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# Parental assessment of social and emotional adaptation of children at high risk for schizophrenia.

Michael Allen Glish

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PARENTAL ASSESSMENT OF SOCIAL AND EMOTIONAL  
ADAPTATION OF CHILDREN AT HIGH RISK FOR SCHIZOPHRENIA

A Dissertation Presented

By

MICHAEL ALLEN GLISH

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 1980

Department of Psychology



Michael Allen Glish

1980

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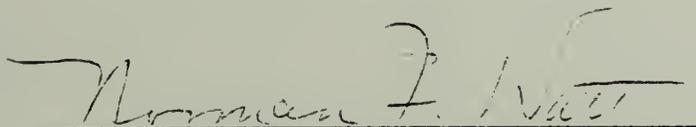
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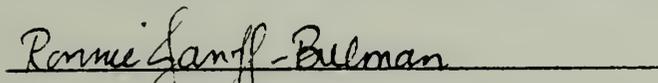
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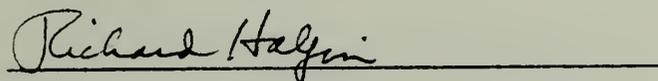
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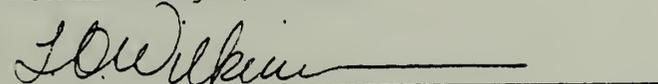
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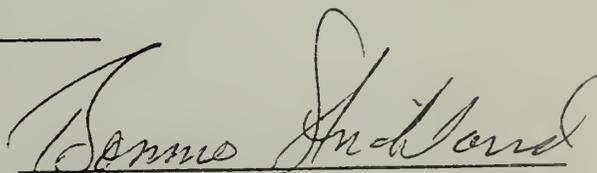
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## DEDICATION

On the basis of precious little information, I decided after my freshman year in college that I wanted to work in the field of community mental health. I was told that the best preparation for such a career was to go to graduate school and become a clinical psychologist. Eight years later, I know considerably more about both myself and my chosen field and I feel I made the right choice.

An influence which has contributed to my interest in a career in public service has been the example of my grandfather, Al Mayden. For most of his life he worked for the Bureau of Federal Prisons. As long as I can remember, I have heard him speak in human terms of the inmates he served. He believes that prisons can help people to return to productive roles in society, rather than simply serve as a means of locking them up. I believe that mental health centers and hospitals should also strive toward that goal.

As I begin to follow in my grandfather's footsteps, I want to take a moment to acknowledge the impact that his love and support have had on my life. So I am dedicating my dissertation to you, Grandpap. I hope to emulate your integrity and dedication in my life.

#### ACKNOWLEDGEMENTS

There are three people who I want to single out who are also responsible for this research. Norman Watt has been my advisor throughout graduate school and has bolstered, in his quiet way, my interest in quantitative research in psychology. I am especially grateful for the offer to be his man in New York City, where I worked for a year on his research grant. During that year I worked with L. Erlenmeyer-Kimling and her staff and it was she who was kind enough to allow me to see what I could make of the parental interviews from her research project. I am the beneficiary of the considerable effort it took to gather the data I have used in the present study. Finally, I am indebted to my wife, Linda, who in our first year of marriage has helped in the delivery of our first brainchild. I hope I will be as helpful when her dissertation is due.

## ABSTRACT

### Parental Assessment of Social and Emotional Adaptation of Children at High Risk for Schizophrenia

September 1980

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M.S., Ph.D., University of Massachusetts

Directed by: Norman F. Watt, Ph.D.

The detection of prodromal signs of schizophrenia requires measurement instruments based on valid categories of child behavior. Studies that have attempted to derive empirically based categories of both adaptive and maladaptive behaviors are reviewed. These studies have consistently found three bipolar dimensions: academic achievement vs. learning disability, cooperation-compliance vs. aggression, and social participation vs. withdrawal. A fourth, unipolar category that describes symptoms of emotional instability has also been found. Schizophrenia development studies have infrequently used empirically derived categories, although the measures which have been used typically reflect these dimensions.

Of the research methods used in schizophrenia research, follow-back and prospective methods have produced the most reliable and generalizable results. These studies have shown that preschizophrenics and high risk subjects are typically emotionally unstable and either aggressive or withdrawn. In some studies, index males have been more aggressive while index females have been more withdrawn. Using information obtained in three rounds of parental interviews, it was predicted that children of schizophrenic parents would show progressive



deterioration in social and emotional functioning over time as compared to the children of psychiatrically normal parents. Sex differences were expected to show index males as more aggressive and index females as more withdrawn. Parents indicated during the third round interview whether their children were in need of psychological treatment. It was predicted that children in need of help would show poorer social and emotional functioning than children who were not deemed in need of help. The dependent measures were derived from the interview items by a correlational technique. Emotional Instability, Aggression, and Withdrawal factors were obtained for all three rounds; Parental Conflicts was obtained for Round 3 only.

The data were analyzed using Risk, Social Class, and Sex as independent variables. Each round was analyzed separately and Round 1 and Round 3 were reanalyzed using a repeated measures analysis. The results showed that low social class index subjects were more emotionally unstable than low social class controls or high social class subjects in either group during Rounds 1 and 2. By Round 3 the difference was found between the index and control groups, but social class was no longer a factor. Index children also had worse relationships with their parents. Males were more emotionally unstable and aggressive than females during all rounds.

Children rated by their parents as needing psychological treatment were found to be more disturbed on all Round 3 factors. Need for help was not predictable from Round 1 ratings. When the criterion for service need was redefined as being emotionally unstable and aggressive or emotionally unstable and withdrawn, need for help was predictable

from the earlier ratings.

It was concluded that the group comparison method is not sensitive to the presence of subgroups that may be deviant on different dimensions. A developmental theory by Ricks and Berry (1970) may account for why schizophrenia development studies have variously found index subjects to be either withdrawn or aggressive. Methods capable of discerning subgroups of incipient schizophrenics at varying developmental stages may be more appropriate than the group comparison method.

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## C H A P T E R I

Schizophrenia is the most dramatic of the major mental disorders. The single term implies a unitary disease, yet the range of symptoms and their impact on a person's life can vary widely (Garmezy, 1970). One form of schizophrenia, often referred to as acute or reactive schizophrenia, has a sudden onset, a brief course, and good prognosis. Another form of the disorder, referred to as chronic or process schizophrenia, has a gradual onset, a lengthy course, and an unfavorable prognosis. Symptoms of the disorder include bizarre, grandiose or persecutory delusions, auditory hallucinations, loose associations and illogical thinking, flat or inappropriate affect, and disorganized behavior. Although the full range of symptoms can appear in either form of the disorder, research on the process-reactive distinction has shown that symptoms of reactive schizophrenia frequently are in the domain of thought while the symptoms of process schizophrenia are in the domain of behavior (Phillips, 1968).

The most tragic consequence of schizophrenia is the debilitating effect that it has on the life of the afflicted person. There is invariably a deterioration of functioning in social and family relationships, work, and self-care. The long term effects of this deterioration are compounded as the schizophrenic is either institutionalized or is left to fend for himself with a meager (if any) income and few (if any) friends or loved ones, barely able (if at all) to take care of the basic tasks of daily living.

Beginning in the mid-1960s state hospitals began to empty in the name of "deinstitutionalization", a well intentioned idea designed



to increase the quality of life of mental patients who had been warehoused for years, often with only cursory treatment. Quality of life of released patients was hoped to improve as they were treated in their own communities and allowed to lead near normal lives in the least restrictive setting possible. Programs of community care, while adequately provided in some areas, have not been established in other areas due to lack of trained mental health professionals and limited funding (Bloom, 1977). A result of inadequate community-based services has been that schizophrenics and other mentally ill persons have gravitated to decaying urban areas. The unavailability of low cost housing and subtle (as well as not so subtle) social pressures have forced them from other areas.

The cost of schizophrenia in both personal and social terms is a compelling reason to study the etiological process of the disorder. Knowledge about this process could potentially lead to more effective treatment and, ideally, to prevention. The primary method of research in this area has been to study adults who have become schizophrenic (Mednick and McNeil, 1968). The potent effects of the disorder, however, obscure its origins, which has led some researchers to ask questions of friends and family members and look at school and clinic records as a means of reconstructing the schizophrenic's past. Most recently, this look into the past has begun with the present, by observing children at high risk of becoming schizophrenic as they grow up. It is hoped that contemporary accounts of preschizophrenics' childhood development will result in a clear picture of the early signs of schizophrenia that until now have been so elusive.

The present study derives from one such high risk research program that has been underway in New York City for nearly a decade (Erlenmeyer-Kimling, 1975). The project has focused on a broad range of developmental measures encompassing cognitive and psycho-physiological functioning, psychological functioning as assessed by psychological testing and psychiatric interview, and social, emotional, and academic competence as assessed by parents and teachers. The study children were between the ages of 7-12 years when the study began, and by now are at an age when schizophrenia has its highest incidence. In fact eight children, seven of them high risk subjects, have already suffered their first breakdown.

We will focus on the parental assessments of their children's behavior as obtained in three rounds of interviews. Parents are the most intimately aware of how their children behave. Teachers and other raters have been considered more objective than parents, but not as familiar with the full range of behavior as a parent might be (Arnold and Smeltzer, 1974; Achenbach and Edelbrock, 1978). Parental evaluations are, therefore, an important contribution to the overall understanding of a child's development.

