THE PSYCHOLOGICAL VULNERABILITIES OF CHILDREN OF VERY SUPERIOR INTELLECTUAL ABILITY

DISSERTATION

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INTRODUCTION AND LITERATURE REVIEW

A. Introduction

The empirical research reported in later sections of this paper focuses upon the psychological adjustment of a group of children having very superior intellectual ability. Preceding the research report is a two-part literature review. The first part considers many of the published studies of people who have made a lasting impact on their culture through their creative literary or scientific achievements. This literature has used labels such as "genius," "creative artist," "creative writer," and "eminent scientist." However designated, individuals earning such labels exhibit a greater incidence of various psychological difficulties than do less eminent individuals. The second part of the literature review considers in detail studies of psychological characteristics and adjustment in which the subjects were children of very superior intellectual ability.

The two parts of the literature review relate directly to the goals of the empirical study. The first part, concerning adult geniuses, helped to crystallize diffuse concerns about the development of children with very superior intellectual ability. It is included primarily to reconstruct for the reader this orienting activity. Because it relates only to adults identified by their achievements, it alone supports no hypotheses specific to any group of children identifiable by present psychometric techniques, including the sample participating in the
study reported below. The second part of the review surveyed all of
the available material regarding children of very superior intellectual
ability and led to specific predictions about the psychological
adjustment of the children who constituted the research sample.

The first part of the literature review suggests that adults exhibiting
outstanding achievements are, in a limited sense, psychologically
vulnerable, and are likely to have been so throughout their
development. The second part implies that children of very superior
intelligence often face difficult and sometimes insurmountable
challenges to the development of their potentials and abilities. This
is one similarity between the two groups. One of the generalizations
common to both parts of the literature review is that there are many
obstacles to turning abilities into achievements.

There are, of course, other similarities between adult geniuses and
children of very superior intellectual ability. Both groups possess in
abundance qualities considered positive in moderation—special talents
and general intellectual ability. They may experience, consequently,
ENough dislocation with their environments to make problems almost
inevitable. Indeed, most people—professionals and
non-professionals—seem to see such individuals as somewhat
"peculiar", be they children or adults. The research findings about
individuals of truly exceptional ability are as yet insufficient to lay
to rest these beliefs.
The focus of the present investigation is very superior intellectual ability in childhood. Information about the "creativity" of these children was not available, nor was it sought during the present study. This decision rested in large part on questions regarding the validity of measures of this elusive trait. Barron and Harrington (1981), critically reviewing the extensive literature on creativity which has largely utilized tests of "divergent*" cognitive processes (Guilford, 1967), concluded that "despite the 80-year history of such measures of productive imagination, the vitally important question of whether divergent thinking tests measure abilities actually involved in creative thinking is not at all easy to answer in satisfying detail. ...divergent thinking test scores have often failed to correlate significantly positively with plausible indices of creative achievement and behavior" (p.44). Furthermore, few of the studies of creativity reported the data necessary to determine whether the divergent thinking tasks measured any creativity-related variance beyond that measured by intelligence tests. The focus of the current study was, therefore, limited to groups of children defined by measuring general (convergent) intelligence.

These introductory remarks may not seem very surprising. What is surprising is their context. Little professional and parental attention has been devoted to identifying and fulfilling the needs that children of very superior intellectual ability may not share with children of normal intelligence. If providing optimally for very intellectually superior children is a goal, and it appears self evident
that it ought to be, then much more serious developmental study is needed. The present review and empirical study are a step in that direction.

B. The myth of the "misfit genius"

1. Introduction

Although the principal focus of this investigation was the development of children of very superior intellectual ability, a brief discussion of the stereotype of the "misfit genius" seemed an appropriate beginning. Images widespread in a culture are not capricious; furthermore, they structure the actions and attitudes of parents, educators, and psychologists responsible for offering to and withholding opportunities from children judged to be of exceptional intellectual ability.

2. Rudimentary ideas of genius

People of very superior intellectual ability are, by definition, not "normal," especially when ability is recognized through notable achievements (Freehill & McDonald, 1981). For example, how likely is Galton's description (see below) of genius, particularly its emphasis on irresistible, upwelling internal forces, to apply to the generality?
"By natural ability I mean ... a nature which, when left to itself, will, urged by an inherent stimulus, climb the path that leads to eminence and has the strength to reach the summit—one which, if hindered or thwarted, will fret and strive until the hindrance is overcome, and it is again free to follow its laboring instincts" (1892, italics added).

Cultures around the world have long recognized geniuses as different, and not merely different in a positive way. Paradoxically, differences, even in a positive direction, violate expectations and tend to acquire a somewhat negative loading. In one sense, ancient folk beliefs that geniuses are in touch with the spirit world (Hirsch, 1931) are positive. But primitive people usually also have beliefs that the mentally ill are in touch with the spirit world (e.g. "spirit intrusion," Bourgignon, 1976, p.48; Kiev, 1964). When people have a poor grasp of the critical variables that distinguish phenomena, superficial similarities often lead to overgeneralization. In this case, the overlap of primitive models, one accounting for illness and one accounting for genius, may have biased later observations of the association between genius and psychological difficulties, resulting in their being interpreted as due to organic factors.

Specific cases of disturbed geniuses fascinated many people during the last half of the 19th century (for historical discussions, see Albert, 1980a, pp.731-732; Martindale, 1971; and Witty & Lehman, 1930). Were the cases representative? The popular belief became a fashionable scientific question. One theory, which maintained that they were
representative, and that genius derived from pathology (Lombroso, 1891) had the beneficial consequence of provoking many descriptive reports. Ellis' (1904) is typical. He examined biographical records of 1020 British persons of eminence. Four percent of his sample were identified as "insane," and a further 13% seemed to suffer from affective or personality disorders. Sixteen percent had been imprisoned, either for crimes or from deviations from norms of the society at that time.

C. Eminence in Art and Literature and Psychological Adjustment

1. Empirical studies

Later work, with better conceptual models, sampling methods, and data collection procedures suggested that different psychological disturbances existed among artists, writers, and scientists. Not all of them, however, could be considered geniuses. Nevertheless, the findings reported above regarding geniuses seem to apply to these merely eminent artists, writers, and scientists. For example, Juda (1949) interviewed in 17 years over 5000 people who knew 113 artists and 181 scientists. She observed in the records thus obtained an incidence of psychosis and psychoneurosis "in a frequency ten times the incidence of the average population" (p. 307). The artists and writers seemed to exhibit more of the psychotic symptoms. The scientists exhibited more of the neurotic symptoms.
This literature is fairly extensive (Andreasen, 1975, 1978; Andreaseu & Canter, 1975; Galton, 1892; Ellis, 1904; Juda, 1949; Lange-Eichbaum, 1931; Myerson & Boyle, 1941; Walberg, 1978, 1981), yet the studies seem to converge. Andreasen's (1978) summary seemed worth quoting:

...whatever type of diagnostic system is used, the creative person whose talent is expressed through artistic achievements, especially when notable recognition is attained, seems to have more psychopathology than would be expected from population norms (1978, p.119).

2. Related studies

Studies with less eminent individuals also provided interesting background information. For example, highly creative persons often gave responses to projective tests which resembled those observed in psychiatric patients (Dudek, 1970; MacKinnon, 1962). In studying writers, Barron (1963,1969) observed elevated MMPI scores on four of ten clinical scales, 2 (depression), 3 (hysteria), 6 (paranoia), and 8 (schizophrenia). More than half of the writers also described visual hallucinations, mystical experiences, and a periodic sense of overwhelming desolation. Drevdahl and Cattell (1958) observed that the artists and writers whom they studied were "not well adjusted" but manifested "divine discontent."
C. Eminence in science and psychological adjustment

1. Introduction

The psychological disturbance attributed to geniuses included the full range of difficulties. Some writers have focused on bizarre behavior (e.g. Lombroso, 1891), others upon moderate to severe depression and alcoholism (Andreasen, 1975, 1978; Andreasen & Canter, 1975). The more severe pathological descriptions applied most frequently to creative artists and writers. In eminent scientists, social relationships appeared to suffer, whereas pathologies other than depression and neurosis went unmentioned. This literature is considered in the sections immediately below.

2. Empirical findings

One after the other, empirical reports of the backgrounds and personalities of eminent research scientists document a pattern of intellectually rather than socially oriented energy investment. Yoder, in his biographical study of 50 eminent men, stated,

I have been forcibly struck with what may be called solitude in the lives of these great men. Either by nature or by opportunity, they thought a great deal alone (1894, p.154).

Terman's (1954) monograph reports that other groups of highly gifted individuals made a better showing on indices of sociality than did scientists. Particularly among eminent biologists and physicists,
social and sexual development tend to be retarded and sometimes incomplete, even into middle age (Roe, 1951a, p.26; 1951b, p.185; 1952, p.25). Mitroff (1972, 1974a, 1974b; Mitroff & Fitzgerald, 1977, p.671) observed in his sample of scientists associated with the Apollo moon mission that only two mentioned markedly positive attitudes toward other people. The attitudes of the remaining twelve scientists ranged from neutrality, skepticism, and ambivalence to outright pessimism.

3. Developmental considerations

It should be recalled that this review is intended to provide points of departure for the study of children. Retrospective accounts of the early relationships of these adults are therefore particularly relevant. The general indifference to close personal relations is reported to be of long standing (Roe, 1951b, p.226). Boyhood is frequently recalled as a period with few friends and concentration on intellectual interests (Chambers, 1964; Eiduson, 1973, p.8; Roe, 1953, p.48). This is hardly surprising in light of the considerable data evidencing the predictive nature of childhood peer relations (Cowen et al., 1973; Hartup & Lougee, 1975; Roff & Sells, 1968; Wirt, Winokur, & Roff, 1970, 1972, 1974, 1975).

Periods of outright pain appear to have punctuated development. Roe thought numerous the scientists' spontaneous expressions of isolation in childhood, and she was struck by their continuity. Typical remarks included:
"I have always felt like a minority member."
"I was very much an isolated person."
"I was always a couple of years younger. I was never
one of the group."
"I was always lonesome. The other children didn't like
me. I didn't have friends. I was always out of the
group. Neither the boys nor the girls liked me. I
don't know why, but it was always that way. I can see
the remnants now... (1951b, p.231)."

McCurdy (1957), in his study of childhood patterns of genius (those in
the Cox [1926] study whose estimated IQs exceeded 160), emphasized "very
great dominance of adults in the lives of these children, and their
isolation from contemporaries outside the family and sometimes within"
(p.538). Goertzel and Goertzel (1962) provided a less systematic
portrait but similar pattern of factors in the lives of 400 eminent
individuals, and presented three current case illustrations
(pp.281-293). Wiener's (1953) autobiography, to list just one datum of
this type, gave a moving account of loneliness and rejection, gaucherie,
and feelings of isolation.

F. Tentative explanations

The literature on eminent adult artists, writers, and scientists (almost
all of whom are male), many of whom are recognized as geniuses, suggests
that, as a group, they exhibit more psychological difficulties and
social isolation than less eminent adult males. Why should eminence in
art, writing and science be associated with psychological abnormality
and social isolation? An answer to this question would help to orient
developmental research.
1. Constitutional variables

Part of the explanation may be constitutional. Despite the prevailing opinion that geniuses "early ripe, early rot" (Terman and Oden, 1947, p.1), most thoughtful writers (Hirsch, 1894; James, 1895, p.290-291; Ellis, 1904, p.227) have been skeptical of the claim that creative productivity is rooted in degenerative mentation (Lombroso, 1891). Yet it is possible that the underlying nervous structure of very creative persons might render them psychologically vulnerable (Kretschmer, 1931; Martindale, 1971). These hypotheses and observations are consistent with genetic interpretations of abnormalities which have been reported to run in the families of geniuses (Karlsson, 1976; McNeil, 1969, cited in Andreasen & Canter, 1978). Very bright individuals may also possess underlying physiological differences. Some investigators (Ertl & Shaeffer, 1969; Henderson & Engel, 1974; McLeod & Peacock, 1977; Vogel and Broverman, 1964, 1966) have found heightened sensitivity of the sensory systems of very bright individuals. Persons with high verbal fluency have been shown to differ from individuals without such fluency in terms of electroencephalographic recordings (Calvin and Ojemaan, 1982).
2. Environmental variables

Another part of the explanation for the association of genius and difficulties may be environmental. Extraordinary intellectual ability and the vulnerabilities it may bring may interact with particular developmental contexts to produce psychological disturbance. Stresses of the type hypothesized above appear to exist. Albert (1978, p. 4) and Zorbaugh (1951, p. 101) report that eminent people come from families anything but harmonious—ones which have built into the relationships, organization of roles, and levels of communication a good deal of tension, if not disturbance. "Special family positions" due to birth order or disruption in family structure generate exacting demands (Albert, 1980). Eminent people as children experience a significantly greater proportion of early family deaths (Albert, 1971; Cox, 1926; Eisenstadt, 1978). Social isolation is routinely observed (McCurdy, 1957; Roe, 1951b, p. 187), in part because of the marked discrepancy between the individual of very high ability and his/her age peers.

3. Requirements of productive behavior

Still another part of the explanation for the association of genius and psychological difficulties may have to do with the demands of productive behavior. If work is pursued "with the same passionate devotion that another would give to his love" (Freud, 1957, p. 77), personal intimacy is almost inevitably reduced (Albert, 1980b; Hirsh, 1931; Strodtbeck, 1958). The inclination to seek this contact may also be reduced. In
theory, sublimating libidinal gratifications in order to function at the peak of creative potentials may be necessary (Eissler, 1961, 1963, 1967; see also McCurdy, 1958, pp.5-11). This process would divert energy from aggressive and libidinal channels, which typically take other people as their objects.

E. Extraordinary giftedness and psychological adjustment

The foregoing discussion has been presented entirely to provide a context for the next part of the literature review, from which issued the empirical study reported below. This first portion of the literature review has examined only individuals who had achieved eminence. There is good reason to believe that many others had the capacities to achieve greatness, but never made it. Only prospective study of many children "at risk for greatness" can uncover the reasons for its withering. Unfortunately, we cannot as yet identify such children. Yet children similar to geniuses, at least in terms of very superior intellectual potential, are available for study. Another perspective on the issue, then, is derived from the literature regarding the development of individuals identified as extraordinarily intellectually gifted early in their lives.

