQ subjects but not for average or high IQ subjects as stated by Allan and Levine (1969-1970). A causal relationship between creativity and conformity due to transfer of common skills across situations was found by the researchers. Thomas and Feldhusen (1971) felt the program helped children develop thinking abilities, and that having children write down their creative ideas was the most effective part of the program.

Some other related material concerning creative children as follows: Plass (1974) data of the Torrance Test of Creative Thinking indicated that factors described a task rather than the hypothesized psychological process for which it was scored. Torrance (1970-1971) stated that curiosity levels of gifted children obtained through untimed conditions appeared to have satisfactory validity while those of the timed conditions did not. The human factor of teachers' use or non-use of techniques was cited by Pugh (1969) as the primary reason for lack of significance on scores of groups of students who were tested for creativity. Roweton and Spencer's testing (1972) results showed no differences inherent of practice upon nonverbal creativity.

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