#### Approach of the present study.

A considerable amount of research has been done to derive a set of categories that describe children's interpersonal and emotional functioning. This body of literature will be reviewed with an eye towards the description of such functioning in both adaptive and maladaptive terms. Secondly, the schizophrenia development research

literature will be reviewed as a basis for the rationale and hypotheses of the present study.

The interview protocols used in the present study are quite comprehensive, but are not directly amenable to statistical analysis. The results of child behavior classification studies have served as a guide in constructing a set of factors used to compare the high risk subjects to the normal controls. The method of group comparisons in nonexperimental research, however, entails a set of logical and statistical issues not encountered in traditional experimental research. These issues will be discussed and a method formulated capable of reliably detecting any differences that exist between the groups.

## C H A P T E R   I I

### CLASSIFICATION OF CHILDREN'S BEHAVIOR

Recent models of the etiology of schizophrenia share the common assumption that early signs of the disorder are observable before the actual onset of symptoms. Some theorists believe that schizophrenia is rooted in psychological or social events during childhood and adolescence. While others suggest that genetic factors begin the process at the moment of conception (Garmezy and Streitman, 1974). Regardless of theoretical orientation, the accurate perception of premorbid signs of developing schizophrenia requires suitable measurement instruments and research designs. A large body of research rarely cited in schizophrenia studies has contended with the problem of developing such a measurement system for childhood behavior, approaching the issue from two directions: the factorial description of adaptive behavior and the empirical classification of deviant behavior. Schizophrenia researchers have made a contribution to this literature, but it has been primarily the efforts of developmental psychologists and child psychopathologists which have resulted in clearly stated dimensions of child behavior and well developed rating instruments.

Unfortunately, the classification systems have been almost as numerous as investigators who have attempted to develop them. The resulting proliferation of scales, categories, and descriptive phrases has left the field without a common language for comparing findings. A selection of classification studies will illustrate the plethora of findings and the methods used to obtain them.

Despite the apparent jumble, however, there is a consistency that emerges among the categories obtained, a consistency that has much to recommend to researchers interested in behavioral antecedents of schizophrenia.

#### Classification of adaptive behaviors.

A major theoretical focus for the study of adaptive child behavior has been placed on social competence. Social competence is the ability of a person to accept and respond effectively to societal expectations according to his or her age and sex. It is also the ability to flexibly and effectively meet novel and potentially disruptive conditions, and to be able to impose one's own direction on the course of events (Phillips, 1968). White (1959, 1965) has proposed that the acquisition of social competence demands years of practice. Such practice begins in infancy with simple play and continues unabated until adulthood requires the mastery of career, family, and interpersonal relationships. An important aspect of social competence is the development, through mastery, of self-esteem. Boundaries between self and not-self are established by learning the properties of external objects. This can be contrasted with schizophrenic persons who show poor reality testing, a blurring of self-other boundaries, low self-esteem, and low interpersonal competence. Schizophrenia can be conceptualized, therefore, as resulting from inadequate development of social competence. White contended that schizophrenics, as children, probably experience "chronic ineffectiveness" which exerts its impact in a cumulative fashion until final breakdown. Breakdown occurs when the fragile adaptive skills of

a socially incompetent person can no longer cope.

The relevance of social competence to the study of adult psychopathology is both theoretical and predictive (Garmezy, 1974). Premorbid social competence has been found to predict symptoms and prognosis not only in schizophrenia but in other forms of psychopathology as well (Zigler and Phillips, 1961 and 1962; Garmezy, 1970). The premorbid social competence scales used in these studies were based on characteristics present immediately prior to the onset of symptoms. The first such measure was the Elgin Prognostic Scale (Wittman, 1941) which measured personality features, rate of onset and precipitating events, symptoms and their duration, and body build. Phillips' initial scale (Phillips, 1953) covered premorbid history, possible precipitating factors, and symptoms. Precipitants and symptoms (not to mention body build) were found to have a weak relationship to prognosis and were disregarded in later studies in favor of premorbid history.

Zigler and Phillips (1961, 1962) assumed that persons of higher social competence would recover more quickly from mental disorders due to their greater adaptive potential. Adaptive potential was measured by age of onset, intelligence, education, occupational level, employment history, and marital status. Attributes of high intelligence, accomplishments in education and work, and the presence of a single continuous marriage were considered to be evidence that a person had adapted to the demands of society. Phillips (1968) extended the measurement of social competence to include more sensitive indicators of adaptive effectiveness. These indicators were grouped into two

major areas of adaptation: 1) education, work, and care for self and one's dependents and 2) involvement in interpersonal relationships. Factors that contributed to effectiveness in these areas were intelligence and social, moral, and psychological development.

The characteristics measured by premorbid social competence scales are the cumulative adaptive accomplishments of an individual immediately prior to the onset of psychiatric disorder. An advantage of this method is that the information can be obtained easily from hospital records. In addition, the knowledge of a person's most recent accomplishments permits inferences about less recent achievements. For example, a person who graduated from college undoubtedly also graduated from high school, as well as completing junior high and grammar school. But the mere implication of such achievements does not provide any information about what a person was like at those earlier times. Secondly, it is not evident from the method of scale construction what the empirical relationship is among the various elements of social competence.

Other investigators have approached social competence from the vantage point of the contemporary behavior of children. The advantage of such an approach is two-fold: aspects of child behavior can be measured directly rather than inferred and behavior can be measured at several longitudinal time points rather than at a single point later in a child's life. Measurements taken in this way are likely to be more reliable and more sensitive to developmental changes. These features can also lead to more valid conclusions about aspects of child development and its relationship to adult behavior.

Gestin (1976) used this approach to develop the Health Resources Inventory. This scale was intended to describe the personal and social competence of grammar school children. Teachers rated their pupils on 54 items that covered areas of self-concept, affective expression, classroom response, motivation, interpersonal skills, socialization, and achievement. The subjects were 592 children in first, second, and third grades. Factor analysis yielded five factors: Good Student (effective learning), Gutsy (adaptive assertiveness), Peer Sociability, Rules (ability to function within limits), and Frustration Tolerance.

Gestin was also interested in the relationship between social competence and pathology. To measure pathology, he used a 41 item behaviorally-oriented measure developed by Clarfield (1974). This scale was composed of three empirically derived problem dimensions: Learning, Acting Out, and Shy-Anxious. Teachers rated disturbed and normal children using both the competence-oriented and the problem-oriented scales. Interscale comparisons showed that the problem-oriented factors correlated negatively with several of the competence-oriented factors. The pattern of significant correlations suggested the two scales described opposite ends of bipolar dimensions. Acting Out and Rules were negatively correlated, describing a cooperative-noncooperative dimension. Shy-Anxious correlated negatively with Frustration Tolerance and Peer Sociability, indicating a participation-withdrawal dimension with confident-anxious overtones. Finally, Learning and Good Student were negatively correlated, describing an academic success-failure dimension. These results support the



traditional view that health and pathology are inversely related. The factors of the Health Resources Inventory, however, suggest that children's mental health is more than simply the absence of problem behaviors, i.e., that mental health implies active prosocial and adaptive behaviors.

Kohn (1977) took a similar approach to the study of primary school children's social competence. He developed and validated two separate rating scales, one to measure social competence and the other to measure symptoms of psychopathology. Two factors accounted for the majority of variance on both instruments: a dimension of interest-participation vs. apathy-withdrawal and a dimension of cooperation-compliance vs. anger-defiance. The symptom checklist yielded unipolar factors representing the negative poles of the two social competence dimensions. Two other indices were used to describe psychological functioning: a rating of global impairment and the teacher's determination of need for psychological treatment.

The subjects were pre-school children who were rated by their teachers once a year through the fourth grade. Demographic variables such as social class, race, and family intactness exhibited a minor relationship with social competence and emotional disturbance. Sex, however, was an important factor. Boys were rated as more globally impaired, in greater need of referral for treatment, and more angry-defiant in every grade. Although boys were also more apathetic-withdrawn in preschool and early grade school, girls became more so in later grades. Behavioral persistence was tested by looking at subjects in the top and bottom quartiles at each grade level to see if their

relative positions remained the same from year to year. The best predictions of persistence were for the shortest intervals (i.e., one year), with predictive efficiency declining as the time span lengthened. The proportion of correct predictions ranged from 31% to 57%, indicating that between a third and a half of the most healthy and the most disturbed children would remain so designated over time.

School performance was measured by teacher rated Task Orientation (from a scale developed by Shaefer and Aaronson, 1966) and standardized measures of verbal and arithmetic achievement. Comparisons of school performance and emotional impairment indicated that emotional impairment antedates poor school performance and, therefore, cannot be considered solely a consequence of educational failure. Apathy-Withdrawal and Low Task Orientation were the best predictors of later poor school performance. Low Task Orientation and Anger-Deviance were highly related, but when Task Orientation was statistically controlled, Anger-Defiance had no relationship to school performance. Disadvantaged status (i.e., low social class, being Black, and lack of family intactness) was also related to poor school performance.

Livson and Peskin (1967) investigated the relationship of childhood social competence to adult mental health. As Kohn did, Livson and Peskin took a longitudinal approach to childhood social competence. They investigated children's capacity to cope with universal life stresses such as physical, psychosocial, and psychosexual demands. Childhood was divided into four periods: ages 5-7, 8-10, 11-13, and 14-16. Behavior during these intervals was assessed by a 35 item scale which was cluster analyzed separately for each group. The

resulting clusters were then compared to global ratings of adult mental health by multiple regression.

Only the clusters of the 10-13 year old period were significantly related to adult mental health. Males who were mentally healthy as adults were characterized as exhibitionistic, relaxed, cheerful, expressive, in control of their temper, and not shy or quarrelsome.