1. Definition of extraordinary intellectual giftedness

Which children have extraordinary intellectual ability? Assignment by psychometric criteria has much to recommend it, and such assignment has been employed frequently in the literature. The precise cutting points
have varied from IQ 150 to 200 (Albert, 1976; Austin & Draper, 1981; Hollingworth, Terman, & Oden, 1940; Robinson, 1981). Regardless of the method used, the intention of the review was to uncover all studies of children not merely intellectually gifted, but extraordinarily so.

The situation of the child of very superior intellectual ability needs to be considered in the context of findings about children with a more moderate level of intellectual giftedness. This context must begin with an acknowledgement of the importance of the pioneering work of Louis Terman, which has been repeatedly replicated. In brief, Terman's work appears to establish that social skills are positively, not negatively, correlated with superior intellectual ability (Getzels and Dillon, 1973, p.694; Carroll and Larrington, 1974; Koury and Appel, 1977).
2. Deviation and detrimental sequelae

The research suggesting that psychological adjustment and intellectual ability are positively correlated rarely focused on extraordinarily intellectually gifted children. Such children are few in number and difficult to identify, and few investigators saw any reason for undertaking the difficult search. Leta Hollingworth's work was an exception.

The literature that exists suggested that extraordinary intellectual giftedness may result in detrimental encounters with typical childhood environments. For example, lack of challenge at school, with its attendant frustration, boredom, and potential for provoking problem behavior is common (Bridges, 1973, 1975; Dvorak, 1923; Hollingworth, 1939; Jackson, Krinsky, and Robinson, 1977; Terman, 1915,p.536). It typically leads to children's setting low performance standards and failing to exercise their talents (Bridges, 1969, 1973, 1975). Extraordinarily bright children are often out of step at school either intellectually or socially (Pritchard, 1951; Roedell, Slaby, and Robinson, 1980; Zorbaugh, Boardman, and Sheldon, 1951), and they are often segregated educationally (George, Cohn, and Stanley; 1979; Haier and Denham, 1974; Stanley, 1973; 1974; 1976). Marked age differences from their intellectual peers presumably may create vulnerabilities and exacerbate normal problems (Hollingworth, 1931; Robinson, 1981; Strang, 1951).
Khoury and Appel (1977) detailed a partial list of hypothetical problems (they labeled them "typical problems"), including underachieving and dropping out of school, making educational and vocational choices out of line with abilities, being expected to act like a "miniature adult", lacking understanding of the nature of their own giftedness and feeling different from others, suffering imbalance between social and emotional development and intellectual development, facing challenge and achievement pressures and negative attitudes and stereotyping by others, and seeking acceptance by masking talents and acting out.

3. The empirical literature to 1958

Most contemporary general textbooks in the area of giftedness included reservations about the social and emotional adjustment of the extraordinarily intellectually gifted child. These reservations were usually restatements of Leta Hollingworth's intuitively appealing, immensely influential and, unfortunately, nearly unique clinical work. Other empirical research in the area was scanty. Strang (1958; reprinted in Cruikshank, 1963), twenty-five years ago, cited only half a dozen studies (Jenkins, 1943, 1948; Hollingworth, 1942; Tsanoff, 1949; Juda, 1949; Terman and Oden, 1947). Four of these studies were inadequate for making statements about the early development of extraordinarily intellectually gifted children. The Tsanoff book presented no original data. The Juda study, already described, did not, in the English translation, furnish any information
about the childhoods of the eminent individuals.

Jenkins (1943, 1948) did not detail the development of his 18 cases of Negro children testing above IQ 160. Consideration of the social adjustment, emotional maturity, and developmental histories was to be deferred to a later publication (Jenkins, 1943, p.164, paragraph 2), a paper apparently never published. Jenkins (same paragraph cited), referring to social adjustment and emotional development, did state, "The generalization may be made that the Negro child of extremely high IQ manifests essentially the same characteristics as the white child of extremely high IQ." He was presumably referring to the earlier Hollingworth (1926, 1931, 1932, 1942) publications and that of Hollingworth, Terman, and Oden (1940), all of which stressed concern about these children in these areas.

Hollingworth (1926, 1929, 1931, 1942; Pritchard, 1951) chronicled altogether 12 original case studies of children scoring at least 180 or above on the 1916 Stanford Binet. These children had problems. Many of them suffered from feelings of inferiority connected with size and strength, for typically they were accelerated in school, and they naturally chose older children as friends (p.256). The children were seldom selected for leadership roles by their older intellectual peers, and this detrimentally affected their self esteem (p.257). Sexual adjustment suffered special strains, particularly for the boys (p.258). School problems and difficulties in developing adequate work habits were very common. The children were, further, faced with the trying
task of "suffering fools gladly."

Hollingworth discussed the tendency to become isolated as a special problem. Her children typically strove to play with others, but they were defeated by differences in interests and vocabulary, or by their desire to organize activities along lines unattractive to other children. Forms of solitary play developed and threatened to become fixed. The characteristic deep interest in reading furthered isolation. She concluded that, "The tendency to become isolated is one of the most important factors to consider in guiding the development of personality in highly intelligent children." All of these problems, she felt, were most acute during the ages four through nine years (Hollingworth, 1931, p.282).

Burks, Jensen, and Terman (1930) found that members of the intellectually gifted group whose IQs exceeded 169 tended to have "considerably more difficulty in making social adjustments than do the more typical members of the gifted group" (p. 183). Of 34 cases testing above IQ 170, 25 were evaluated on a five point scale of social adjustment. Nine, or 36%, fell into the two lowest categories, twice the proportion for the gifted group as a whole (p.175). Twenty-four, 71% of the 34 Ss were described by parents as "definitely solitary or poor mixers" (p.175).
During the middle teens the child of IQ 170 or above was especially likely to show some maladjustment (Terman and Oden, 1947, p. 287). Many of the subjects in the highest IQ group had "difficulties galore in social adjustment" during ages 7-12 (Terman and Oden, 1947, p. 288). Often in later life the Ss made a "deliberate choice to make good [their] social deficiencies by going all out" to develop socially (Terman & Oden, 1947, p.157). This choice was not altogether successful. After some perusal of the original Genetic Study of Genius data, Feldman (personal communication) reported that the group members "experienced more turbulence in their lives than the group at large, and their achievements did not meet the expectations one might have had for them."

Despite these remarks, Terman and Oden's generalizations about the intellectually gifted sample as a whole received much more emphasis than did their qualifications in the cases of those testing above IQ 170. They concluded, rather surprisingly, that subjects of highest childhood IQ were not sharply differentiated in adult life from subjects who tested considerably lower, and that, on the average, "those of highest IQ accomplish more and are equally well adjusted" (1947, p.295). Yet even in college--hardly a demanding setting--the records of 25% were only fair or poor (cited in Zorbaugh et al., 1951, p.99).
4. The remaining empirical literature

a. Introduction

In the 25 years since Strang's (1958) review, surprisingly few studies of personality, psychological adjustment, or social behavior of extraordinarily intellectually gifted individuals were published. Appendix 3 contains all known studies, including unpublished dissertations, of more than three individuals whose mean IQ exceeds 150. This IQ level is at best a compromise; one could not go any lower and consider the population sampled to be extraordinarily intellectually gifted; one could not go any higher and retrieve from the literature a significant number of studies. Austin and Draper (1981) confirmed that there have "hardly been studies."

An introduction to these studies is in order. The Hollingworth series has already been discussed. Other work has recognized the difference between extraordinarily and moderately intellectually gifted children, but has provided no empirical data regarding adjustment (Albert, 1978, 1980; Austin & Draper, 1981). Four studies employing only group comparisons have presented few, if any, unfavorable differences between highest IQ groups and other comparison groups (Barbe, 1964; Lehman and Erdwin, 1981; Weiss, Haier, & Denham, 1976; Haier & Denham, 1976). [The last two studies were included because the subjects were highly intellectually gifted, although criteria other than IQ score were used.] Three studies, however, did present such differences in terms of group comparisons (Burt, 1970; Freeman, 1979; Painter, 1976).
Of fifteen studies in which it was possible to examine data in terms of a specific subset within the intellectually gifted group who were highly intellectually gifted, only one (Hollingworth and Rust, 1937) did not find that a sizable minority, usually more than would be expected from population norms, exhibited or reported clinically noteworthy behavior (Anastasiow, 1964; Burks, Jensen, and Terman, 1930; Crowder and Gallagher, 1957; Feldman, personal communication; Gallagher, 1958; Hollingworth, 1926, 1929, 1931, 1942; Jenkins, 1943; Kincaid, 1969; Neville, 1937; Selig, 1959; Terman and Oden, 1947; Zorbaugh, Boardman, and Sheldon, 1951). Because the highly intellectually gifted are a minority of a intellectually gifted population, however, such findings usually did not distort the group mean.

b. The studies

Austin and Draper (1981), after reviewing the literature on peer relations of the intellectually gifted, noted that highly intellectually gifted children may possess traits which adversely affect social acceptance. They cautioned that those with IQs less than 150 may be popular with peers, but that those with IQs greater than 150 may fall into less popular categories.
Hollingworth and Rust (1937) studied 36 boys and 19 girls whose mean age was 18 years six months. The range of IQs in the sample was 135-190, with a median of about 153. The Bernreuter Personality Inventory was used as the dependent variable. A table listing scores for each subject permits one to conclude that the 12 subjects with IQs exceeding 164 compared favorably to the group as a whole. The Bernreuter, unfortunately, while it might have been the instrument of choice in the mid-30s, is psychometrically destitute according to Becker (1965) and Veldman (1965).

Barbe's (1964) sample with IQ scores ranging from 148-174 showed good adjustment in terms of a variety of teacher-, parent-, and self-rating indices, virtually the same as that exhibited by a comparison group of moderately intellectually gifted children with IQs ranging from 120-135. Frierson (1969, p.34) stated that Barbe (1964) found, in 65 Ss with IQs exceeding 168, many more "behavioral irregularities."

Unfortunately, our own inspection of the original material did not appear to support Frierson's claim.

Lehman and Erdwin (1981) compared sixteen third graders (mean Stanford-Binet IQ= 152.6; range of IQs= 141-165) to a group of age peers and a group of "mental peers" from the sixth grade. The California Psychological Inventory (Gough, 1957) and an inventory of children's social attitudes and values were the primary measures. The intellectually gifted children were more like older children matched for mental age than their chronological age mates on measures of
personal and social adjustment, and they reported more positive feelings about themselves, more maturity in interactions with others, and better relations with others.

Weiss, Haier, and Keating (1974) studied the first 35 seventh and eighth grade boys to participate in the highly select Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University. The California Psychological Inventory (CPI) was administered to each child. The intellectually gifted group was compared with another intellectually gifted high school group and with a normal high school group. The most salient finding was that the mathematically gifted boys were, as a group, not interpersonally ineffective or maladjusted. They were, rather, more dependable, more perspicacious in dealing with the rule structure of the environment, and more likely to take a firm and upright stance concerning moral matters than the other two groups. On the CPI they were characterized by flexible and adaptable temperament and innovative, independent, and self-actualizing modes of achieving.

Haier and Denham (1976) administered the CPI, the Eysenck Personality Inventory (EPI), the Study of Values, Vocational Preference Inventory, and the Adjective Checklist to 71 boys and 25 girls, ages 12 to 14, who had scored extremely high on the SAT-Mathematics. As a group the mathematically precocious boys and girls were interpersonally effective and socially mature. Both boys and girls were self confident and well adjusted.
The above studies do not provide much evidence of disturbed adjustment among the subjects. There is a difference, after all, between adjustment variables, including peer relationships, and psychological traits. Again, differences appear at the group level only about half of the time, unless, returning to the earlier part of the literature review, groups are chosen on the basis of achieved eminence.

Furthermore, the subjects considered here barely approach the threshold at which marked differences in social behavior are observed (IQ > 150/160). The IQ mean of the SMPY samples (Weiss et al., 1974; Haier and Denham, 1976) were unpublished. The studies next presented were not as vulnerable to these criticisms.

Freeman (1979) studied 70 children (mean Stanford-Binet IQ=147.1) whose parents joined a national organization for gifted. They were compared with children from the same school (mean IQ=134.3) matched for sex and age and "ability" (on the Ravens Progressive Matrices), and with students randomly selected from the same classes (mean IQ= 119). The fact that the children were initially matched on Ravens' scores, and that Binet IQ scores were only later obtained, accounts for the discrepancy in terms of ability by which the samples were initially "matched." Freeman was particularly interested in examining the consequences of parental behavior upon their children, but the data she presented was relevant to the concerns of this review. Over three times as many target as control parents found their children "very difficult in general. "Difficult" was sometimes a euphemism for
impossible" (p. 156). Nearly five times as many target parents as controls described their children as "very emotional" and twice as many described them as "particularly sensitive." Nearly three times as many target as controls children were said to have difficulty with sleep, and six times as many were said to sleep significantly less.

Target children had far fewer friends than the controls; 7% had no friends at all, compared with 1% in each of the control groups. The friends the target children did have were described more often as being older. The higher the IQ scores, the fewer friends. Social adjustment measures showed these intellectually gifted children were less well adjusted and more difficult to bring up, even compared with "intellectual peers." They also had more personal and emotional problems.

A "high-IQ" group was constituted of children from all three groups with IQs exceeding 140. Compared to a group of more moderately intellectually gifted children also nominated by parents, no problems were found to be particularly associated with high intelligence per se. The data permit do support the conclusion that the most intellectually gifted sample had a substantial number of problem children. Within the high-IQ group maladjustment was not related to IQ, suggesting that it was randomly distributed among the children. Since 64% of the 25 maladjusted children are in the high-IQ group, and since 47% of the high-IQ children had IQs greater than 160, it can be estimated that about eight of the children with IQs greater than 160, or nearly 25% of
the total group of children with IQs greater than 160, were maladjusted in some sense.

Kincaid (1969) initiated in 1963 a longitudinal study of 561 pupils in grades kindergarten through sixth grade who had scored IQ 150 and above on the Stanford-Binet. (This incidence of exceptional intellectually giftedness is about twice the number expected in a normal distribution.) Eleven girls and seven boys scored above IQ 180. A large percentage of the group was not achieving to expectancy, in spite of the fact that their parents believed the children were enthusiastic in their attitude toward school. In addition, about 20% of the parents felt that emotional problems existed, and about 10% of the children were described as having difficulties in family living (p.266). Without a comparison group it was difficult to know what to make of this finding.

Zorbaugh et al. (1951) reported their impressions of more than 100 children scoring IQs greater than 170. These children were a subset of the 6000 seen at the New York University Counseling Center for Gifted Children. Observations "strikingly confirm those of Terman and Hollingworth" (p.99). Many showed evidence of maintaining their high level of functioning at increasing emotional cost. The authors believed that diminution of social interest, creativity, and originality reflected an increasing absorption of emotional energies within themselves, which in turn resulted from an increasingly stressful social adjustment. The authors concluded, "We find that highly gifted children as a group fail to fulfill the extraordinary promise of their early
years. It is our belief that this failure is not due to inherent instability, but to the emotional cost of the acute problems of adjustment they characteristically face in the course of their development" (p.105).

Selig (1958) identified 27 children scoring four or more standard deviations above the mean (mean 1937 Stanford Binet IQ=179.4). Clinical judgments of the children were made on the basis of the Rorschach Inkblot Test and by an independent global assessment by a social worker. The adjustment classifications showed a reliability of .82 between the methods. Forty-four percent were considered adjusted and 55% maladjusted.

Were it not for the individual case study of these children and the use of the Rorschach as a differential diagnostic tool in personality evaluation, the generalized Rorschach findings for the group being congruent with Davidson's and Terman's data would have continued to give a misleading picture of healthy adjustment for the total group. The high incidence of maladjustment was five times the estimated incidence among school children generally. A final conclusion must remain guarded until sufficient numbers of highly gifted children have been studied to warrant more positive determination (1959, p.3374)

Neville (1937) studied the first 78 children administered the Binet-Simon at the Psychological Centre for School and Home. The mean IQ of the children was not presented, although it must have been high. The range of scores was from 140 to 180+. Neville presented several tables that permit partial extraction of information pertinent to a high IQ group. Thirty-five children of the total 78 exhibited some form of
problem. To 25 children whose IQs are determinable from the report were attributed specific difficulties. Eight of the 35 children with IQs greater than 150, or nearly 25% of subgroup, were so affected. The problems mentioned included

uniformly poor work
completely wrapped up in himself and his home, resenting all attempts to make him mix with other boys
opinionated and unpopular, smarting under the feeling that nobody likes her
extremely interfering and bumptious, completely upsetting his group
too tied to her mother to make other social contacts
overweighted with care and suffering at times from fits of depression, being overwhelmed with doubt about himself (1937, p.).

Unfortunately, this is a conservative estimate of difficulties, as 10 other problem cases cannot be assigned to specific children, including the "serious neurotic cases."

Crowder and Gallagher (1957) studied second to fifth graders (N=35) with Stanford-Binet IQs greater than 150. Sociometric ratings of a randomly selected sample of classmates were compared with the target sample. The target sample was significantly more popular according to both sociometric and teacher ratings. A "sizable minority" of these children were, however, "not doing well socially." More of the Ss in the elementary grades than in the primary grades exhibited problems. Gallagher (1958) also examined peer acceptance of those with IQs greater than 165 (N=15). He found a nonsignificant trend indicating that these children were less popular than those children with IQs 150-164 (N=39).
Painter (1976, cited in Austin and Draper, 1981) compared high-IQ first graders (Stanford-Binet IQs greater than 141, n=73) with 64 children of "average bright" IQ (mean IQ=116). High-IQ children stated a preference for being with other children as often as did controls, and indicated as often that they had a least one other special friend. Parents' responses indicated that twice as many highly gifted children as controls preferred older friends. (This observation also appears in case study materials [e.g. Hollingworth, Garrison and Burke, 1922; Terman and Fenton, 1921]). Teachers rated the high-IQ children as less popular and more socially isolated than the controls, but teachers would not be in a position to observe social relations with older children who, as reported by the parents in the same study, were important social contacts.

Two other studies deserved passing attention. Anastasiow (1964) divided into "high achievers" and "low achievers" 23 children with Wechsler Intelligence Scale for Children (WISC) IQs exceeding 145 or Stanford-Binet IQs exceeding 155. The number of children assigned to these groups is unknown. Low achievers had significantly lower self-concept scores on the Sears Self Concept Test (Sears, 1964) in the areas of physical ability, social relations with boys and girls, and total self concept. The data suggested that a substantial number of extraordinarily intellectually gifted children were underachievers in some sense and that this had a negative effect on various components of their self concept.
Burt (1970) noted that among the children in his sample with IQs greater than 150, maladjustment tended to be higher in severity and frequency. Burt's misrepresentation of his data in studies of heritability (Hearnshaw, 1979; Jensen, 1981), unfortunately, make this data questionable as well.

5. Summary

Let us summarize again the studies of extraordinarily intellectually gifted children. When dependent variables were examined in terms of differences of group means, more than half of the studies uncovered unfavorable differences between extraordinarily intellectually gifted and moderately intellectually gifted children or normal controls. With one exception, 14 studies which discussed subsets of the extraordinarily intellectually gifted group found a significant minority (20-25%) with problems of some sort. These figures are substantially higher than those observed in almost all epidemiological studies of the middle childhood age group, which range from 5.7% to 16% (Achenbach and Edelbrock, 1981; Kastrup, 1976; Pringle, Butler, and Davie, 1966; Rutter, Tizard, and Whitmore, 1970).

For purposes of comparison, consider the data provided by Hitchfield (1973, p.23) from analyses of the Bristol Social Adjustment Guide administered to an representative children born in England. Problems among moderately intellectually gifted children (mean IQ for boys was
131; for girls, 126) were observed as 3% versus 12% for control children at age seven, and at age eleven the intellectually gifted sample evidenced problems of adjustment at the rate of 7%. No figures for control children were given at this age.

6. Case study reports

Case study reports of extraordinarily intellectually gifted children have peppered the literature (Bridges, 1975, pp.10-11; Bush, 1914; Burks et al., 1930, pp.266-271; Dvorak, 1923; Garrison et al., 1917, 1922; Gesell, 1922; Goldberg, 1934; Hildreth, 1954; Hirt, 1922; Jones, 1923; Langenbeck, 1915; Ogilvie, 1973; Pringle, 1970, pp.61-64; Root, 1921, pp.82-91; Rusk, 1917; Terman and Fenton, 1921; Waddle, 1924, pp.187-207; Witty and Jenkins, 1935; Zorbaugh et al., 1951, pp.86-87). Few reports remarked on the issues discussed in this paper, but those few that did (Bridges, 1975; Hildreth, 1954; Jones, 1923; and Dvorak, 1923) provided anecdotal support for the statements made above. For example, note Jones' brief descriptions of three of her four extraordinarily intellectually gifted children (the fourth is a two year old).

Florence (age 9-3; IQ=181): ...has an aura of self-sufficiency which is far from attractive. She is not a popular child, either with teachers or with pupils, a natural result of an honest and well-justified feeling of superiority (1923, p).

Hilda (age 10-9; IQ=181): ...she will not be torn from her books to play with children; in fact, she dislikes the society and games of other children because, physically, she is unable to compete with them (1923, p).
Ruth (age 8-11; IQ 175): ...she is inclined to reserve--indeed seems somewhat introverted. She is not popular with other children, does not enjoy their society, and, far from being a leader, seems to have a well defined sense of inferiority (1923, p.).

Hildreth’s (1954, p.257) Case A (10-6; IQ=183) was described when nearing age 11 as a "curious mixture of keen intellect and infantile emotional reactions." Dvorak’s (1923) and Bridges’ (1975) boys show the types of school difficulties encountered by extraordinarily intellectually gifted children.

G. Points of Departure for the Empirical Study

The second part of the literature review strongly suggested that children of very superior intellectual ability may differ in several ways from normal children and from children of moderately intellectual superiority. In the first place, they seem to exhibit more psychological difficulties. These difficulties are not always of severe proportions, but they are significant enough that their parents report them to researchers. The children also seem to have a tendency to develop solitary recreational activities, often in spite of the desire to share in the activities of other children. Finally, the review seemed to suggest that such children may be very unlikely to meaningfully tap their intellectual potentials. This may exacerbate psychological difficulties in a child who feels like he or she ought to be more productive.
In short, children of very superior intellectual ability seem to be faced with particularly pressing problems. These areas were thought worthy of further investigation in a sample that was made available by the Child Development Research Group at the University of Washington. The report of this investigation is located immediately below.
II. The Empirical Study

A. Introduction

The Child Development Research Group (CDRG) at the University of Washington, inspired and directed until March of 1981 by the late Halbert B. Robinson, is the site of a series of large-scale research and service projects. These have included a longitudinal study of young gifted children, a preschool, consultation with the Seattle public school system, a diagnostic and counseling clinic, and a program for early entrance to the university, including a component interfacing middle or junior high school with the Early Entrance Program, and a research program directed at the adjustment of these young scholars in comparison with non-accelerated students. The projects' common theme has been the identification and nurturance of children with very advanced intellectual and academic capabilities.

In 1974 the Group instituted a longitudinal study of preschool children with distinctively advanced cognitive skills (see Robinson, Jackson, and Roedell, 1977, 1978). A pilot study formulated initial project goals, enlisted a few subjects, selected instruments, and formulated a longitudinal design in the two years ending September, 1976. In the next three years, approximately 500 children were recruited. During the two years ending in June, 1981, the Project continued the assessment of subjects.
B. Hypotheses

The CDRG longitudinal study focused on the structure and development of early cognitive abilities, and it provided the subject pool for the current study. The purpose of the research reported below, however, was to examine relationships between psychological adjustment and intellectual development. The first part of the literature review suggested that persons of very superior intellectual ability may possess a variety of psychological vulnerabilities, and that more often than would be expected in other groups, these vulnerabilities actually result in difficulties. The second part of the review documented this finding as a specific risk for children of very superior intellectual ability (Burks, Jensen, and Terman, 1930; Burt, 1970; Freeman, 1979; Gallagher, 1958; Gallagher and Crowder, 1957; Hildreth, 1954; Hollingworth, 1926, 1929, 1931, 1942; Jones, 1923; Kincaid, 1969; Neville, 1937; Selig, 1958; Zorbaugh et al., 1951). The expectation derived from the studies of highly gifted children is that problems will be present in 20-25% of the highly gifted children versus 5-10% of the moderately gifted group. The following hypothesis, consequently, appeared worth testing:

HYPOTHESIS ONE: A greater percentage of children from the extraordinarily intellectually gifted population than from a moderately gifted population will evidence psychological disturbances.
The first part of the literature review suggested that persons of very superior intellectual ability may tend to be socially isolated. The second part of the review documented this expectation as a specific risk for children of very superior intellectual ability (Burks, Jensen, and Terman, 1930; Freeman, 1979; Hollingworth, 1926, 1929, 1931, 1942; Painter, 1976). Although some of the literature suggested that highly gifted children exhibit troubled relations with other children, there was no reason to think that this problem flowed from their high ability. It may be, in some children, a consequence of defeat in seeking out, among age peers, appropriate children for friendships. The isolation is, apparently, not an isolation of disturbance, but an isolation due to difficulties in finding many persons with whom to share one's interests. This is one reason not to expect the peer relations of the children of very superior intellectual ability to be more disturbed than those of children of moderately superior intellectual ability. Furthermore, since these children tend to internalize their discomforts rather than externalize them (Hollingworth, 1942), there was still less reason to look for disturbance in peer relations. Hence, the literature did not appear to adequately support the hypothesis that these children would exhibit more difficulties than the moderately gifted control children in their peer relations, although it was clear that greater isolation should be expected. The following hypothesis, then, appeared worth testing:

**HYPOTHESIS TWO:** A greater percentage of children from the extraordinarily intellectually gifted population than from a moderately gifted population will evidence the greater isolation from age peers.
The literature review strongly suggested the generalization that highly gifted children, as a group, fail to meet the performance expectations that one might have for them, and that they fail as well to show any superiority in terms of compensating desiderata such as happiness and personal comfort (Anastasiow, 1964; Bridges, 1973, 1975; Dvorak, 1923; Feldman, personal communication; Kincaid, 1969; Zorbaugh et al., 1951). The following hypothesis was suggested:

HYPOTHESIS THREE: A greater percentage of children from the extraordinarily intellectually gifted population than from a moderately gifted population will show signs of inadequately utilizing their gifts.

C. Method

The original CDRG longitudinal study was not designed to address the hypotheses derived from the literature surveyed in Chapter I. The data collected were primarily demographic and cognitive. Emotional and social behaviors and personal characteristics were minimally surveyed. The task of this research, which employed a subset of subjects participating in the longitudinal study, was to gather and analyze data concerning non-intellective factors affecting the utilization of abilities and the obstacles to such utilization. The method of the research is described immediately below.
1. Subjects (note 1)

The subjects of the CDRG longitudinal study on the early identification of intellectual precocity were drawn from the Puget Sound region, mostly from Seattle and its environs, during the years 1974 through 1979. Publicity for the project was generated through newspaper articles, letters to area educators, scattered radio and television coverage, and word of mouth in the University of Washington community. Parents were encouraged to contact the Group if they believed their child to be highly advanced in any area of intellectual ability, and were given criteria by which to judge such precocity. Once the parents had completed a lengthy questionnaire documenting their child's precocity, intelligence testing was scheduled. Most of the 509 children in the study were tested first between the ages of two and four years. The mean age at the time of the first testing was three years five months. The majority of children were retested at one to two year intervals after first contact, with the final round of testing completed in August, 1981. Parents were periodically asked to fill out questionnaires regarding school progress.

The CDRG sampling methods were different from those of previous studies. Although many eligible families were probably not reached by the publicity efforts, the choice to participate was entirely up to the parents and children. With the exception of the 1978 cohort screened on the basis of the parent questionnaire, virtually all individuals whose parents had sufficient faith in their child's precocity and the perseverance to fill out a lengthy questionnaire were accepted for
testing.