Females were independent, self-confident, curious, and had a healthy appetite. Conversely, males who were mentally unhealthy as adults were characterized as withdrawn, aloof, and having poor control over hostility. Females were dependent, self-doubting, and less inquisitive. The failure of early childhood and adolescent ratings to predict later mental health led Livson and Peskin to conclude that a successful transition from grammar school to junior high is a prime factor in successful adaptation later in life.

Chamberlin (1976) developed a teacher rating scale for early detection of child emotional disorders. Factor analysis of the rating scale yielded four factors: Aggressive-Resistant, Inhibited, Activity Level - Attention Span, and Prosocial Orientation. The first two factors are familiar ones; the third factor is similar to Task Orientation in Shaefer and Aaronson's (1966) scale. The fourth factor reflects participation in school activities, friendly relations with other children, and leadership ability. However, when tested a year later, many of the children's ratings changed. The correlation between the two time periods was .50, leading Chamberlin to conclude that some children labeled initially "high risk" functioned normally a year later, even in the absence of specific intervention. He felt that

it was potentially harmful to label a child on the basis of transient and situational behavior. Interestingly, Kohn (1977) interpreted similar findings to mean that behavior was stable and predictable.

Each of the studies reviewed have found a group of broadly based factors which describe independent areas of childhood behavior. Another possible approach is to look at finer, inter-related aspects of functioning. Becker and Krug (1964) hypothesized that a larger group of first-order factors could be subsumed by a smaller group of second-order factors. Factor analysis of the parent and teacher ratings of kindergarten pupils yielded two broad factors and a number of smaller ones. The two broadly based factors were Emotional Stability vs. Emotional Instability and Extraversion vs. Introversion. The five more narrowly based factors were found, as predicted, to be subsumed by the broad-based factors. Emotionally stable, extraverted children were found to be cooperative, loving, and sociable, while emotionally stable, introverted children were calm-compliant and submissive. Emotionally unstable, extraverted children were assertive, emotional-demanding, and defiant-hostile. Emotionally unstable, introverted children were distrusting and withdrawn. The authors' conclusion was that the hierarchical method of factor construction more adequately reflects the empirical structure of the variables by recognizing the dominant influence of the two major dimensions without obscuring the contribution of more narrowly based attributes.

#### Classification of child psychopathology.

The effort to find a reliable and coherent taxonomy of childhood

psychopathology represents the second major research area that has focussed on the categorization of child behavior. The importance of such a system extends beyond its use by clinicians to those who have an interest in training, epidemiology, and research (Achenbach and Edelbrock, 1978). This effort was a reaction to the paucity of diagnostic categories in the Diagnostic and Statistical Manual. In the first edition (American Psychiatric Association, 1952), there were only two categories: Adjustment Reaction and Childhood Schizophrenia. Dreger et al. (1964) noted that most cases were either left unclassified or diagnosed as an adjustment reaction. The latter classification did nothing more than to state what was already known: that the child has a problem.

Although attempts to produce empirically based categories were undertaken as early as the 1940s (Ackerson, 1942; Hewitt and Jenkins, 1946). The bulk of such studies appeared in the 1960s and later when advances in computer technology allowed the convenient use of factor analysis. Peterson (1961) devised a 58 item teacher checklist based on referral problems of child guidance center patients. The subjects were elementary school children who were divided into four groups: kindergarten, first and second grades, third and fourth grades, and fifth and sixth grades. The ratings from each round were analyzed separately with two major factors resulting in each analysis: Conduct Problems and Personality Problems. The Conduct Problems factor described disruptive, destructive, and uncooperative behavior. The Personality Problems factor encompassed withdrawal and shyness, as well as internalizing symptoms such as anxiety, fears, and depression. Boys proved to have more conduct problems throughout grade school and more

personality problems until fourth grade. However, after fourth grade girls overtook the boys on the latter factor.

In a similar study, Dreger et al. (1964) had parents of clinic-referred and normal children (6-13 years of age) describe their children's behavior using a card sorting technique. There were 142 items that, when factor analyzed, yielded 10 factors which covered characteristics such as egocentricity, antisocial aggressiveness, poor scholastic achievement, sleep disturbance, sociability, and hyperactivity. The clinic children were more antisocially aggressive, more hyperactive, and weaker scholastically. Normal children were, interestingly, more sadistically aggressive and more socially immature.

In addition to differentiating clinic referred and normal children, Connors (1970) tested the ability of an empirically derived scale to differentiate various diagnostic groups. The study also investigated the relationship of age, race, and social class to the factor structure. Five factors were derived from the symptom checklist: Aggressive-Conduct Disorder, Anxious-Inhibited, Enuresis, Antisocial Reaction, and Psychosomatic Problems. Clinic children received more negative ratings on all five factors. The scale also differentiated hyperkinetic and neurotic diagnostic groups. The hyperkinetic children were more restless, more prone to lie, and had more problems with friends. The neurotic children had more fears and worries, and more psychosomatic problems. Social class and age had no relationship with any of the factors. Race was related to one factor, antisocial reaction, indicating that Blacks were more antisocial.

Miller (1967a and b) was interested, as were Becker and Krug

(1964), in the hierarchical relationships among narrowly based factors. Eight such factors were obtained from ratings of the behaviors of male clinic patients. Factor analysis of scores based on these dimensions yielded three second-order factors. Correlations of the first-order factors with the second-order factors produced the following hierarchical relationships: Inhibition consisted of Social Withdrawal, Anxiety, and Sleep Disturbance; Aggression consisted of Infantile Aggression, Hyperactivity, and Antisocial Behavior; and Learning Disorders consisted of Learning Disability and Immaturity.

Jenkins (1966) used currently available computerized statistical methods to reanalyze the pioneering data of Hewitt and Jenkins (1946). The earlier study found three factors: Overinhibited, Socialized Delinquent, and Unsocialized Aggressive. The later factor analytic study produced five narrow-band factors which were subsumed by two broad-band factors: Inhibited was comprised of Shy-Seclusive and Overanxious-Neurotic and Aggressive consisted of Hyperactive-Distractable, Undomesticated and Socialized Delinquent.

Thomas Achenbach has perhaps undertaken the most extensive attempt to create an empirically based classification system. In his first study (Achenbach, 1966) he culled parent, teacher, public agency personnel, and clinician observations from clinic records of 300 male and 290 female patients. Five factor analyses were performed for each sex. The first two analyses looked at age groups (4-10 and 11-15 for boys, and 4-11 and 12-15 for girls). Two more analyses looked at two social class groups formed by median split. A fifth analysis looked at the total sample.

The results were approximately the same in all of the analyses. The first factor was bipolar and accounted for the majority of the variance. The second factor was unipolar and accounted for much of the remaining variance. The pattern of factor loadings for these two factors remained constant over all ten analyses, indicating a homogenous factor structure across sex, age, and social class. The bipolar factor, Internalizing/Externalizing, reflected phobias, fears, and withdrawal at one end and disobedience, fighting and destructiveness at the other. The second factor, Severe and Diffuse Psychopathology, reflected fantastic thinking, bizarre behavior, and ideas of reference.

In two later studies (Achenbach, 1978; Achenbach and Edelbrock, 1979), the method was altered to create a parentally rated checklist. The checklist was comprised of items from the earlier study as well as newly added social competence items. The latter items covered participation in school and social activities, involvement in social relationships, and school performance. The subjects, boys and girls receiving treatment at child guidance clinics, were separated into two age groups (6-11 and 12-16 years). The ratings were factor analyzed, yielding two major factors for each of the four groups: Internalizing and Externalizing. In three of the groups there was a third, Mixed, factor.

The results of the four analyses were strikingly similar. The composition of the Internalizing and Externalizing scales was nearly identical across age and sex groups. As the children got older, however, their problems changed slightly. For example, Immaturity was a problem only for older children. In addition, with increasing age, Withdrawal took on a different quality depending on the sex of



the child. Girls further internalized withdrawal by becoming depressed, while boys externalized it somewhat by becoming hostile.

#### Schizophrenia development scales.

Attempts to develop empirically based classification scales for use in schizophrenia development research have been few. As will be seen in Chapter IV, the behavioral categories in these studies are most often rationally based. This provides little basis for inter-study comparison of results. Some studies (e.g., Weintraub, Neale, and Liebert, 1975) have used scales developed by others, while a few hardy souls have undertaken the development of their own scales.

Roff et al. (1976) studied the relationship between childhood symptoms and adult outcome based upon data from child guidance records of male schizophrenic patients. Symptom descriptions were culled from the records and factor analyzed. The resulting factors were Unsocialized Aggressiveness, Low IQ-Poor School Performance, Neurotic, and Schizoid. Pekarik et al. (1976) developed a peer rating scale for the Stony Brook High Risk Project (Neale and Weintraub, 1975). From an initial list of 80 items drawn from previous research on peer rating scales, only the 35 most reliable items were retained. These items were used by pupils in grades one through nine to rate their fellow classmates. Factor analysis yielded three factors: Aggression, Withdrawal, and Likeability.

The most extensive empirical categorization procedure in schizophrenia development research has been undertaken by Norman Watt. The first stage of his procedure was a restropective study of the school

behaviors of a group of schizophrenics (Watt et al., 1979). Spontaneous teacher comments found in primary and secondary school records were rated as either positive or negative along 23 bipolar dimensions. When all the remarks were coded, the number of negative comments was subtracted from the number of positive comments for each scale, and divided by the number of years which the remarks spanned. The result was the average number of remarks per year for each of the 23 scales.