It would be difficult to determine the population which the CDRG sample represents. The recruitment methods were efficient for locating a large number of very able preschool children. Test results were consistent with the expectation that parents are able to recognize extraordinary abilities in their children and are willing to devote considerable effort to participate in a demanding research project. However, it can in no way be claimed that all segments of the Seattle community were evenly represented.

The children in the CDRG study proved very bright. All cohorts tested had both a mean IQ close to 130 and a variance no smaller than that of the standardization sample (Stillman, 1982, p.8). A broad range of assessment procedures was used to document their cognitive abilities, including the short form of the Stanford-Binet (Terman and Merrill, 1973, starred items only), the forward and backward digits from the Numerical Memory subtest of the McCarthy Scales of Children's Abilities (McCarthy, 1972), WPPSI/WISC Block Design and Mazes subtests (Wechsler, 1967), and math and reading subtests of the Peabody Individual Achievement Test (Dunn and Markwardt, 1970).

The subjects included in the investigation reported below were a subset of those participating in the longitudinal study. The choice of criteria to define the set was subjective and somewhat arbitrary. The IQ score of 164, four standard deviations above the mean, according to
the normal curve occurs with a frequency of three individuals in 100,000. In the CDRG longitudinally study sample it was clear that the score occurred more frequently than that. A sample of children scoring above this IQ criterion sufficient to permit statistical analyses could be identified within the CDRG longitudinal study. All children participating in the longitudinal study who obtained one or more IQ scores greater than 163 (n=38; 22 girls and 16 boys) were invited to participate.

A moderately gifted group appeared preferable to a group of average children for purposes of control. The literature review appeared to support the generalization that such children tend to evidence favorable adjustment and manage their talents effectively. With this control group drawn from the same sources, fewer differences between the samples in family background, family aspirations, and educational opportunities were expected than would be expected with any other control group. Unfortunately, at the time of the selection of the samples, it was not fully appreciated that this group of children, because of their referral by parents to an agency identified as working exclusively with gifted children, might be contaminated by the findings of an increased level of adjustment difficulty such as those reported by Freeman (1979) for children whose parents voluntarily joined an association for gifted children, versus equally gifted children whose parents did not. This complication is discussed both in the section reporting results of statistical analyses and in the section discussing the results.
The children comprising the highly gifted group were all non-black, therefore the moderately gifted control group was constituted from non-black children whose scores on the Stanford Binet were between 120 and 140 and whose last measured IQ score equalled or exceeded 125 but did not exceed 140. All such children (n=61; 31 girls and 30 boys) were invited to participate. Later, a girl with a terminal illness and a boy with severe cerebral palsy were eliminated from the control sample. The cutting scores delimiting the control group were as arbitrary as those marking the target group. Such children, however, fell into a ten point fan around the mean of the longitudinal cohorts.

Altogether, 32 highly gifted children (82%) and 49 of the moderately gifted control children (80%) participated in this investigation. Unfortunately, the battery was so large and time-consuming that only in rare cases were all of the instruments available for analysis. The Longitudinal Study Follow-up Questionnaire was completed by 95% of the subjects, but response rates were lower for the other instruments. Eighty-two percent of subjects completed the Child Behavior Checklist and the Parent Vineland, 73% the Teacher Vineland and the Conners. Eighty-three percent of the children completed the Piers-Harris and 89% completed the Children's Friendships Questionnaire. These data constituted the raw material for the analyses and results discussed below.
The children participating in this portion of the longitudinal study ranged in age from 5.58 to 10.58 years. The mean age of the highly intellectually gifted children was 7.96 (s.d. = 1.33) and of the control children was 8.31 (s.d. = 1.09) at the time when the questionnaires were filled out. The differences were not statistically significant (p = .50). Table 1 presents the age, sex, and IQ characteristics for all of the children in the two groups when they were approximately ages four and six years. These ages correspond to those for which the most complete data are available. Some children are not represented in the table because no IQ scores were obtained reasonably close to these ages.
Table 1
SUBJECT DESCRIPTIVE DATA

IQ Nearest Age 48 Months

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age</th>
<th>Age range (S.D.)</th>
<th>IQ Mean</th>
<th>IQ Range (S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Gifted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>13</td>
<td>44.69</td>
<td>38-54</td>
<td>4.29</td>
<td>163.08</td>
</tr>
<tr>
<td>females</td>
<td>18</td>
<td>46.61</td>
<td>32-59</td>
<td>8.23</td>
<td>158.94</td>
</tr>
<tr>
<td>total</td>
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<td>45.81</td>
<td>32-59</td>
<td>6.83</td>
<td>160.68</td>
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<tr>
<td>Moderately Gifted</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>22</td>
<td>43.54</td>
<td>32-57</td>
<td>8.14</td>
<td>129.41</td>
</tr>
<tr>
<td>females</td>
<td>18</td>
<td>42.68</td>
<td>32-54</td>
<td>7.71</td>
<td>127.47</td>
</tr>
<tr>
<td>total</td>
<td>40</td>
<td>43.39</td>
<td>32-57</td>
<td>7.83</td>
<td>128.82</td>
</tr>
</tbody>
</table>

IQ Nearest Age 72 Months

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age</th>
<th>Age range (S.D.)</th>
<th>IQ Mean</th>
<th>IQ Range (S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Gifted</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>12</td>
<td>73.33</td>
<td>66-80</td>
<td>3.98</td>
<td>166.75</td>
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<tr>
<td>females</td>
<td>17</td>
<td>71.65</td>
<td>56-84</td>
<td>7.10</td>
<td>168.76</td>
</tr>
<tr>
<td>total</td>
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<td>72.34</td>
<td>56-84</td>
<td>5.98</td>
<td>167.93</td>
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<tr>
<td>Moderately Gifted</td>
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</tr>
<tr>
<td>males</td>
<td>25</td>
<td>70.2</td>
<td>60-77</td>
<td>4.23</td>
<td>129.52</td>
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<td>females</td>
<td>21</td>
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<td>58-78</td>
<td>5.34</td>
<td>132.54</td>
</tr>
<tr>
<td>total</td>
<td>46</td>
<td>70.02</td>
<td>58-78</td>
<td>4.62</td>
<td>131.22</td>
</tr>
</tbody>
</table>

2. Instruments

Selection of instruments proved difficult. A search through the available literature began with a review of each measure listed in the eight Mental Measurements Yearbooks. Psychological Abstracts was searched back to 1975 under the headings of affiliation, egocentrism, interpersonal attraction, peer relations, social adjustment, and social
skills for citations that might include research instruments relevant to
the concerns uncovered in the literature review. Also reviewed was the
book *Measures for Psychological Assessment* (Ki-Taek, Cobb, and French,
1975), which lists 568 instruments under the following categories: peer
acceptance, social acceptance, affiliation, alienation, social approval,
interpersonal attraction, social behavior, social competence, self
concept, impulse control, locus of control, self control, personality
development, ego strength, group participation, group satisfaction,
inhibition, parent-child relations, pessimism, and purposiveness. Other
sources included the two volume *Tests and Measurements in Child
Development Handbooks* (Johnson and Bommarito, 1971), *CSE-RBS Test
Evaluations* (Hoepfner et al., 1972), and *Self-Concept, Theory,
Measurement, and Behavior* (Burns, 1979).

Many instruments were examined. Most were rejected for one or more of
the following reasons:

- Inappropriate for the age range of focus
- No reliability studies
- Too specialized
- Individual administration required
- Applicable only to case materials
- Interview or specialized material required
- Withdrawn from print, obsolete
- Unpublished thesis measures
- Sex
- Trained raters required
- Versions for different ages cut across the age group being studied.

The search yielded 16 measures, each of which met all of the following
criteria:
1. Provided information about utilization of talents, general adjustment, including both negative and positive behaviors; general development, including communication, daily living, and socialization skills; social skills, friendships; self concept.

2. Widely recognized in the literature, with acceptable norms, reliability and validity studies OR was the only instrument in a target area or was one of very few, all with inadequacies.

3. Could be used with children in grades 1-5 or ages six years to ten years.

4. Suitable for large scale administration and computer scoring.

5. Brief enough so that no more than two or three hours of a subject's time was involved in completing the instruments.

The last criterion necessitated the abbreviation of some of the scales (e.g. elimination of the motor skills subscale of the Vineland) and dropping other measures that might have supplied data of interest. Unfortunately, this guideline was not strictly followed. Instruments that appeared interesting at the time of the formulation of the research project were included, though it later became clear that they did not address in whole or in part the hypotheses derived from the literature review. Subjects complained about the time they had to invest. The result was that the rate of response was marginally acceptable for some of the instruments. These cases are discussed in the section presenting results.

The measures that emerged in the search and survived the evaluation were the following:
Child Behavior Checklist (Achenbach, 1978)
Vineland Adaptive Behavior Scales, Parent and Teacher Questionnaires (Sparrow, Balla, and Cicchetti, 1981)
Personality Inventory for Children, Social Skills Subscale (Wirt, Lachar, Klinedinst, and Seat, 1977)
Longitudinal Study Follow-up Questionnaire (developed for this study)
Middle Childhood Temperament Questionnaire (Hegvik, 1980)
Family Environment Scale (Moos, 1979)
Friends Questionnaire (developed for this study)
Piers Harris Children's Self Concept Scale (Piers and Harris, 1969)
Bialer-Cromwell Children's Locus of Control Scale (Bialer, 1961)
Conners' Teacher Rating Scale (Conners, 1969)
Teacher Rating of Peer Acceptance (Roff, Sells, and Golden, 1972)

Those that were retained in this study because they addressed in a significant way the hypotheses derived from the literature review are described below in more detail.

Parent Measures:

Child Behavior Checklist (Achenbach, 1978; Achenbach and Edelbrock, 1981)

This instrument consisted of 20 social competence items and 118 behavior problem items, the latter portion originally constructed for scoring behaviors reported in psychiatric records. Three pilot editions were tested and revised on the basis of item analyses and feedback from parents, clinicians, and paraprofessionals in child guidance clinics where the CBCL was used. The instrument provided an assessment of undercontrolled and overcontrolled child behavior problems.

Achenbach reported administering the instrument to mothers after a one week interval with test-retest reliabilities of .952 for behavior problems and .996 for social competence. Intiparent reliability was .985 for behavior problems and .978 for social competence for a sample of parents of 168 children
being evaluated in mental health settings. Longer term stability was assessed by computing intraclass correlations for CBCLs obtained from 12 mothers of non-referred children interviewed a three month intervals; the test-retest correlations were .838 for behavior problems and .974 for social competence.

Vineland Adaptive Behavior Scales, Parent Questionnaire (Sparrow, Balla, and Cicchetti, 1981)

This instrument was a revision of the Vineland Social Maturity Scale. It tapped the entire range of development, from birth to adulthood. The measure included those items which survived cultural changes; added many new items to replace those known to be deficient; used more satisfactory and current measures of reliability and validity; and was at the time of the research project undergoing collection of norms based on representative, nationwide samples. It provided information concerning developmental level in non-intellectual, non-personality areas. It consisted of four domains: communication, daily living, socialization, and motor skills. The motor skills subscale was not administered in this study.

Personality Inventory for Children, Social Skills Scale (Wirt, Lachar, Klinedinst, and Seat, 1977)

This instrument consisted of 27 true-false items taking approximately five minutes to complete. It was composed of items bearing on a child's tendencies to isolate himself/herself, have few/no friends, be excessively shy, engage in little verbal communication, seek younger friends, and daydream.

Child Measures

Piers-Harris Children's Self Concept Scale (Piers and Harris, 1969)

This instrument consisted of 80 true-false items designed primarily for research on the development of children's self-attitudes and the correlates of these attitudes. The instrument could be used with children reading below the third-grade level. Scoring for the standardization sample showed no significant differences between means for third and tenth grades. Data presented in the manual on the internal consistency, stability, and validity of this instrument made it seem the best choice for tapping self-concept
variables.

Teacher Measures

Conners' Teacher Rating Scale (Conners, 1969)

This instrument consisted of 39 item behavior symptoms. It yielded four orthogonal factors: hyperactivity, conduct problem, inattention, and tension-anxiety. Its factor structure has been replicated. Normative data for both normal and hyperactive populations existed.

Teacher Rating of Peer Acceptance (Roff, Sells, and Golden, 1972)

This instrument consisted of a seven point rating scale in which teachers selected one detailed description of the child's peer relationships in the classroom. These ratings were found to correlate with peer sociometric ratings ($r=.56$). There was modest stability in this correlation with peer ratings taken one, two, and three years later ($rs=.40, .37, and .34$, respectively).

Vineland Adaptive Behavior Scales, Teacher Questionnaire (Sparrow, Balla, and Cicchetti, 1981)

This instrument was modeled on the Vineland Social Maturity Scales. It provided developmental data regarding communication, socialization, daily living, and motor skills (see above).

In addition, two instruments were devised specifically for this study. One, the Children's Friendships Questionnaire (Appendix 1), tapped the child's view of his/her friends. The other, the Longitudinal Study Follow-up Questionnaire (Appendix 2), elicited information regarding the family constellation, the child's educational trajectory and a brief evaluation of it, adjective descriptions of the child, parental educational values, how well satisfied parents were with their child's
current academic placement, and open-ended descriptions of problems and characteristics particular to each child. In addition, the Longitudinal Study Follow-up Questionnaire asked questions about how intently a child was pursuing his/her intellectual interests.

The scoring of the parent concerns in the area of intellectual and social development were of particular interest as dependent variables. These concerns were listed by parents in response to the question, "Please describe any special concerns you may have about your child's future intellectual, social, or emotional development?" For the purposes of this study, the number of parent concerns in the areas of intellectual and social development were counted. Entries were NOT rated for severity, which would have necessitated possibly unreliable evaluations of particular raters. The only decision to be made was whether the concern was intellectual, social, or emotional in nature. Protocols were reviewed twice, two months apart, and the agreement between assignments to each category were computed. At each scoring, twenty-eight intellectual concerns were counted. At the first scoring, thirteen social concerns were counted, and at the second scoring, twelve social concerns were counted. It is felt that this yielded a satisfactory measure of reliability for the dependent variable as it was used in this study.
3. Procedures

Most instruments were accompanied by sets of instructions for transferring responses to computer readable forms. The measures were mailed to parents in mid-March, 1982. Periodic reminders were sent by mail and were made over the phone. Often additional packets were sent to parents who misplaced them or threw them away. Data collection was terminated in January of 1983. Participation in this phase of the longitudinal study, as in all others, was purely voluntary. Protocols were machine read, transferred to magnetic tape, and analyzed using the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975).

4. Dependent Variables

The dependent variables tapping the psychological adjustment included well standardized instruments (Child Behavior Checklist, Teacher Rating Scale, Personality Inventory for Children—Social Skills subscale, Teacher Rating of Peer Acceptance). The Vineland Adaptive Behavior Scales tapped functioning in skill domains sensitive to developmental progress in the communication skills, daily living skills, and socialization areas. The standardized instruments seemed to inadequately address social isolation and achievement, although individual items were related to this characteristic. Isolation was operationalized by summing the following eleven items endorsed by the respondents:
PIC Social Skills Subscale, Parent
108. My child really has no real friends.
109. My child has very few friends.

Child Behavior Checklist
V.1 About how many close friends does your child have?
(if none)
12. Complains of loneliness.
42. Likes to be alone.

Children's Friendship Questionnaire
2. How many really good, close friends do you have? (if none)
6. Too few friends
15c, 15e, 15g. # of more social activities preferred to do "by yourself"
17. I prefer to play alone.

The problem of operationalizing childhood achievement was knotty. The main problem was conceptualizing what constituted meaningful achievement for these children. The significance of accelerated grade placement was diminished by the variety of academic placements, including enrichment programs which were accelerating children, and acceleration programs that were but enriching. Grades were almost certainly not comparable from one setting to the next. Standardized test scores would have been highly desirable, but were not available. Hence, no direct measures of achievement per se were available.

Still another variable of interest was motivation or, more specifically, the children's intellectual "drive." This ill-defined quality is perhaps at the heart of outstanding achievements produced over a long period of time. Table 2 indicates the questions by which this variable was operationalized.
This literature is fairly extensive (Andreasen, 1975, 1978; Andreasen & Canter, 1975; Galton, 1892; Ellis, 1904; Juda, 1949; Lange-Eichbaum, 1931; Myerson & Boyle, 1941; Walberg, 1978, 1981), yet the studies seem to converge. Andreasen’s (1978) summary seemed worth quoting:

...whatever type of diagnostic system is used, the creative person whose talent is expressed through artistic achievements, especially when notable recognition is attained, seems to have more psychopathology than would be expected from population norms (1978, p.119).

2. Related studies

Studies with less eminent individuals also provided interesting background information. For example, highly creative persons often gave responses to projective tests which resembled those observed in psychiatric patients (Dudek, 1970; MacKinnon, 1962). In studying writers, Barron (1963,1969) observed elevated MMPI scores on four of ten clinical scales, 2 (depression), 3 (hysteria), 6 (paranoia), and 8 (schizophrenia). More than half of the writers also described visual hallucinations, mystical experiences, and a periodic sense of overwhelming desolation. Drewdahl and Cattell (1958) observed that the artists and writers whom they studied were "not well adjusted" but manifested "divine discontent."
Table 2

Operationalization of Intellectual Drive
Sum of the Following Items Endorsed by Respondents:

Longitudinal Study Followup Questionnaire

IV.A. Has your child any interest that he/she is pursuing with something like adult intensity?

IV.B. What is it...you are responding to?
   total time invested
   amount of work invested
   sense of direction/plans

IV.B.2. He/she characteristically pursues an interest intently for a substantial period of time until he/she has achieved significant mastery of the area.

p.13. Vigorous work is spent on assignment.

p.13. One point for each of the following adjectives: deliberate, efficient, industrious, methodical, organized, painstaking, persevering, persistent, planful, precise, thorough

Vineland Parent Questionnaire

110. Has realistic long range goals and communicates about them in detail.

Vineland Teacher Questionnaire

(13). Has realistic long range goals and communicates about them in detail.

In addition to the standardized instruments and objective scales specifically designed for this study, parents were asked to list any concerns that they held regarding the intellectual, social, and emotional development of their children. These concerns were counted, and in the section describing results many of these comments are reported in detail.
D. Results of Statistical Analyses

1. Preliminary analyses of age and sex differences

Data were first analyzed for age and sex differences both between and within the highly gifted and moderately gifted groups. In the first set of analyses the means obtained on all dependent variables were tested for differences between boys and girls. Of the 47 variables, significant sex differences appeared on the parent version of the PIC Social Skills scale, parents' rating of their child's performance in his/her academic program, and on three of the scales of the Teacher Rating Scale. These qualifications are discussed where more pertinent. The sexes were combined for all other analyses.

There were, as has already been stated, no age differences between the highly gifted and moderately gifted children at the time of completing the questionnaires. Age could have entered, however, as a significant factor into any of the analyses conducted and presented below. To test the possibility that effects of age were confounding the results, children were divided at the age median (age 8 years, 0 months) into younger and older groups. The mean age of the older children was 9.14 year (N= 40; s.d.= .81) and of the younger children was 7.80 years (N= 38; s.d.= .49). Grade placement during the academic year 1981/1982, total score on the both versions of the Vineland Adaptive Behavior Scales, and the externalizing score on the Child Behavior Checklist
reflected differences between younger and older children. In the first three instances, the older children scored higher, whereas on the CBC externalizing scale, the younger children scored higher. These findings are detailed where more pertinent.

Parental education and number of siblings were other significant background variables that might have distinguished between the highly and moderately gifted groups. The sibling variables uncovered no differences between the groups. Parents had identified their highest level of education on the Longitudinal Study Follow-up Questionnaire, and were assigned to one of three categories—no college degree, college degree, or advanced degree. Mothers of highly gifted children were best characterized at the group level by possession of post-graduate degrees, whereas mothers of moderately gifted control children were best characterized by college graduation (t = 2.131, df = 76, p = .03). There was a non-significant trend (t = 2.557; df = 76; p = .11) for more fathers of the highly gifted children to have advanced post-graduate degrees than those of the moderately gifted children.

2. Tests of differences between groups on variables tapping psychological adjustment and behavioral difficulties
The literature review appeared to support the generalization that, as a group, children of very superior intellectual ability exhibit a higher frequency of moderate to severe psychological disturbance. It seemed important to examine how the children within the highly gifted and moderately gifted samples compared on variables tapping adjustment. The best instruments sampling these areas were the Child Behavior Checklist and the Conners Behavior Checklist. While not addressing pathology per se, the Piers-Harris also tapped a dimension of adjustment.

(b.) The Child Behavior Checklist

The comparison of means for the highly gifted children with those for the moderately gifted control children uncovered no significant differences on the Child Behavior Checklist. Data published by Achenbach and Edelbrock (1981) for a sample of 200 normal ("nonreferred") children ages six years to ten years permitted an additional comparison. The data are presented in Table 3. Although the published data did not include a precise sample mean or standard deviation, these data were obtained from the first author (Achenbach, Note 2). The difference between the mean score of the highly gifted sample was significantly different in a one-tail test from the mean score of the normative group \( (t = 1.94; df = 227; p = .025) \). The test comparing the moderately gifted sample to the normative sample did not yield a significant difference \( (t = .77; df = 237) \). The critical value of \( t \) in a one-tail test at the .05 level of significance is 1.645.
Table 3
Means and Standard Deviations on the Child Behavior Checklist

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>CBC mean</th>
<th>standard deviation</th>
<th>t*</th>
<th>df*</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly gifted</td>
<td>29</td>
<td>25.793</td>
<td>18.78</td>
<td>1.94</td>
<td>227</td>
<td>.025</td>
</tr>
<tr>
<td>Moderately gifted</td>
<td>39</td>
<td>22.333</td>
<td>12.83</td>
<td>.77</td>
<td>237</td>
<td>n.s.</td>
</tr>
<tr>
<td>NORMS**</td>
<td>200</td>
<td>20.040</td>
<td>15.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* These statistics refer to tests comparing the experimental samples with the NORMS group.

** Norms were obtained from T. Achenbach in a personal communication.

Data published by Achenbach and Edelbrock (1981, pp. 58-59) permitted a chi-square test of relative frequencies of children exceeding the authors' clinical screening cut-off score on the behavior problems scale (37 and 40 respectively for girls and boys ages 6-11 years). Such information would suggest whether there were indeed children within either group who merited clinical attention. Six of 29 highly gifted children (21%) and five of 39 (13%) of the moderately gifted children exceeded the screening score, versus 19 of 200 (9.3%) in the normative sample. The value of the chi-square statistic computed from the two by three matrix representing these figures. The chi-square value of 4.80, which would have been small using a correction for small Ns, did not achieve significance, although it probability of observing these differences in proportions by chance is less than 10%.
The moderately gifted sample clearly did not contain a higher proportion of children exceeding the clinical screening cut-off criterion than the normative sample. It appeared, however, that there was a difference between the highly gifted children and the norms available for the CBC. Consequently a chi-square statistic was computed from a two by two table comparing only the highly gifted gifted group with the norms. The value of the chi-square computed using Fisher's exact test (Nie et al., 1975, p. 243) was marginally significant at the .068 level of probability. Although the test of the difference in incidence of cases exceeding the clinical screening cut-off point does not exceed the accepted criterion for statistical significance, it is likely that such cases account for the difference from the mean of the normative sample reported above.

Another index of poor adjustment would be a low social competence score on the CBC. The possibility also existed that the proportions of children from the highly and moderately gifted samples exceeded the proportion of children from the normative sample who scored below the clinical screening score on the social competency scale of the Child Behavior Checklist. However, none of the children comprising the present sample was below the clinical screening cut-off score on the social competency scale (16.0 and 15.5 respectively for girls and boys ages 6-11 years).
(b.) Conners' Teacher Rating Scale

Information obtained from teachers only partially corroborated the findings extracted from information obtained from parents. It was expected that the externalizing scale on the CBC would correlate with the factors on the Teacher Rating Scale (TRS) labelled conduct disorder, inattentive, and hyperactive, and that the internalizing scale on the CBC would correlate with the factor labelled tense/anxious on the TRS. The correlations between the CBC internalizing and externalizing scales and the comparable factors of the (TRS), however, were virtually nonexistent. The strongest tendency (N= 30, r= -.306, p=.097) toward correlation appeared in the non-significant correlation between the CBC internalizing scale and the TRS factor labelled inattentive. None of the negative findings regarding either highly gifted children exceeding the clinical screening criterion on the CBC or the highly gifted children who declined sharply in IQ appeared on the TRS variables.

Few interesting differences appeared on the TRS. There was the expected sex difference which, interestingly, did not appear on the CBC. On the factor labelled inattentive boys scored higher than girls (df= 54, T= 2.56, p=.013). On the factor labelled hyperactive boys scored higher than girls (df= 54, T= 2.90, p=.006). There was also a tendency (df= 54, T= 1.77, p=.079) for boys to score higher on the conduct disorder factor. On the factor labelled tense/anxious, the girls scored higher than the boys (df= 54; T= 2.08; p=.040).
Comparison of the gifted children's scores with norms for the TRS was possible. The two sets of norms for school age children of each sex were taken from Werry, Sprague, and Cohen (1975). The data from the TRS are presented separately by sex in Table 4 and Table 5. Since there were no differences between the groups of gifted boys, they were pooled into one sample for these comparisons. The gifted girls were pooled for purposes of comparison with norms except in the case of the hyperactivity factor, for which both highly gifted girls' and moderately gifted girls' scores are presented. With two exceptions, the means for the gifted sample fell between the values given in the two sets means given in the norms. The two exceptions were tested for differences between the means of the gifted sample and the normative mean which it most closely approached. These tests yielded insignificant values of the F statistic.
Table 4
Male Subjects' Means and Standard Deviations on the Teacher Rating Scale

<table>
<thead>
<tr>
<th></th>
<th>Gifted Boys (N=23)</th>
<th>Norms 1* (N=291)</th>
<th>Norms 2* (N=418)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.326</td>
<td>1.21</td>
<td>1.60</td>
</tr>
<tr>
<td>s.d.</td>
<td>.268</td>
<td>.39</td>
<td>.53</td>
</tr>
<tr>
<td>Inattentive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.679</td>
<td>1.60</td>
<td>1.96</td>
</tr>
<tr>
<td>s.d.</td>
<td>.573</td>
<td>.58</td>
<td>.60</td>
</tr>
<tr>
<td>Tension/anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.338</td>
<td>1.29</td>
<td>1.61</td>
</tr>
<tr>
<td>s.d.</td>
<td>.332</td>
<td>.33</td>
<td>.46</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.772</td>
<td>1.56</td>
<td>2.07</td>
</tr>
<tr>
<td>s.d.</td>
<td>.481</td>
<td>.65</td>
<td>.73</td>
</tr>
</tbody>
</table>

*Norms obtained from Werry, Sprague, and Cohen (1975)

The subjects in the first normative sample were 143 boys in grades 1-6. The N of subjects in the second normative sample was for the combined sexes, although the means and standard deviations were reported separately for the boys and the girls.
Table 5
Female Subjects’ Means and Standard Deviations on the Teacher Rating Scale

<table>
<thead>
<tr>
<th></th>
<th>Gifted Girls (N=33)</th>
<th>Norms 1* (N=291)</th>
<th>Norms 2* (N=418)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.213</td>
<td>1.08</td>
<td>1.42</td>
</tr>
<tr>
<td>s.d.</td>
<td>.212</td>
<td>.30</td>
<td>.47</td>
</tr>
<tr>
<td>Inattentive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.381</td>
<td>1.43</td>
<td>1.71</td>
</tr>
<tr>
<td>s.d.</td>
<td>.286</td>
<td>.55</td>
<td>.58</td>
</tr>
<tr>
<td>Tension/anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>1.512</td>
<td>1.35</td>
<td>1.73</td>
</tr>
<tr>
<td>s.d.</td>
<td>.293</td>
<td>.33</td>
<td>.46</td>
</tr>
</tbody>
</table>

Hyperactivity

<table>
<thead>
<tr>
<th></th>
<th>Highly Gifted, N=13</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>1.612</td>
<td>1.25</td>
<td>1.58</td>
</tr>
<tr>
<td>s.d.</td>
<td>.387</td>
<td>.39</td>
<td>.65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mod’ly Gifted, N=20</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>1.356</td>
<td>1.25</td>
<td>1.58</td>
</tr>
<tr>
<td>s.d.</td>
<td>.260</td>
<td>.39</td>
<td>.65</td>
</tr>
</tbody>
</table>

*Norms obtained from Werry, Sprague, and Cohen (1975)

The subjects in the first normative sample were 148 girls in grades 1–6.