The scales were both grouped rationally to form clusters and factor analyzed to form empirical factors. The rational clusters were Scholastic Motivation, Emotional Stability, Extraversion, Assertiveness, and Agreeableness. The empirical factors were Conscientiousness, Security, Extraversion, Personableness, Independence, Achievement, Submissiveness, and Consideration. The empirical factors were, for the most part, finer gradations of the dimensions represented by the rational clusters. The results of the study indicated that the two methods of scale construction were equally useful, although the clusters were more broadly based and, therefore, likely to be more reliable.

The retrospective scales were used to form the basis of the Pupil Rating Form, a scale to be used in prospective studies of schizophrenia development (Grubb and Watt, 1979). The Pupil Rating Form contained the original 23 scales plus five additional scales. The items were bipolar and rated along a five point scale. Four factors were derived from teacher ratings of normal children: Scholastic Motivation, Emotional Stability, Extraversion and Harmony (Watt et al., 1980). These factors resembled the rational clusters of the longitudinal study.

### Overview of classification studies

Although obscured by variations in method and terminology, the classification of children's behavior does show some consistency of pattern. Studies of general populations of children, often based on school samples, have repeatedly yielded three principal dimensions of social competence that describe academic achievement, compliance-cooperation, and social participation. Studies of clinical samples generally find clusters of psychological symptoms that correspond inversely with the major dimensions of social competence: learning disability, aggression, and withdrawal. This suggests that social competence and disturbance are opposite ends of continuous child behavior dimensions. A fourth, unipolar, factor from the clinical studies reflects emotional instability. Emotional instability tends to correlate positively with withdrawal, while learning disability is positively associated with aggression. The four factors show sufficient independence, however, to be considered four major, distinct domains of child behavior. Validity of these dimensions are indicated by their ability to distinguish between groups of normal and disturbed children.

Variability in results stems from several sources such as the content of scale items, populations sampled, the raters, and factoring method. The major source of variability is most likely item selection and subject status, i.e., clinic referred or normal children (Miller, 1967a). Parent, teacher, and clinician ratings have resulted in similar factors, as have different methods of factor extraction.

## C H A P T E R    I I I

### LONGITUDINAL RESEARCH IN SCHIZOPHRENIA

The search for the behavioral precursors of schizophrenia has been approached in four major ways (Garmezy and Streitman, 1974). Clinical retrospective studies have been the most predominant (Mednick and McNeil, 1968). These studies rely on the recollections of adult schizophrenics, as well as those of relatives, friends, and teachers as sources of information about childhood behavior. Follow-back studies obtain such data from information routinely collected during childhood such as cumulative school records. Follow-back studies begin with children who are being treated for psychiatric problems. The subjects are later assessed in adulthood to determine the relationship between childhood disorder and adult adjustment. Prospective (or high risk) studies follow children who are thought to be vulnerable to schizophrenia, assessing them at regular intervals until they become adults.

These approaches have relative strengths and weaknesses which affect the validity of their findings. The central issues affecting validity are retrospective bias, generalizability, and ability to test specific hypotheses (see the extensive reviews of Mednick and McNeil, 1968; Offord and Cross, 1969; Jones, 1973; Rosenthal, 1974; and Garmezy and Streitman, 1974). Results which are unbiased, generalizable, and designed to test specific hypotheses provide an empirical base from which plausible etiological theories can be developed.

Four research paradigms.

Clinical retrospective method. This is the approach most prone to retrospective bias (Yarrow, Campbell, and Burton, 1970). Memories of events many years past tend to fade, so childhood behaviors may only be vaguely remembered. A subject's current behavior may influence recollections of earlier behaviors. For example, if a patient is currently withdrawn, others might tend to think the patient was always this way. Emotional and social factors can also affect what is divulged. A mother may feel guilty about a past event or may feel ashamed to reveal a socially undesirable aspect of her child. This method is able to test specific hypotheses and representative samples of schizophrenics can be readily obtained. But the relative certainty of biased data eliminates this method from serious consideration. Results of studies which have used clinical retrospective data are, therefore, of questionable validity.

Follow-back method. Retrospective bias is eliminated when the data are obtained from records kept prior to the onset of illness. School records in particular contain a wealth of data concerning children's social and emotional functioning, in addition to performance in school. Teachers or guidance counselors have no knowledge of a child's eventual adjustment, although they may be influenced by previous entries in the cumulative record.

The researcher is limited, however, in the kinds of hypotheses that can be tested using data which were recorded for reasons other than psychological research. Entries may not refer to certain domains of behavior (such as life at home) and may be expressed in terms too vague or general. Records are easy to work with, however, and are readily

available if further hypotheses are developed. A significant advantage of using school record data is that it is equally available for both schizophrenic and normal subjects. Creating representative samples is, consequently, not a difficult task.

Follow-up method. Most of the studies using this method have studied children who were seen in child guidance centers. Although this may be a good way of investigating the range of adult outcomes in these children, it is not a particularly useful way of determining the etiology of schizophrenia. Only a minority of schizophrenics are seriously disturbed as children. Furthermore, most children seen in child guidance centers are male and have been referred for destructive behaviors (Garnezy and Streitman, 1974). This eliminates from consideration representative samples of females, children with behavior problems other than aggressiveness, and those who were never disturbed enough to require treatment.

The range of testable hypotheses is potentially great using the follow-up approach. Records kept by clinicians may be more amenable to psychological research than school record data. Behaviors may be described with more precision and terminology may be more consistent across clinicians. Restrospective bias is, as in the follow-back method, eliminated since there can be no prior knowledge of outcome. Contributors to the patient's record, however, could be biased by diagnoses or other assessments written before their entries.

Prospective method. Currently the most favored method in schizophrenia development research, this approach allows for periodic assessment as subjects develop during childhood and adolescence. High

risk groups can be chosen with a specific theoretical assumption or may be chosen simply because a particular attribute has been shown to be related to higher prevalence of schizophrenia. Thus a behavior geneticist and a family process investigator might both define a high risk group according to schizophrenic parentage. The former would be interested in genetic hypotheses while the latter simply chose the sample because the prevalence rate of schizophrenia is 6 to 40 times higher than in the general population (Kety, 1978). Generalizations of findings from a study using such a sample, however, are limited to the subpopulation of schizophrenics who have schizophrenic parents, and they are in the minority among schizophrenics.

High risk researchers are free to choose measures which can test specific hypotheses. This advantage has a limitation, however. Measures chosen at the beginning of a long-term study may be inadequate to test hypotheses derived many years later. Any changes in data collection to test newer hypotheses may require the sacrifice of data collected prior to these changes.

Of these widely used research methods, only the follow-back and prospective methods are capable of producing results which are free of retrospective bias, are hypothesis specific, and are reasonably generalizable to the schizophrenic "universe". Therefore, a review of follow-back and prospective studies will be presented and their results will guide the rationale of the present study. Clinical retrospective and follow-up studies have provided an initial direction for subsequent follow-back and prospective research, but their results are not of sufficient validity and generality to be considered here.

### School records studies.

Warnken and Seiss (1965) compared teacher comments for a sample of male schizophrenics and normal controls. The authors devised 115 "clusters" of key words and their synonyms to ascertain the frequency of specific comments in the subjects' cumulative school records. The groups differed on 45 clusters. Normals were more often described in positive ways such as friendly, good worker, and honest. They were described negatively as well: lacks friends, overly critical, and submissive. The preschizophrenics were rated in a predominantly negative light. Emotionally they were dependent, dreamy, suffering from feelings of inferiority, not well balanced, and peculiar. Behaviorally, they were rated as both more disruptive and withdrawn: quick temper, restless, and uncooperative, as well as lacking initiative, and being quiet, shy, and withdrawn.

There were further indications of social isolation. The records were examined during primary, junior high, and high school periods. During each period, the subjects were rated on a five-point aggressive-passivity scale. At each level the preschizophrenics were rated as more passive. In addition, nearly two-thirds of the index group participated in no extracurricular activities as compared to only a quarter of the controls.

Barthell and Holmes (1968) measured social isolation by extent of involvement in high school activities. The senior yearbooks of a sample of schizophrenics, psychoneurotics, and normal controls were used as the source of data. The authors classified the activities into four groups: 1) social activities such as student council and



and student publications, 2) service activities such as hall monitor and office assistant, 3) performance activities such as band and drama, and 4) athletic activities. The first group was intended to reflect activities which were primarily social in nature, whereas the second group included activities that were more solitary in nature.

There was no difference between schizophrenics and psychoneurotics on the total number of activities, while both groups were involved in fewer activities than normals. There was a difference between preschizophrenics and normals on the number of social activities. The psychoneurotics' mean fell between the means of the other groups. There were no differences among the groups on any other activity classifications. The latter finding failed to replicate Bower, Shellhammer, and Daily (1960) who found that preschizophrenics had shown less interest in sports and drama than normals. Barthell and Holmes concluded that social participation forms a continuum, with preschizophrenics on the socially withdrawn end of the scale, normals on the socially involved end, and psychoneurotics falling in the middle.

Woerner et al. (1972) looked at both participation in school activities and teacher comments about social competence. The subjects were schizophrenics, personality disorder patients, and their siblings. Siblings were used as a means of controlling for social class, home environment and genetic makeup. Teacher comments were selected from two periods: K-6th grade and 7th-8th grades. Teacher comments were categorized into 1) Group Adjustment (how the child got along with others), 2) Work Habits, 3) Conduct (amount of cooperation in class), and 4) Personal Adjustment (withdrawal, nervous habits, and degree of

happiness). Extracurricular activities were divided into 1) Individual Interests (solitary activities such as reading, music, and painting), 2) Group Participation (groups such as scouts, debating club, and band), 3) Leadership Positions, and 4) Athletic Involvement.