The N of subjects in the second normative sample of elementary school children was for the combined sexes, although the means and standard deviations were reported separately for the boys and the girls.
(c.) Vineland Adaptive Behavior Scales

The Vineland Adaptive Behavior Scales tap functioning in skill domains sensitive to developmental progress in the domains of communication, daily living, and socialization (social) skills. Although nothing in the literature suggested the likelihood that any of its specific domains would be affected, it was included as a dependent variable. No differences between highly and moderately intellectually gifted children emerged in the comparisons on either the parents' or the teachers' versions of the revised Vineland. The only findings that emerged were that, in fact, the scores on these developmental measures correlated strongly with age. Since there were no differences between the highly and moderately samples of gifted children on these variables, correlations of age with revised Vineland scores were computed. The correlation of age with raw score score on the parent version of the revised Vineland was .59 (N=57; p=.0001). The correlation of age with raw score score on the teacher version of the revised Vineland was .58 (N= 68; p=.0001). The correlation between the two versions was .523 (N= 50; p=.0003).

When this study was completed, no norms were available for the revisions of the Vineland. The expectation of significantly higher scores for both of the gifted samples compared to normal age peers could not be tested.
(d.) Piers-Harris Children's Self Concept Scale

The Piers-Harris was employed to sample the children's attitudes about themselves. Its most common research applications have been with children older than those participating in the present study. There do not, however, appear to be developmental trends in the normative data (Piers and Harris, 1969, p.3). The sample of highly gifted children scored, as a group, no differently than the moderately gifted control sample (df= 67, t=.452, p=.657). In terms of the norms available for the Piers-Harris, both highly gifted and moderately gifted groups exceeded the means available for the fourth graders, the lowest grade group for whom norms are available.

Since there were no differences between the highly and moderately gifted children in this sample, the groups were pooled and the grand mean (mean= 64.6, N= 69, s.d.= 11.65) was tested against the mean for the fourth graders (mean= 47.79, N=275, s.d.= 15.19) provided by Piers and Harris (1969). The gifted group clearly exceeded the normative group in its mean score (t= 8.63, df=342, p < .0005).

3. Analyses conducted within the highly gifted sample

Although it has been established that the children of very superior intellectual ability differed from the normative sample in mean number of total problems on the CBC, more information was uncovered in subsequent post-hoc analyses. Several analyses of the Child Behavior Checklist suggested that there may, in fact, have been two populations
of highly gifted individuals. Those who exceeded the clinical screening criterion on the Child Behavior Checklist were different from the rest of the highly gifted group in other ways. Highly gifted "problem" children (N=6, 2 boys and 4 girls) tended to have dropped in IQ between the ages of four years and six years (the mean IQ change was -8 points), whereas those 23 highly gifted children not exceeding the clinical criterion tended to have gained significantly (mean IQ change was +15 points). The test of the difference between the two groups on mean change in IQ yielded a t value of 2.46 (df= 27, p= .02). (See Table 3.)

Four of the six problem children (67%) had lost more than 10 IQ points between the ages of four and six (the mean change in IQ for these four children was -18 points), versus two of 23 children (9%) in the low-problem group. The test of the difference in proportions yielded a chi-square statistic of 7.24 (df= 1, p< .005) using Yates' correction for small N (see Bruning and Kintz, 1977, p. 232).

Within the entire highly gifted group, the correlation between IQ measured at six years and the CBC behavior problems scale was -.518 (n=26; p=.0068). That is, the higher the IQ measured at age six, the lower the incidence of problems on the CBC. These children, of course, are the ones who tended to remain about the same or increase in measured IQ. The IQ loss or gain scores (range -32 to +62) were also correlated with the total problems score on the CBC. The correlation between change in IQ score between years four and six and CBC problems score was
-.485 (n=25; p=.0134). That is, the more positive the change in IQ, the less likely it is to evidence problems on the CBC.

The six highly gifted children with problems were rated lower in terms of academic achievement than the 21 highly gifted children without problems (t= 3.48, df= 25, p=.002). (See Table 6.) In addition, there was a tendency (t= 1.93, df=25, p=.064) for highly gifted children with problems to earn higher scores on the isolation variable. It was the extreme scores of only two of the six highly gifted children with behavior problems, however, that were responsible for this tendency. There was a weak tendency (t= 1.70, df= 20, p=.097) for problem children to score lower on the index of intellectual drive described in the section on dependent variables. These differences are exhibited in Table 3. Similar analyses compared the five moderately gifted children exceeding the CBC clinical screening score with the 30 other moderately gifted children. None of these was significant, the largest yielding an F value of 1.54 (df= 33, p=.13).
Table 6

Means and Standard Deviations on Several Dependent Variables for Highly Gifted Children Divided into "Problem" and "Non-problem" According to the Clinical Screening Criterion on the CBC

<table>
<thead>
<tr>
<th></th>
<th>Problem</th>
<th>Non-Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IQ change</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>mean</td>
<td>-8.333</td>
<td>+15.316</td>
</tr>
<tr>
<td>s.d.</td>
<td>15.17</td>
<td>21.72</td>
</tr>
<tr>
<td><strong>Academic achievement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>mean</td>
<td>3.000</td>
<td>1.857</td>
</tr>
<tr>
<td>s.d.</td>
<td>.890</td>
<td>.654</td>
</tr>
<tr>
<td><strong>Isolation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>mean</td>
<td>3.833</td>
<td>1.938</td>
</tr>
<tr>
<td>s.d.</td>
<td>3.49</td>
<td>1.24</td>
</tr>
<tr>
<td><strong>Drive</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>mean</td>
<td>5.833</td>
<td>9.304</td>
</tr>
<tr>
<td>s.d.</td>
<td>3.125</td>
<td>4.704</td>
</tr>
</tbody>
</table>

The above analyses suggested the importance of examining all of the individuals who had dropped in IQ between the ages of four years and six years as potential clinical problems. Ten of the 32 highly gifted children had dropped in IQ, all but one of them by more than 10 points. Significant differences appeared in mean variable scores between these ten children and the 22 children in the highly gifted group who did not drop in IQ. All were unfavorable to the children who declined in IQ.
The differences appeared on the Child Behavior Checklist problems scale (t= 2.19, df= 23, p= .037), the parents' rating of children's grades at school on a 1-5 scale, 5 being high (t= 2.22, df= 25, p= .035), and the Piers-Harris total score (t=2.04, df= 24, p= .051). The total score on the teacher version of the Vineland Adaptive Behavior Scale, which supposedly reflects communication, life skills, and social maturity, showed a weak trend (t= 1.74, df= 19, p= .096) for the decliners to be less mature. This difference was absent on the parent version. These observations are displayed in Table 7.
Table 7
Means and Standard Deviations on the Adjustment and Maturity
Variables for Highly Gifted Children Who Declined in IQ
versus Highly Gifted Children who Increased in IQ

<table>
<thead>
<tr>
<th></th>
<th>Decliners</th>
<th>Non-Decliners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Behavior Checklist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>mean</td>
<td>40.29</td>
<td>22.61</td>
</tr>
<tr>
<td>s.d.</td>
<td>23.90</td>
<td>15.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 2.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=.0369</td>
</tr>
<tr>
<td>School grades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>mean</td>
<td>3.625</td>
<td>4.294</td>
</tr>
<tr>
<td>s.d.</td>
<td>.916</td>
<td>.588</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 2.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=.0348</td>
</tr>
<tr>
<td>Piers-Harris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>mean</td>
<td>54.17</td>
<td>66.72</td>
</tr>
<tr>
<td>s.d.</td>
<td>19.40</td>
<td>10.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 2.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=.0513</td>
</tr>
<tr>
<td>Teacher Vineland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n.</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>mean</td>
<td>170.0</td>
<td>194.7</td>
</tr>
<tr>
<td>s.d.</td>
<td>32.8</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 1.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=.0958</td>
</tr>
</tbody>
</table>

The possibility existed that both the problem and the IQ-declining highly
gifted children could be accounted for by age or sex differences. There
was no significant difference in the proportion of boys or girls between
the highly gifted problem children and the highly gifted non-problem
children, or between the highly gifted decliners in IQ versus the highly
gifted non-decliners. No differences in mean age appeared between
problem/non-problem or decliner/non-decliner children.
It was of interest to determine whether there might have been any Age X Group interactions affecting the pathology variables in this study. No such interactions were detected in a two-way analysis of variance. However, one difference did appear in a one-way analysis of variance when children were assigned to the four intersection sets of of highly gifted and above the age median, highly gifted and below the age median, moderately gifted and above the age median, and moderately gifted and below the age median. It will be recalled that the age median of the total sample, which happened to be exactly eight years of age, and that the mean age for the older children was 9.145 (N= 40; s.d.= .811) and for the younger children was 7.795 (N= 38; s.d.= .49).

The older highly gifted children scored much higher on the internalizing subscale of the CBC than the other groups of children (t=1.70, df= 65, p= .053). The finding suggests that there may be a tendency for problems of an internalizing nature to increase with age in the highly gifted population. This finding, however, was not in evidence on any of the other measures nor, it should be recalled, did it appear in the two-way analysis of variance examining the interaction of Age and Group. It should, therefore, be viewed with extreme caution. Table 8 displays these findings.
Table 8

Means and Standard Deviations on the Internalizing Subscale of the Child Behavior Checklist

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>mean</th>
<th>standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>older highly gifted</td>
<td>13</td>
<td>12.692</td>
<td>9.14</td>
</tr>
<tr>
<td>younger highly gifted</td>
<td>15</td>
<td>6.733</td>
<td>4.02</td>
</tr>
<tr>
<td>older moderately gifted</td>
<td>21</td>
<td>7.952</td>
<td>5.37</td>
</tr>
</tbody>
</table>
| younger moderately gifted  | 18 | 8.627  | 6.16

\[ F = 2.887 \]

\[ p = .0529 \]

3. Measures of isolation and social adjustment

The literature review appeared to support the generalization that, as a group, highly gifted children tend to have more difficulties in finding other children with whom to form friendships, and that consequently they may be more isolated and lonely than their age peers. Analyses of the scale constructed to tap the variable of isolation revealed, as predicted, that the highly gifted children scored significantly higher than the moderately gifted control children (\( t = 1.917; \) df = 52; \( p = .029 \) for a directional test).

The difference between the groups was accounted for by the difference in the proportions of children with extreme scores. Scores at or above the 90th percentile were considered extreme. Five highly gifted children (23%) had extreme scores, but only one moderately gifted child (3%).
The test of the difference between the proportions yielded a chi-square statistic (with Yates' correction) of 3.15 (df = 1; 3.85 is the critical value for significance at the .05 level).

The variable tapping symptoms of isolation from other children was, as noted, constructed for this study. It did, however, correlate strongly with some other measures used in the study, suggesting construct validity and supporting its use as a warning signal. For example, the correlation with the internalizing scale of the CBC was .56 (N = 54; p = .0001). The correlation with the externalizing scale of the CBC was .38 (N = 54; p = .0046). Obviously, the correlation with the total CBC behavior problems score was high (r = .43; N = 54; p = .0015). The isolation scale also correlated highly with the parent version of the Personality Inventory for Children Social Skills subscale (r = .49; N = 54; p = .0003).

Comparison of the number of parent concerns about social development offered an additional test of the hypothesis that highly gifted children differ from moderately gifted children in terms of social variables. These concerns were reported on the Longitudinal Study Follow-up Questionnaire. Because concerns were often expressed diffusely, their presence or absence, rather than the their severity, was recorded. The groups differed significantly (t = 2.23, df = 76; T = 2.23, p = .027) on the total number of expressed parent concerns for social development. The following remarks are typical of parents' wording. The first six were chosen from the records of children who were not problem children on the CBC or decliners in IQ from age four years to age six years. The last
five were such children.

At times he is too aggressive socially. Peer pressure has been hard for him to handle.

She has the outward mannerisms (speech, etc.) of her classmates, who are 1-2 years older, and seems much more mature than girls her own age (other people comment on this too). She does not, however, necessarily share her peers' interests (boys, rock music, TV—we don't have one, electronic games). Hope she finds a place where she can use her extraordinary intellect and still fit in.

She wants to play or talk and really accomplish something instead of just giggle or "goof around." She is less a child in this regard compared with others in her age group and therefore can communicate better with adults on their own level. This encourages her to prefer adults at times.

I'm hopeful that her intellectual abilities will not inhibit her social opportunities (she's pretty outgoing, so there may be no problems).

Lack of friends because too directive or "show-off"

Highly accelerated—how it would affect social development

She's the only child I know well, but she seems very different from the "average" child to me. She needs more opportunities for social contact and activities outside of school.

He is also not on the same wave length as other kids.

Emotional—comes home with lots of complaints about emotional issues about social interactions at school.

Chooses to spend time alone, rather than with neighborhood kids. Is very definite about whom he likes/dislikes. Does not go out of his way to please others or get peer approval.
The data regarding isolative tendencies and parents' concerns for their children's social development are displayed in Table 9.

Table 9
Means and Standard Deviations on the Isolation Scale and on Parents' Concerns Regarding Social Development

<table>
<thead>
<tr>
<th></th>
<th>Highly Gifted</th>
<th>Moderately Gifted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>Mean</td>
<td>2.455</td>
<td>1.625</td>
</tr>
<tr>
<td>S.D.</td>
<td>2.180</td>
<td>.942</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p = .0576</td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>.31</td>
<td>47</td>
</tr>
<tr>
<td>Mean</td>
<td>.290</td>
<td>.085</td>
</tr>
<tr>
<td>S.D.</td>
<td>.530</td>
<td>.280</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p = .0271</td>
</tr>
</tbody>
</table>

The PIC Social Skills subscale (filled out by both parents and teachers), the Social Competency subscale of the Child Behavior Checklist, and the Teacher Rating of Peer Acceptance were all administered in order to investigate the possibility that the highly gifted children had more difficulties, were less socially competent, or less popular than their age peers. The findings from analyses of these measures converged. The highly gifted children were no different from the moderately gifted children and both gifted samples scored essentially at the Achenbach and Edelbrock (1981) mean on the Social Competency subscale of the Child Behavior Checklist. The two gifted samples also scored at the Wirt et al. (1977) means on both parent and teacher versions of the PIC Social Skills subscale.
Boys scored higher than girls on the parent version of the PIC Social Skills scale. Higher scores, incidentally, represent more difficulties with peers. This result, then, is congruent with much of the literature, which consistently finds boys of this age scoring higher than girls on such indices. It is, unfortunately, not an interesting finding in terms of the central purposes of this study.

With the exception of one moderately gifted boy, all of the children were rated at least satisfactory on the Teacher Rating of Peer Acceptance. Tests of the group difference on this variable uncovered nothing of significance or interest. Another analysis of the Teacher Rating of Peer Acceptance measure was conducted to test the possibility that the groups differed in terms of the number of children considered average in popularity versus the number of children considered extremely popular. This analysis, too, uncovered nothing of significance or interest.
The data regarding difficulties in peer relationships are presented in Table 10.

Table 10  
Means and Standard Deviations on the Social Relations Inventories

<table>
<thead>
<tr>
<th></th>
<th>Highly Gifted</th>
<th>Moderately Gifted</th>
<th>Norms*†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social competency (CBC)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>15</td>
<td>32</td>
<td>200</td>
</tr>
<tr>
<td>mean</td>
<td>22.067</td>
<td>20.285</td>
<td>20.04</td>
</tr>
<tr>
<td>s.d.</td>
<td>3.200</td>
<td>4.200</td>
<td>15.00</td>
</tr>
<tr>
<td><strong>PIC social skills (P)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>29</td>
<td>43</td>
<td>2400</td>
</tr>
<tr>
<td>mean</td>
<td>9.138</td>
<td>7.814</td>
<td>8.2</td>
</tr>
<tr>
<td>s.d.</td>
<td>4.300</td>
<td>3.200</td>
<td>4.6</td>
</tr>
<tr>
<td><strong>PIC social skills (T)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>23</td>
<td>37</td>
<td>2400</td>
</tr>
<tr>
<td>mean</td>
<td>8.522</td>
<td>8.243</td>
<td>8.2</td>
</tr>
<tr>
<td>s.d.</td>
<td>5.700</td>
<td>4.800</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*The CBC norms were obtained from Achenbach (personal communication) for boys age 6-11.
†The PIC social skills scale norms were reported in Wirt et al. (1977) for approximately 1200 children of each sex between the ages of 6 and 16.

A common finding in the literature was that children in highly gifted samples had older friends. As expected, the highly gifted children in this investigation endorsed an item on the Children's Friendship Questionnaire indicating that they had older friends far more frequently than did the children in the moderately gifted sample. Fifteen of 30
highly gifted children (50%) versus five of 53 moderately gifted children (12%) endorsed this item. The test of the difference between proportions yielded a chi-square statistic (with Yates' correction) of 28.43 (df=1, p< .001).

The highly gifted children appeared to be no different from their peers, and were certainly no different from their moderately gifted age peers, in the sex of their best friend. This was the most consistent finding in the study, with every highly gifted boy designating another boy as his best friend, and, with one exception, all highly gifted girls designating other girls as best friends. There were no departures from same-sex choices among the moderately gifted children.

These findings regarding social relationships suggest that the highly gifted children do have fewer friends and may consequently feel more lonely and isolated from their age peers. Social relationships are often with older children and adults. Their relations with other children do not in general appear troubled, but parents nevertheless voiced concerns about their highly gifted children's future development in the area of social relationships.

4. Measures of achievement

Loss of measured intellectual ability over time may be expected to make less likely later achievements of highly intellectually gifted children. Seven of the 32 (22%) highly intellectually gifted children dropped more
than 12 points (one and one half times the error of measurement of the Stanford-Binet) between the ages of four and six years. Only two of the 49 moderately gifted control children (4%) dropped more than 12 points, but of course the criteria by which they were selected renders this comparison meaningless.

Grade placement and parents' assessments of performance are difficult to interpret. Nevertheless, these variables were among the few others available for analysis. There were no differences in grade level or age at school entry between highly and moderately gifted children. There were, however, significant differences between the highly gifted children and the moderately gifted children in their of participation in full-time programs for the gifted. Thirteen of the highly gifted children (43%) versus seven of the moderately gifted children (15%) were placed in such programs (chi-square = 7.05, df = 1, p < .01).

Unfortunately, teacher ratings of academic performance were not available. As judged by parents on a 1-7 scale (1 representing superior performance), the performance of the highly gifted children was superior to that of the moderately gifted children (t = 2.41, df = 74, p = .017). Most of the parents of highly gifted children rated them as superior or extraordinary even in the full time special programs in which they were participating. A sex difference emerged here. As a group, girls' ratings tended to be superior to boys'. The mean rating was 3.7 for 42 girls versus 4.0 for 34 boys, (t = 1.94, df = 74, p = .0527). The differences between 18 highly gifted girls and 11 highly gifted boys did
not, however, approach significance (t = .78, df = 27, p = .708), nor did the
difference between 21 moderately gifted girls and 23 moderately gifted
boys (t = 1.40, df = 42, p = .164). Therefore, the interpretation that
this finding represents a difference primarily between highly gifted and
moderately gifted children seems justified.

The literature review suggested that highly gifted children are very
likely be indistinguishable in achievement at some point in later
development from moderately gifted children -- or even to appear
unfavorably in comparison with them -- despite their superior ability.
The resultant hypothesis was that underachievement would be early in
evidence, and that variables related to the drive to excel would
distinguish between highly gifted and moderately gifted groups, with the
highly gifted group comparing unfavorably. In fact, however, the group
comparison on the intellectual drive variable revealed no significant
difference.

The variable was further fractionated into the four items relating to
specifically to work habits. There was no difference in the proportion
of children earning zero points for disciplined work habits. Seven
(24%) of the highly gifted children and 16 (34%) of the moderately
gifted children did not appear to devote a significant amount of effort
to either their own interests or to assignments at school.
Comparison of the number of parent concerns about intellectual development reported on the Longitudinal Study Follow-up Questionnaire offered an additional test of the hypothesis that highly gifted children differed from moderately gifted children in terms of achievement variables. The presence or absence of concerns was recorded, but no attempt was made to rate the severity of the concerns. The groups differed on the total number of parent concerns about intellectual development, the parents of highly gifted children expressing more of these ($t = 1.37, \text{df} = 76; p = .030$ in a directional test). The following lists a number of the concerns expressed by parents of highly gifted children:

I am concerned about her low academic interest, lack of interest in academic competition or achievement.

Seems very unorganized about papers and assignments

I worry that he will be an underachiever; I don't know how to prevent this. However, I believe he has the right as much as any child to choose how much, how fast he wants to learn.

Main concern is the quality of intellectual development in the schools she will attend in the future.

Finding adequate educational resources will be a real challenge.

We are concerned that the very good private school that she is attending will not be able to hold her interest as she advances.

I'm somewhat concerned about finding appropriate school placements in the future.

Is not achieving in special program. Her teacher last year felt she was not bright enough!
III. Discussion

The data gathered from parents, teachers, and children participating in the empirical study reported above related to a complex series of questions targeted on the social and emotional adjustment of young school children of very superior and moderately superior intellectual ability. The answers to these questions are tentative, as they must be, especially given the number of analyses conducted in relation to the sample sizes and the strict limitations regarding the population to which the findings can be generalized.

A. The findings regarding psychological adjustment

The first of the three pivotal questions addressed by the empirical investigation concerned the psychological adjustment of children of very superior intellectual ability. The first part of the literature review suggested that adults of very superior intellectual ability possess a variety of psychological vulnerabilities, and that more often than would be expected in other groups, these vulnerabilities actually result in difficulties. The second part of the review documented the specific risk for children of very superior intellectual ability (Burks, Jensen, and Terman, 1930; Burt, 1970; Feldman, 1979; Gallagher, 1958; Gallagher and Crowder, 1957; Hildreth, 1954; Hollingworth, 1926, 1929, 1931, 1942; Jones, 1923; Kincaid, 1969; Neville, 1937; Selig, 1958; Zorbaugh et al., 1951). The expectation derived from the studies of children of very superior intellectual ability was that problems would be present in
20-25% of the sample of children of very superior intellectual ability versus 5-10% in the sample of children of moderate intellectual superiority. The following hypothesis, consequently, appeared worth testing:

HYPOTHESIS ONE: A greater percentage of children of very superior intellectual ability than of children of moderately superior intellectual ability will evidence psychological disturbances.

The mean score on the total problems scale of the Child Behavior Checklist for the children of very superior intellectual ability did indeed exceed the mean score for the normative group published by Achenbach and Edelbrock (1981). In addition, the sample of children of very superior intellectual ability appeared to include a greater proportion (21%) of children exceeding the clinical screening criterion on the Child Behavior Checklist behavior problems scale than the proportion (9.3%) found within the normal sample of the same age. The proportion of children of very superior intellectual ability exhibiting difficulties is above the maximum prevalence rates of behavior problems found in epidemiological studies of school age children (Graham, 1979, p.195).

These CBC data may underestimate the number of children having significant adjustment difficulties. The mother of one "non-problems" child, for example, called the CDRG shortly prior to data collection to consult about her son's difficulties, and yet she did not describe her son's behavior as problematic in the inventory. There were no CBC data
on two of the children who dropped more than ten points in IQ—_one of whom dropped 35 points_. Such drops were shown to be associated with a variety of difficulties. A final example is the case of another child of very superior intellectual ability whose mother communicates regularly with the CDRG about social isolation problems confronting her son that are certainly consequences of his very superior intellectual ability.

The mean score for the sample of children of moderately superior intellectual ability fell between the mean score for normative sample and the mean score for the group of children of very superior intellectual ability on the total problems scale of the CBC. The scores for this group were not significantly different from either the normative or the highly intellectually able groups. The expectation had been, however, that this group would exhibit fewer problems than either of the other samples.

It seems reasonable to suppose that the method of selecting the subjects yielded a sample unrepresentative of the general population of children of moderately superior intellectual ability. One distinguishing characteristic of the samples participating in this investigation was that they were nominated by their parents. Hence, in all likelihood, factors of the kind implicated by Freeman (1979) were probably operating within the sample of children of moderately superior intellectual ability. There were no other reasons to predict an elevated incidence of problems in this group. In her sample, it should be recalled,
Freeman observed that the group of children whose parents joined a national association for gifted children exhibited an increase in psychological difficulties, which other gifted children did not.

There were, obviously, not a sufficient number of children with a high number of problems in the moderate intellectually superior sample recruited for this project to elevate the mean of that group over the mean of the normative group. There were, however, a sufficient number to prevent significant differences from emerging in the comparisons with the children of very superior intellectual ability. A group of children of moderate intellectual superiority selected by means other than parent nomination might have had significantly fewer problems in comparison with the group of children of very superior intellectual ability.

On the other hand, there were compelling reasons to predict the elevation of difficulties within the sample of children of very superior intellectual ability. These reasons were detailed in the second part of the literature review. The "Freeman effect" seemed to provide an inferior explanation of this finding, though, to be sure, these very bright children had also been nominated by their parents.

The finding that, at the group level, the children of very superior intellectual ability had more problems as measured by the CBC tells only part of the story. The truth is that it is a minority—though a sizable minority—of children who account for this difference between the means. It was no surprise that these children were characterized by
other problems as well. For example, they tended to have dropped in IQ, have lower academic performance ratings, be more isolated, and have a lower drive to achieve through hard work at demanding self-assigned intellectual tasks. These same relations did not hold true within the moderately intellectually superior sample.

Another finding added a developmental dimension to the observation of a higher group mean on the CBC total problems scale for the children of very superior intellectual ability. On the internalizing scale of the Child Behavior Checklist, older children of very superior intellectual ability scored higher than younger children of very superior intellectual ability and higher than both younger and older children of moderate intellectual superiority. This finding was very weak. It could be interpreted to mean that as children of very superior intellectual ability grow older, they tend to become less well adjusted, perhaps because of being increasingly discrepant from environmental supports. Furthermore, the symptom pattern tends to be more internally than externally directed. Since it was the only finding implicating an age difference within the highly gifted sample, there was good reason to consider the likelihood of its being a non-reproducible finding.

Parents were the informants completing the CBC. It seems that parents of children of very superior intellectual ability do indeed report a greater number of problems than parents of normal children. In contrast, the teachers of these children do not report such observations on a similar instrument, the Conners' Teacher Rating Scale (TRS).
Except for the hyperactivity factor on the Teacher Rating Scale, none of the information obtained from teachers distinguished between children of very superior and moderately superior intellectual superiority, or between the gifted children as a group and available norms for the instruments. There appeared little reason to give much weight to the isolated observation by teachers that highly gifted girls were more hyperactive than the other gifted children. It, too, may represent an irreproducible finding.

The failure of the TRS findings to converge with those of the CBC should not be surprising. The correlation between scores reached by parent and teachers even when both are completing the CBC is relatively low (.23 to .41; Quay, Sprague, Shulman, & Miller, 1966). Correlations would be expected to drop when parents and teachers are filling out substantially different inventories. Furthermore, the TRS better measures undercontrolled behavior, which children of very superior intellectual ability are not prone to manifest. In short, the failure of the teachers to report more problems on the TRS does not necessarily undermine the interpretation that the children of very superior intellectual ability have more difficulties than normal children.