The K-6 results showed that males were lower than females on nearly all social competence ratings. There were no differences between the diagnostic groups on these measures. Psychiatric patients were lower than controls on all four measures, except for male schizophrenics, who did not differ on any measure. The 7-8 results also showed that boys were less socially competent. Psychiatric patients were again lower than controls on all dimensions, with the exception of patients with personality disorders, who differed only on Personal Adjustment. It appeared that deviant ratings decreased in the 7-8 period, but this was felt to reflect the decreased amount of contact that teachers have in junior high as compared to elementary school.

On the individual items, 80% of the schizophrenics were described as withdrawn, lethargic, and having few friends. This compared with only 22% of those with personality disorders. The schizophrenics were also more nervous and had more nervous habits, while personality disordered patients tended to be more hyperactive. There were no differences among the groups on Individual Interests or Group Participation. Male patients did not participate in sports, whereas their controls did. Few subjects in any of the groups held leadership positions.

Watt et al. (1979) rated teacher comments on 23 bipolar scales. These were grouped rationally into five clusters and empirically into eight factors. The subjects were psychiatric patients (schizophrenics,

manic depressives, neurotics, and personality disordered patients) and normals. Schizophrenics were less emotionally stable and less agreeable than their controls; patients with personality disorders were less agreeable than their controls. Empirical factors revealed that schizophrenics were lower on security, extraversion, personableness, and consideration and higher on submissiveness. Personality disordered patients were lower on personableness and manic depressives were higher on independence.

To find out when all these traits became manifest, the ratings for psychiatric patients and normals were divided into two periods, K-6th grades and 7-12 grades. With the sexes combined, there were no differences between the patients and controls during the earlier period on either the clusters or the factors. Male patients were more insecure than female patients relative to the controls. Males in general were less scholastically motivated than girls. During the later period, boys were not only less scholastically motivated, but were less emotionally stable, less assertive, and less agreeable. The diagnostic comparisons showed that patients were less agreeable and more emotionally unstable.

Because the preschizophrenics deviated greatly in the areas of emotional and interpersonal behavior, an extensive series of analyses was conducted to investigate the childhood roots of schizophrenia. Using the subsample of schizophrenics and their matched controls, the groups were first compared on the cluster scores for the entire K-12 period. The results showed that preschizophrenic boys were more emotionally unstable and more disagreeable than their controls. Pre-

schizophrenic girls were more introverted than normal girls.

The ratings were then divided into the two rating periods. During the earlier period, only one group difference approached significance: the preschizophrenic girls were marginally more passive than female controls. This suggestion of passivity gave way in the later period to social introversion. Preschizophrenic boys were found to be more disagreeable than male controls during the later period. The preschizophrenic boys were not more emotionally unstable during either rating period, in contrast with the results when both periods were combined.

Although their study was prospective in design, the results of Mednick and Schulsinger (1968) bear mentioning at this point. Theirs is the only one of the group of high risk studies that has been underway long enough that an appreciable number of high risk subjects has become schizophrenic. Mednick and Schulsinger's examination of the characteristics of this subgroup is comparable to the retrospective comparison of adult schizophrenics in follow-back designs.

The high risk subjects who became schizophrenic (the "Sick Group") were matched with both well adjusted high risk subjects (the "Well Group") and normal subjects. They were compared on a range of measures, including a parental interview and a school report. The parental interview covered the social, familial, and educational status of each subject. The school report covered interactions with peers and academic achievement.

The parental interview failed to differentiate among the groups except in a few areas. The Sick group tended to lose their mothers to

psychiatric hospitalization at an earlier age and for longer periods of time. No behavioral differences marked the Sick Group. Teachers reported that, once upset, Sick Group children remained upset for longer periods of time. They were also more disturbing to the class, being characterized as disciplinary problems, domineering, aggressive, and disruptive. Sex differences were not investigated.

Taken as a whole, school report studies indicate that preschizophrenics are frequently aggressive or socially withdrawn. Studies which measured emotional stability found that these subjects were more disturbed than their normal counterparts. Of the two studies that compared schizophrenics to other psychiatric patients, neither found strong differences in childhood behaviors among the diagnostic groups.

#### High risk studies.

The majority of high risk studies are still in intermediate stages and thus their primary objective - the study of the antecedents of schizophrenia - is unfulfilled. Unlike follow-back studies in which all the subjects are known to be schizophrenic, relatively few high risk subjects in the uncompleted studies have been reported to be schizophrenic. Intermediate results of high risk studies are therefore not unequivocal indicators of schizophrenia development.

The rationale of comparing high risk and normal control groups prior to onset is based on the assumption that a certain proportion of the high risk sample is undergoing the development of schizophrenia. In the case of the genetic risk criterion 6% - 15% of children with one schizophrenic parent and 40% of children with two schizophrenic

parents are likely to become schizophrenic themselves (Kety, 1978). Some investigators assume that fully half of the single-mated offspring will develop some kind of psychopathology (Mednick and McNeil, 1968). Therefore, index and control comparisons should reveal developmental signs of schizophrenia, even if conducted prior to onset. This rationale has been criticized by some (Hanson, Gottesman, and Heston, 1976; Weintraub, Neale, and Liebert, 1975) who state that the characteristics of the subsample of incipient schizophrenics is too small to pull the index mean significantly away from the control mean, assuming that parametric procedures are used.

Using the genetic risk criterion (the most popular in high risk studies) introduces another methodological consideration. The presence of a psychiatrically disordered parent is itself a potent factor in a child's life. Differences between index and control subjects may be attributable to this cause rather than (or in addition to) any intrinsic schizophrenic diathesis. Therefore, a group of children whose parents suffer from a psychiatric illness other than schizophrenia is an important control in high risk studies.

In addition to the Sick Group-Well Group comparisons reviewed above, Mednick and Schulsinger (1968) compared the high risk group to the normal controls on a variety of measures, including psychological and behavioral adjustment. A psychiatrist rated the overall adjustment on a five-point scale ranging from poor to good. The parental interview and school report were also used in the comparison. The results showed that 24% of the high risk subjects were rated poor or relatively poor following the psychiatric interview, as compared to only 1% of the

normal subjects. The parental interview and school report indicated that the index subjects were more easily upset and reacted by withdrawing. They handled interpersonal challenges with passivity and were frequently rejected by their peers.

Higgins (1966) obtained similar results when he divided the index group into children reared at home and those reared in foster homes. Using the psychiatric ratings and the school reports, Higgins found no differences between the groups on either measure. When the individual items of the school report were looked at, however, differences did emerge. Home-reared subjects were more passive, inhibited, uninvolved, and indifferent to teacher approval. The reared-apart subjects were seen as more easily upset.

These results are not completely consistent with the Sick Group-Well Group comparisons. The latter results showed that the Sick Group was easily upset and reacted with aggression. The high risk-normal comparisons showed the high risk group as a whole reacted to provocation with passivity and withdrawal. Home-reared subjects resembled the high risk group, suggesting that withdrawal and passivity are related to schizophrenia development, but could also be effects of being raised by a schizophrenic parent.

Beisser, Glasser, and Grant (1967) assumed that schizophrenic mothers do exert a pathogenic effect on their children. Children of schizophrenic mothers were compared to children of psychoneurotic and normal mothers according to behavioral characteristics as rated by parents and teachers. The sample was divided into two age groups: 5-8 years and 9-12 years. Parents failed to distinguish between the

two diagnostic groups at either time period. Both groups, however, were different from the normal control group. The most frequent behavioral deviations were nervousness, unusual fears, discipline problems, temper tantrums, overactivity, sibling conflicts, peer aggression, day dreaming, and sleep interruption.

Teacher ratings also failed to differentiate between the two diagnostic groups, whereas they did distinguish the latter groups from the controls. Boys were rated more deviant than girls, although the authors did not specify which behaviors the teachers felt were deviant. Agreement between teachers and parents was low despite the similarity of results. The mother-teacher correlation was .27 and the father-teacher correlation was .34.

Landau et al. (1972) obtained parent, teacher, and psychiatric interview data for the children of a mixed group of psychiatric patients, the majority of whom were schizophrenic. Unfortunately there were no comparisons made among the diagnostic groups. Comparisons between the children of patients and children of normal parents were made on an item by item basis. The parent interview indicated that the index children had more problems in the area of primary habit disorders such as bed-wetting, eating problems, and crying spells. They also had more problems with psychosomatic complaints, neurotic symptoms, obsessiveness, and reality testing. The index children had more discipline problems at home and at school and had more difficulty with interpersonal relationships. They were prone toward physical aggression, were more destructive and delinquent, and had more problems with peers.

Teachers reported no differences between index and control children



on school achievement or extracurricular activities, but confirmed the parents' perceptions about delinquency and aggressiveness. Psychiatric examination indicated that more index children were psychiatrically disturbed and suggested that half were in need of treatment. The psychiatric interviewers also commented on the aggressiveness of the index group.