The Vineland Adaptive Behavior Scales were administered to assess the developmental level in communication, daily living, and socialization skills areas. It was of some interest to determine whether children of very superior intellectual ability compared unfavorably to children of moderately superior intellectual ability in terms of the domains sampled
by this instrument, as they might if their cognitive development was progressing at the expense of development in other areas. None of the indices derived from the Vineland distinguished between the children of very superior intellectual ability and the children of moderate intellectual superiority. Scores for all the children were, however strongly associated with age. Norms were not available for comparison. This finding suggests that there is little need for concern about the general adaptive behavior skills of children of very superior intellectual ability.

The Piers-Harris Children's Self Concept Scale was also used to tap psychological adjustment. Rather than comparing unfavorably to normal children or to children of moderately superior intellectual ability, the children of very superior intellectual ability scored no differently from the children of moderately superior intellectual ability on the Piers-Harris total self concept score, and both groups were substantially above the mean for a normative sample of fourth grade children. The recognition for ability that intellectually gifted children probably receive in both of the primary settings in which they were living their lives, namely school and home, is probably very powerful. Because of the relationships of high self-concept to satisfactory psychological adjustment, relationships, and achievement in the gifted population (Fung, Janos, & Robinson, in preparation), this finding bodes well for future development.
B. The findings regarding isolation

The first part of the literature review suggested that adults of very superior intellectual ability tend to be socially isolated. The second part of the review documented this as a specific risk for children of very superior intellectual ability (Burks, Jensen, and Terman, 1930; Freeman, 1979; Hollingworth, 1926, 1929, 1931, 1942; Painter, 1976). The following hypothesis, then, appeared worth testing:

HYPOTHESIS TWO: A greater percentage of children from the extraordinarily intellectually gifted population than from a moderately intellectually gifted population will evidence greater isolation from age peers.

In this empirical investigation, the children of very superior intellectual ability scored higher on a scale constructed specifically to measure the extent of isolation from age peers. This variable correlated highly with all of the problem scales on the Child Behavior Checklist and with the parents' version of the Personality Inventory for Children Social Skills subscale. It was, of course, in this study impossible to untangle the causal relations between these variables. One might imagine that isolation and loneliness caused other problems. Equally plausible was that the problems these children exhibited led to later loneliness and isolation. In either case, the area of friendships undoubtedly is one in which children of very superior intellectual ability may need a great deal of support.
In addition to the objective measure of isolation and loneliness, the parents of the children of very superior intellectual ability in this sample expressed many more concerns about their children's social development. Often these concerns reflected the special strains upon normal social development imposed by the cognitive differences from age mates. Several of the parents appeared to be reflecting upon potential rather than actual problems. This parental foresight and its expression in the research questionnaires was, presumably, more likely to insulate the children from eventual social difficulties than to potentiate them. On the other hand, these parents were expressing their awareness of special risks to their children, risks that may or not be met in all cases.

Although the literature suggested that some children of very superior intellectual ability exhibit troubled relations with other children, there was no reason to think that it was due to very superior intellectual ability per se. Furthermore, there was some reason to think that these children would internalize their discomforts rather than externalize them (Hollingworth, 1942). Hence, the literature did not appear to adequately support the hypothesis that these children would exhibit more difficulties than the moderate intellectual superiority control children in their peer relations. The peer problems of children of very superior intellectual ability centered around finding relationships satisfying to them, not around inappropriate behaviors in those circumstances granted them. The children of very superior intellectual ability in this sample had no more difficulties
with other children than children of moderately superior intellectual ability who were used for purposes of comparison.

The children of very superior intellectual ability in this sample much more often than the children of moderately superior intellectual ability endorsed the item indicating that they had older friends. Their friends were of the same sex, as were those of the control children. The interests of children of very superior intellectual ability are more likely to be shared by older individuals, who are at the same intellectual level. The sex preference is, at this age, appropriate for both chronological and mental age norms. The movement of the children in the two groups toward opposite sex relationships would be interesting to track.

C. Findings regarding achievement and achievement potential

The literature review strongly suggested the generalization that children of very superior intellectual ability, as a group, fail to meet the performance expectations that one might have for them (Anastasiow, 1964; Bridges, 1973, 1975; Dvorak, 1923; Feldman, personal communication; Kincaid, 1969; Zorbaugh et al., 1951). The following hypothesis was suggested:

HYPOTHESIS THREE: A greater percentage of children of very superior intellectual ability than of moderately superior intellectual ability will show signs of inadequately utilizing their intellectual gifts.
One of the most ominous signs of failing to adequately utilize one's intellectual gifts is to exhibit a marked decrease in those gifts from one measurement period to another. Twenty-two percent of these children had dropped more than 12 points in measured IQ between the ages of four and six years, and none of these subjects would be considered children of very superior intellectual ability as defined in this study at the age of six years. That such a great percentage of children of very superior intellectual ability show serious losses in ability should be of great concern to them, their parents, and others.

The interpretation that the loss of IQ between the ages of four and six years was due to regression to the mean must be entertained. If such an effect was operating in the sample, it would mean that several of the children were inaccurately assigned to the category of highly intellectually gifted. This interpretation is difficult to reject because it is not really known what the error of measurement may be at very extreme levels of IQ. On the other hand, requiring a person to lose 12 IQ points between the ages of four and six years before considering him/her to have dropped in IQ appears to be reasonable. This is, after all, one and one half times the error of measurement for the Stanford-Binet. Furthermore, the phenomenon of regression to the mean in no way can account for the strong association observed between IQ loss and increase in problems of various kinds. Hence, it is likely that the children constituting the highly intellectually gifted sample were in fact so gifted initially, and that their intellectual superiority diminished early in their school years.
Ability is only one component necessary for significant achievements, and it needs to be accompanied by environmental stimulation and encouragement. It was, then, encouraging if not surprising that the children of very superior intellectual ability in this sample were much more often in special full time programs for the gifted than the were children of moderately superior intellectual ability. Furthermore, they achieved higher parent ratings of performance in these programs than the control children obtained in their academic programs.

In spite of the above findings, skepticism remained about how reflective were special class placement and performance therein of the processes that result in significant achievements produced over a long period of time. The two groups of intellectually gifted children could not be distinguished on a measure constructed specifically to tap the construct of intellectual drive and focused work habits. This variable seemed much more closely related to eventual utilization of abilities than either placement in a special academic program or performance in such a program. This "drive" variable indicated that one quarter of children in both of the intellectually gifted groups were not evidencing habits of penetrative inquiry or zealous investment in projects of interests to themselves. This warning signal, unfortunately, is likely to be downgraded in importance by those who think such variables are unimportant at early ages.
The concern that the "drive" variable was tapping something of significance was suggested by the finding that parents of children of very superior intellectual ability in this sample expressed many more concerns about their intellectual development than did the parents of the children of moderately superior intellectual ability. Parents of highly intellectually gifted children, it seems, were well aware of the obstacles to the utilization of talent that existed both within and around their children. Statements of concerns, it should be noted, probably were signals of factors that will act to increase rather than decrease the likelihood of later findings regarding significant differences between the groups in terms of variables better tapping the utilization of talents.

D. Suggestions for further research

There is a substantial literature suggesting that children of very superior intellectual ability are different in many ways from normal children and also from children of moderately superior intellectual ability. The empirical study reported above found such differences in terms of behavior problems reported by parents, feelings of loneliness and isolation from age peers, and in factors related to effective utilization of ability. In all three of these areas, the children of very superior intellectual ability appeared to be in more danger of problems than other groups of children. There is little information available about how they arise or how to best prevent them.
Among the circumstances provoked by very superior intellectual ability are parental expectations for superior performance. It is possible that mishandling in this regard interrupts the development of achievement motivation, which seems to require a sense of self-control (Heckhausen, 1982). Parents, especially well educated and highly motivated ones in active pursuit of rewarding careers, may be inexpert at distinguishing between challenging their children and alienating them by assuming too much control of their intellectual development. The consequences of this difficult discrimination are often severe, as many who have worked in the Diagnostic and Counseling Service or the Early Entrance Program at the University of Washington have reported. Very often the child will struggle with his/her parents using underachievement and failure as weapons.

Another risk is to raise expectations one has for a child without providing adequate support. A child may feel that the relationship with his/her parents is contingent. Possible outcomes are depression and disturbances in later relationships. Cases with such dynamics are believed to have been observed in the Diagnostic and Counseling Service and in the Early Entrance Program at the University of Washington. Such dynamics require a great deal more investigation before developmental psychologists can consider themselves adequately enough informed to confidently suggest interventions.
Another unique risk of children of very superior intellectual ability is that many of their parents would rather see their children be socially well adjusted than superior in any way. Such remarks are quite typical among parents seen at the Diagnostic and Counseling Service at the University of Washington. Little is known about how the encouragement of very superior intellectual ability competes with the social arena for time, let alone for the poorly understood resources of personality.

The factors just mentioned may contribute separately and in combination to the difficulties reported in the literature review and observed in this empirical investigation. There is little information available about how they operate. This focus on problems, though, assumes that it is legitimate to investigate the conditions which best nurture such ability. Cultural values appear ambivalent regarding such a goal. The impact of cultural values upon decisions made by children of very superior intellectual ability and their parents and teachers have been inadequately studied also.

E. Summary

The empirical investigation reported in this paper focused upon the psychological adjustment of a group of children having very superior intellectual ability. Preceding the research report was a two-part literature review. The first part considered many of the published studies of people who have made a lasting impact on their culture
through their creative literary or scientific achievements. Such individuals exhibited a greater incidence of various psychological difficulties compared to less eminent individuals. The second part of the literature review considered in detail studies of psychological characteristics and adjustment in which the subjects were children of very superior intellectual ability.

The two parts of the literature review related directly to the goals of the empirical study. The first part, concerning adult geniuses, helped to crystallize diffuse concerns about the development of children with very superior intellectual ability. The second part led to specific predictions about the psychological adjustment of the children of very superior intellectual ability who constituted the research sample. When dependent variables were examined in terms of differences of group means, more than half of the studies uncovered unfavorable differences between extraordinarily intellectually gifted and moderately intellectually gifted children or normal controls. With one exception, 14 studies which discussed subsets of the extraordinarily intellectually gifted group found a significant minority (20-25%) with problems of some sort. These figures were substantially higher than those observed in almost all epidemiological studies of the middle childhood age group.

In the empirical investigation following the literature review, 32 children of very superior intellectual ability (with Stanford-Binet IQs exceeding 164) were compared to 49 children of moderately superior intellectual ability. The children ranged in age from six to nine.
Children of very superior intellectual ability were found to exceed the clinical screening criterion on the Child Behavior Checklist far more frequently than the normative sample. In comparison with children of moderately superior intellectual ability, the children of very superior intellectual ability were found to be more isolated from their age peers. In addition, their parents expressed more concerns about their social development. Many of the children of very superior intellectual ability lost substantially in terms of intellectual ability between the ages of four and six years. In addition, a substantial minority seemed to lack the motivation to develop their intellectual gifts. The children were, however, found to be participating in special programs for the gifted more often than children of moderately superior intellectual ability, and they were also rated higher in terms of academic performance than children of moderately superior intellectual ability.

One of the generalizations of this literature review and empirical study is that there are many obstacles to turning abilities into achievements. Because of very superior intellectual ability, one may experience enough dislocation with one's environments to make problems almost inevitable. Yet little professional and parental attention has been devoted to identifying and fulfilling the needs that children of very superior intellectual ability may not share with children of normal intelligence. If providing optimally for very intellectually superior children is a goal, and it appears self evident that it ought to be, then much more serious developmental study is needed.
current academic placement, and open-ended descriptions of problems and characteristics particular to each child. In addition, the Longitudinal Study Follow-up Questionnaire asked questions about how intently a child was pursuing his/her intellectual interests.

The scoring of the parent concerns in the area of intellectual and social development were of particular interest as dependent variables. These concerns were listed by parents in response to the question, "Please describe any special concerns you may have about your child's future intellectual, social, or emotional development?" For the purposes of this study, the number of parent concerns in the areas of intellectual and social development were counted. Entries were NOT rated for severity, which would have necessitated possibly unreliable evaluations of particular raters. The only decision to be made was whether the concern was intellectual, social, or emotional in nature. Protocols were reviewed twice, two months apart, and the agreement between assignments to each category were computed. At each scoring, twenty-eight intellectual concerns were counted. At the first scoring, thirteen social concerns were counted, and at the second scoring, twelve social concerns were counted. It is felt that this yielded a satisfactory measure of reliability for the dependent variable as it was used in this study.
APPENDIX ONE

Critical Items from the Children's Friendship Questionnaire

1. Are your friends
   1. mostly the same age as you
   2. mostly younger than you
   3. mostly older than you.

2. How many really good, close friends do you have?

3. Are most of your friends
   1. boys
   2. girls

4. Do you have
   1. too few friends
   2. the right number of friends
   3. too many friends

5. Children were asked whether they would prefer to do the following
activities by themselves, with a younger child, with someone their own age, with an older child, or with a grown-up: read a story, build a model, go for a walk, do a puzzle, eat at a table, ride a bike, play at the park.
APPENDIX TWO

Critical Items from the Longitudinal Study Follow-up Questionnaire

Parents were asked to respond to the following questions:

1. Describe your child's performance in school during the autumn of 1981 as reflected in school grades and/or teachers' comments using the following scale: 1- unsatisfactory, 2- below average, 3- satisfactory, 4- superior, 5- extraordinary.

2. Where does your child fall in terms of academic achievement when compared to his/her classmates. 1- top in class, 2- among highest, 3- above average, 4- average, 5- below average, 6- among lowest, 7- lowest in class.

Parents were asked to rate the following items in terms of importance assigned within their philosophy of education, using a one to five scale (1- very significant...5- insignificant). Parents were then asked to indicate how well each item was being met in their child's current academic placement, using a one to five scale (1- very well...5- very poorly).

- intellectual level of offerings, content areas of offerings,
- pace of instruction, similarly interest peers, inspiring teachers, supportive milieu, non-academic activities,
- recreational contact with peers, teacher attitudes regarding achievement, peer attitudes regarding achievement, time for interaction with peers, time for interaction with teachers,
- quality of interaction with peers, quality of interaction with teachers.

Parents were asked to respond to the following item: Please describe any special concerns you may have about your child's future intellectual, social, or emotional development.

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