Hanson, Gottesman, and Heston (1976) took an interesting methodological approach. Rather than looking at group differences, they attempted to isolate the subgroup of index children who were most vulnerable to future schizophrenia. Three variables theoretically linked to schizophrenia were chosen from a series of measures made between birth and seven years. These were performance on tests of gross and fine motor coordination, the intertest variability on a battery of psychological tests (e.g., the WISC, Bender Gestalt, Draw-a-Person, and achievement tests), and ratings of schizoid behavior. Schizoid behavior was defined by emotional flatness, withdrawal, irritability, and negativism.

Four groups were used for the discrimination procedure: children of schizophrenic parents, children of other psychiatric patients, and matched and randomly chosen control groups. Cut-off scores for each of the three variables were obtained by finding the scores that maximally differentiated the groupings. A "hit" was a score above the cut-off point for each variable. To be considered a hit on the schizoid variable, a child had to score above the cut-off point at both four and seven years.

The results showed that children of schizophrenics hit on more combinations of these variables than any of the other three groups.

The most striking finding was that five children from the schizophrenic parent group hit on all three variables at once while no other children did. The probability of this occurring by chance was .006. The authors concluded that these five children were at greater risk of becoming schizophrenic. They also suggested that the three marker variables have potential for theoretical and clinical interest.

Rolf (1972, 1976) used peer and teacher ratings to investigate the relative social competence of four target groups and their normal controls. The target groups were 1) children of schizophrenic mothers, 2) children of depressed mothers, and clinic referred children diagnosed as 3) externalizers and 4) internalizers according to Achenbach's (1966) definition. Each target subject was compared to a matched and random control subject chosen from the same classroom. The 1972 study looked at both teacher ratings and peer sociometric ratings, while the 1976 study reanalyzed the peer evaluations using a different method. The results of the teacher ratings from the earlier study and the peer ratings from the later study will be reviewed here.

The teachers rated the subjects on 25 items which were grouped in four rational clusters: 1) Academic Behavior, 2) Emotional Stability, 3) Extraversion, and 4) Agreeableness. Daughters of schizophrenic mothers were less emotionally stable than their controls, but this was the only difference found for the schizophrenic and depressed mother groups. Externalizers were clearly more deviant than their controls on all four clusters. Internalizing boys were also more deviant on all four clusters, while internalizing girls were only less emotionally stable than their controls.

The teachers also rated the children on three scales of global adjustment. These were 1) Emotional Adjustment, 2) Social Adjustment, and 3) Intellectual Potential. On these measures, all four target groups were rated lower than their controls. Externalizers were rated lowest of the four target groups. Thus teachers failed to distinguish children of psychiatric patients from controls on most measures, whereas children being treated for behavior problems were easily distinguished.

Peers judged their classmates using a modified version of the Bower Class Play (Bower, 1969). In the standard version, a child pretends to be the director of a play and selects classmates for various positive and negative roles. Rolf modified the groupings to include negative externalizing and negative internalizing roles as well. A fifth measure was obtained by subtracting total negative roles from total positive roles for each child to establish the directionality of the peer ratings.

The results consisted of enumerating the significant differences between targets and controls as well as comparing the relative standing among the targets for each sex. All targets had fewer positive and more negative roles than their controls with few exceptions. All targets except children of depressed mothers were rated more negatively than positively. Rolf concluded that peers see children of schizophrenic mothers differently than those of depressed mothers.

In assignment of roles, peers appropriately nominated externalizers for externalizing roles and internalizers for internalizing roles. Sons of schizophrenic and depressed mothers were nominated for externalizing roles. Daughters of schizophrenic and depressed mothers were not

nominated for either externalizing or internalizing roles, although daughters of schizophrenics received more nominations for roles indicating withdrawal.

Weintraub and his colleagues (Weintraub, Neale, and Liebert, 1975; Weintraub, Prinz, and Neale, 1978) also used teacher and peer ratings to evaluate behaviors of children of schizophrenic and depressed mothers. Controls were chosen in the same manner as Role (1972). The teachers rated the subjects on the 11 factor Devereaux Elementary School Rating Scale (Spivak and Swift, 1966). Peers used the four factor Pupil Evaluation Inventory developed by Pekarik et al. (1976). The subjects were divided into two groups: K-5th grade and 6th-9th grades.

The results indicated that teachers rated boys higher on several factors: classroom disturbance, impatience, and irrelevant responsiveness. Children of schizophrenic and depressed mothers were more maladjusted than normals on several factors but never differed from each other. These factors were classroom disturbance, impatience, disrespect-defiance, comprehension, inattentive-withdrawn, creative-initiative, and need for closeness. Younger children were more creative and had a greater need for closeness.

The peer evaluation showed boys to be more aggressive and less likeable. As was the case with the teacher ratings, children of schizophrenic and depressed mothers did not differ on peer ratings but did differ from normals. The patient groups were more aggressive and withdrawn as well as less likeable. There were no differences between the two grade levels.

Watt et al. (1980) obtained teacher ratings of the children in the present study. The teacher ratings coincided with the Round 3 parent interviews. The teachers completed two rating forms, the four factor Pupil Rating Form (discussed in Chapter II) and the 13 factor Hahneman High School Behavior Rating Scale (HHSB). The PRF factors are primarily behavioral while the HHSB factors pertain mostly to academic achievement.

Three of the PRF factors differentiated the schizophrenic - risk group from the normal controls. The index group was less scholastically motivated, less harmonious, and more emotionally unstable. Six of the HHSB factors were significant, five of which were related primarily to academic behavior. On the remaining factor, the index group was found to be more Quiet-Withdrawn. This contrasted with the lack of significant difference on the PRF Extraversion factor.

The results of the high risk studies closely parallel those of the school records studies. Each study found that children of schizophrenics are either more aggressive, more socially withdrawn, or both. Every study that measured emotional stability found that these children were also more psychologically disturbed. Overall, males were rated as more disturbed on all dimensions. Unlike the follow-back studies, differences between index and control groups appeared at all age levels.

A striking feature of both the school record and the high risk studies is the lack of clear differentiation between preschizophrenics or high risk subjects and their psychiatric controls. Watt et al. (1979) found preschizophrenics to be less emotionally stable and less agreeable, while patients with personality disorders were rated only as less agreeable. Rolf (1972) found that the only difference between

teacher ratings of children of schizophrenic and depressed mothers was that daughters of the former were more emotionally unstable. Rolf (1976) again found only one difference between the two groups. Children of schizophrenic mothers were rated more negatively than positively by their peers, while there was no such differential in the "depressed-mother" group. Hanson et al. (1976) found that some high risk children hit on all three of the variables theoretically related to schizophrenia, while none of the psychiatric controls did. Other studies comparing preschizophrenics and high risk subjects to psychiatric controls found the two groups indistinguishable. The conclusion is that while the two groups may show some differences in some studies, the differences are subtle and have not been clearly defined.

## C H A P T E R I V

### RATIONALE

The rationale of the present study is drawn from both theoretical and empirical sources. The central premise of longitudinal schizophrenia research is that the etiology of the disorder is a continuous process which may begin as early as conception (Meehl, 1962). Consequently, indications of the etiological process should be visible many years prior to the acute symptoms (Watt et al., 1979). One potent correlate of the symptoms, course, and outcome of schizophrenia is premorbid social competence (Phillips, 1968). Social competence has also been theoretically posited as a causal factor (White, 1959, 1965). Its contribution is thought to be progressive, with early adaptive failures compounding into more serious failures until a time when unbearable stress results in decompensation.

The theory of social competence and the empirical relationship between premorbid social competence and symptoms, course, and outcome in schizophrenia has provided a basis for research in behavioral antecedents of the disorder. The above review has indicated that emotional instability, aggressiveness, and social isolation are behavioral dimensions that have characterized children who later became schizophrenic and children at high risk of becoming schizophrenic.

Emotional Instability. This has been the dimension that has most consistently distinguished high risk and preschizophrenic groups from both normal and psychiatric controls. Index subjects have been rated as poorly adjusted, nervous, insecure, anxious, obsessive, and depressed. They have been shown to be more frequently beset by

sleeping problems, bedwetting, sexual problems, psychosomatic complaints, and phobias. None of the studies has stated that these children were seriously psychopathological, but it is clear that these emotional problems are distinct and persistent.

Aggressiveness. This is also a consistent feature of high risk and preschizophrenic groups. Index children have been depicted as abrasive, disagreeable, delinquent, undisciplined, impatient, disruptive, and behavior problems. These children are not as disruptive, however, as children being treated for externalizing problems (Rolf, 1972; 1976).

Social Withdrawal. At first glance, social withdrawal and aggressiveness seem to be independent dimensions, with several studies indicating only one or the other attribute as characteristic of the index group. The appearance of independence may be illusory because the measures of some studies emphasize one dimension while some studies emphasize the other. The studies that found index males to be more aggressive found index females to be more withdrawn. Other studies have shown both characteristics to be present, although the group comparison method makes it difficult to know whether the group as a whole or distinct subgroups are responsible for the presence of both dimensions.

It is conceivable that aggression and some forms of social isolation are related. Disagreeable, abrasive children may alienate their peers, resulting in isolation imposed by others. In this regard, studies have shown index subjects to receive negative peer ratings, be less likeable and more isolated and have few friends and more problems with interpersonal relationships. But other characteristics suggest a



self-initiated turning away from others. Index children are also seen as submissive, withdrawn, shy, inhibited, and introverted.

Sex Differences. Sex differences have been inconsistent from study to study. Some show males as being more deviant on all measures while others indicated no sex difference at all. As pointed out above, Rolf (1976) and Watt et al. (1979) found index males to be more aggressive while index females were more withdrawn. This is consistent with the findings of the behavioral classification studies reviewed in Chapter II.

Hypotheses. This rationale leads to the following hypotheses:

1. Differences in social competence are slight during middle childhood (Rounds 1 and 2), but significant during adolescence (Round 3). Specifically, the index and control groups will not differ on any of the factors during the first two rounds, but the index group will be more emotionally unstable, more aggressive and more withdrawn at Round 3. The index group will also have more troubled relationships with their parents at Round 3.
2. The index group becomes progressively less competent over time in comparison to the control group. This will result in a Risk main effect in the longitudinal analysis on each dependent measure, and possibly in an interaction of Risk x Time.
3. Risk and Sex interact in the cross-sectional analyses. The interactions will show the following effects:
  - a. Male index subjects are more aggressive than male controls or females in either group.
  - b. Female index subjects are more withdrawn than female

controls or males in either group.

4. Children who have received help for emotional problems or whose parents feel they should receive such help are more aggressive, more withdrawn, less stable emotionally, and have more troubled relationships with their parents during adolescence.

## C H A P T E R V

### METHOD

#### Statistical and logical issues in research design.

Three issues are frequently encountered in longitudinal research: confounding variables, multiple dependent variables, and unequal cell frequencies in factorial designs. Of the three, only the first has received widespread attention in schizophrenia development research. The latter two have been largely ignored, while the solutions offered for the first may be fraught with hazards generally unrecognized. Handled incorrectly, the three share a common danger of increasing the probability of Type I error, i.e., the probability of rejecting the null hypothesis when it is actually true.

Confounding variables. A confounding variable, sometimes referred to as a nuisance variable, is one which is systematically related to the dependent variable but is not one of the variables manipulated by the researcher. In true experimental research, controlling for the effects of confounding variables is done to increase precision when estimating treatment effects. Such control is typically attempted by matching subjects on such variables prior to treatment or statistically suppressing the effects by the analysis of covariance (ANCOVA).

The role of confounding variables, and hence the method of controlling for them is ambiguous in schizophrenia development research. There are no true independent variables in this field. In fact, there is no identifiable etiological process at all. There is nothing akin to "treatment" in standard psychological research, only the footprints,

broken twigs, and faint scent that tells the schizophrenia researcher that something resembling an etiological process has passed by. It is an uncanny researcher who is able to discern which of these signs are worthy of study and which are confounding.

Indeed, the variables chosen by researchers to occupy the independent variable side of the prediction equation - sex, genetic risk, parental diagnosis, IQ, and social class - are the closest approximations thought to relate to presumed prodromal signs. Assuming any one to be a confounding variable presumes a knowledge of the etiological process that does not currently exist. Probably the most reasonable method of analysis would be to include certain variables both as independent variables and as covariates to see what results (Meehl, 1971).

Certain features of ANCOVA and matching indicate their limitations even when control of extraneous variables is indicated. In general ANCOVA and matching are effective in experimental and nonexperimental situations when it is known that treatment does not affect the value of the covariate.\* This is most effectively accomplished when the covariate is measured prior to treatment. Ideally, there should be no correlation between the covariate and the independent variables (Evans and Anastasio, 1968). A systematic relationship can also be prevented by assigning treatment randomly to pre-existing groups.

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\*Matching is actually a special case of ANCOVA (Cochran and Rubin, 1973) and in general the criticisms of ANCOVA apply equally to matching. Thus in this discussion "covariate" and "matching variable" are used synonymously.

When independent variables and covariates are mere classifications of subject attributes (as they frequently are in schizophrenia development research), not only is a correlation frequently present, but often there is a mutual causal relationship. ANCOVA used with classification variables is prone to biased estimation of treatment effects (Fleiss and Tanur, 1972; Overall and Woodward, 1977).

Another drawback concerns the reliability of the effects of the covariate. Unreliability may result from measurement error or from undetermined effects of the covariate. In the latter case, the effects of the variable, occupation of father for example, are not identical for every subject. Unreliability attenuates the correlation between the covariate and the dependent variable, increasing the probability of Type I error.

Lastly, the specification of a set of covariates may exclude important variables which also are related to the dependent variable. What may appear to be a treatment effect could possibly have been accounted for had the correct covariates been selected (Campbell and Erlebacher, 1970). In general, the best control for subject attributes is random assignment. The next best is to assign treatment randomly to pre-existing groups. The weakest control is matching or ANCOVA, especially when the researcher must rely on classifications of subject characteristics to serve as the experimental variables (Campbell and Stanley, 1966).

Multiple dependent variables. Traditional experimental designs have been able to accommodate many independent variables but typically only one dependent variable. The usual way of accommodating multiple

dependent variables has been to perform separate univariate analyses. Repeated measures designs are often used when the same subject is measured on separate occasions, but rarely when the subject is measured several times on the same occasion.

When one dependent variable is used, rejections of the null hypothesis occur at a  $1-\alpha$  level of confidence. When more than one dependent variable is used, this level becomes  $(1-\alpha)^p$  where  $\alpha$  is the univariate probability of Type I error and  $p$  is the number of dependent variables (Hummel and Sligo, 1971). Thus, when five dependent variables are used, the level of confidence drops from .95 to .77 when  $\alpha = .05$ . This overall probability level obtains when the dependent variables are not correlated. If the variables are correlated, the overall probability would be less than  $(1-\alpha)$ , but by an unknown amount.

A conservative way to hold down the overall probability is to divide by the number of variables. But  $\alpha/p$  becomes prohibitively small as  $p$  grows large. The most general way to obtain a specified level of confidence is to use multivariate statistical tests (Morrison, 1975; Bock, 1975). Each univariate test has a multivariate generalization that is appropriate when more than one dependent variable is present. Once a multivariate null hypothesis is rejected using the multivariate test, univariate statistics can be used to specify which of the dependent variables was responsible for the rejection of the overall hypothesis.

Unequal cell frequencies in factorial designs. Unequal cell frequencies are the rule rather than the exception in longitudinal research. The loss of subjects is a regrettable, although predictable,

occurrence. The complications caused by subject attrition have to do with the unbiased estimation of main effects. When the cells of a factorial design contain equal numbers of subjects, main effects can be estimated independently of each other without bias. When the cells contain disproportionate numbers of subjects, the main effects become artificially correlated and cannot be independently estimated (Overall and Spiegel, 1969).

A related problem is the correlation of independent variables when the variables are classifications of subject attributes rather than the true independent variables. Classification variables such as race, social class, political affiliation, etc. are almost always intercorrelated. As in the case of unequal cell frequencies, such correlations make the independent estimation of main effects impossible using standard methods. Failure to account for correlation among main effects, whatever the source, can result in spurious significant findings.

Several methods have been suggested to obtain unbiased estimates of correlated main effects (Herr and Gaebelin, 1978; Carlson and Timm, 1974). The basis of these methods lies in the test of "A eliminating B" and "B eliminating A", where A and B are main effects and "eliminating" refers to the elimination of the effects of one variable to reveal the independent contribution of the other. When there are several effects in the design (including interactions) each effect is tested while eliminating the contributions of the others.

This method has a disadvantage in that it throws some of the baby out with the bathwater. For example, if A and B are correlated, some

portion of their variance is shared while the remaining portions are unique (See Figure 1). When the test of A eliminating B (and vice versa) is performed, the result yields estimates of only the independent variance. The shared variance is ignored.

In the case of unequal cell frequencies, the overlap is considered an artifact of the unbalanced design, and the discarded variance is of little concern. But when the independent variables are correlated, due to their underlying relationship in the population, the shared variance becomes an important aspect of the findings. An example is given in Figure 1. The shared variance is a larger proportion of C than it is of D. To discover this relationship, C would be tested while ignoring D and vice versa. These tests would produce estimates of the total effect of each variable. Then each variable would be tested while eliminating the effects of the other, resulting in estimates of the independent effects of each variable. The proportionate decrease in the sum of squares is an estimate of the degree of overlap between the variables.

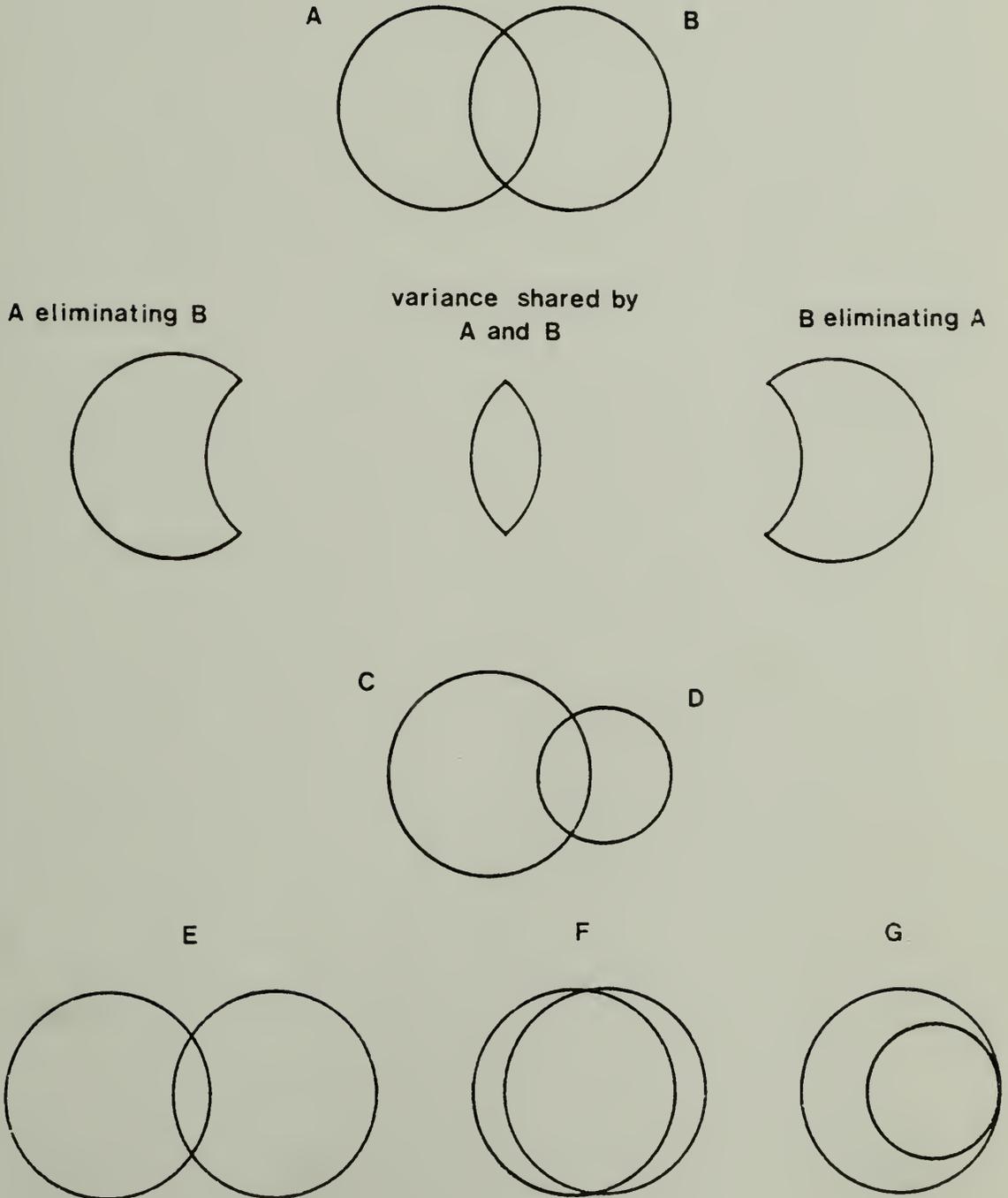
This example can be depicted tabularly by denoting the sum of squares at each point in the analysis:

	Ignoring Test	Eliminating A	Eliminating B
A	50	--	25
B	100	75	--

The sum of squares obtained from the ignoring tests indicates that B accounts for twice the variance that A does. When the eliminating tests are performed, it appears that half of the A effect overlaps with a quarter of the B effect. Furthermore, the independent effect



Figure 1. Illustration of Several Patterns of Intercorrelated Effects and Their Shared and Unique Variances.



of B is three times greater than that of A. Thus, while A and B contribute independent effects, B is the more potent, accounting for three quarters of the total variance. Further, half of the A effect is accounted for by B.

If ANCOVA were used to analyze the same data, the conclusion would be greatly limited. If A were chosen as the effect being tested, B would be the covariate. The results would indicate the significant A effect but would not produce any information about the B effect in its own right. The fact that B accounts for such a large proportion of the variance would be obscured, preventing any theoretical conclusions about the relationship of the two variables from being made.

Other examples are given in Figure 1. In example E, overlap is small and two independent effects are plainly evident. In F the overlap is substantial and it is likely that only one common effect is actually present. In G one effect is entirely subsumed by the other, but unlike F, there are two effects present, the smaller being one aspect of the larger.

To summarize, several methodological issues complicate the unbiased estimation of main effects in longitudinal research. Each of the issues taken alone may not seem like formidable obstacles. Taken together, they point to the fundamental difference between estimation of treatment effects in experimental situations and estimation of relationship among classification variables in nonexperimental situations. The method outlined above is an alternative to the use of methods such as ANCOVA and matching which have been borrowed from the experimentalist's armamentarium. The use of multivariate regression

to calculate the ignoring and eliminating tests is an effective way to examine the relationships among independent and dependent variables while controlling for Type I error.

### Subjects

In 1971, L. Erlenmeyer-Kimling and her associates (Erlenmeyer-Kimling, 1975) began a longitudinal high risk study in the New York metropolitan area on the developmental characteristics of the children of schizophrenic parents. This sample originally included 205 children who were between the ages of 7 and 12 at the time of first examination. The sample consisted of 80 high risk subjects (children with one or two schizophrenic parents), 25 psychiatric control subjects (who had a parent with a psychiatric disorder unrelated to schizophrenia), and 100 normal control subjects (whose parents had no known psychiatric history). All the children were from white, English-speaking families, with both parents living in the home at the time the study began.

Families with a mentally ill parent were selected by reviewing admissions at several state psychiatric hospitals in the New York area. Independent diagnoses were assigned by two psychiatrists who reviewed the records of patients after all references to hospital diagnoses and medications had been removed. After making a diagnosis based on hospital records and scoring the 100-point Global Assessment Scale (Endicott et al. 1976), only those cases in which there was full diagnostic agreement were contacted for participation. Final participation in the study rested with the consent of the patients and their families. A normal control group was obtained by sending a letter to

families in two large suburban school districts who had children in the specified age range and who met the other criteria.

### Measures

The basic focus of the Erlenmeyer-Kimling study is to investigate functions that have been associated with the disorder of schizophrenia. Laboratory measures concentrate on attention, distractibility, response latency, and neurophysiological functioning. In addition, an attempt has been made to assess the emotional, familial, and social functioning of the children through interviews with parents, teacher ratings and school records, and interviews with the children themselves.

The present study is based on information obtained from three rounds of structured home interviews. The well parent of high risk subjects (or the more functionally intact parent in families with two schizophrenic parents) was interviewed and a randomly chosen parent was interviewed for the normal control subjects. The interview data for the psychiatric control subjects were not used in the present study due to the disproportionately small size of that group. The initial interview covered the family history of each parent and a complete developmental history of each child in the family. The interviews for all three rounds contain questions about emotional, social, and behavioral aspects of the children, although the specific items differ with each interview. Copies of the interview protocols are contained in the Appendix.

The first round of interviews was conducted in 1971-72, the second round in 1973-74, and the third round in 1978-79. The sample

size decreased with each succeeding round. Nearly all the available index subjects and all of the control subjects consented to home interviews during Round 1 (78 index and 100 control subjects). Both groups declined during Round 2 (49 index and 94 control subjects), with a slight rebound for the index group and a further decline for the control group in Round 3 (52 index and 82 control subjects). Table 1 presents the number of subjects for each round broken down by sex.

Construction of factors. The interview protocols consisted of both precoded and open-ended questions. Only the precoded items were reviewed for use in factor construction. The open-ended items served primarily as a means of allowing more elaborate answers. Each of the items was reviewed with regard to its possible association with factors obtained in behavioral classification studies. Six initial factors were constructed based on content similarity in the interview items:

Emotional Instability, Hyperactivity, Aggression/Conduct Problems, Withdrawal/Isolation, Learning/Academic Problems (Round 1 and 2 only), and Parental Conflicts (Round 3 only).

The interview items chosen referred to the presence or absence of problems in the specified areas of behavior. Accordingly, the range of responses for each item was partitioned into "problem" and "no problem" categories. Each of the "problem" responses was then assigned to a factor. For example, Round 1 item 52 reads, "Does your child prefer to play with others or alone?" and had three possible responses: (0) alone, (1) with others, and (2) both. A response of (1) or (2) is considered normal social behavior and is therefore classified "no problem". A response of (0) is not considered normal social behavior

Table 1. Number of Subjects in the Index and Control Groups for All Three Rounds, Broken Down by Sex.

		Round 1		
		Male	Female	
Index		38	40	78
Control		59	41	100
		97	81	178

		Round 2		
		Male	Female	
Index		23	26	49
Control		55	39	94
		78	65	143

		Round 3		
		Male	Female	
Index		28	24	52
Control		46	36	82
		74	60	134

and is classified as a "problem". In this example, the latter response was assigned to the Withdrawal/Isolation factor.

Other items are partitioned in a different manner. There was only one "problem" response in the last example, but other items have more than one "problem" response. For example, Round 2 item 28 reads, "Are there any behavioral or discipline problems at home?" The possible responses are (0) No problems, (1) Disobedient, uncooperative, (2) Cannot get along with other kids, (3) Hyperactive, (4) Aggressive, destructive, (5) Lying, (6) Stealing, and (7) Other. Any response of (1) to (7) is indicative of a problem behavior, and each is assigned to a factor depending on its content. In this example, responses of (1), (4), (5), (6), and (7) were assigned to the Aggression/Conduct Problems factor. A response of (2) is assigned to Withdrawal/Isolation and (3) was assigned to Hyperactive. The "problem" responses and their initial factor assignments are indicated in the Appendix.

To calculate factor scores, the number of "problem" responses was counted. The total number of these responses within each respective factor constituted the factor scores for each subject.

Correlational analysis. After computing the initial factor scores, a correlational matrix was calculated for each of the responses with each of the other responses and each of the factors. Responses were eliminated from further analyses if they did not correlate significantly ( $p < .05$ ) with any other response. The remaining responses were reassigned to another factor if the correlation with that factor was higher than the one to which it was originally assigned. If the assignment of a response was ambiguous due to more or less equal

correlations with more than one factor, the response was reassigned according to the thematic content of the responses with which it was correlated.

The results of this procedure indicated that very few responses were correlated primarily with Hyperactivity and Learning/Academic Problems. The responses that had initially been assigned to these factors tended to correlate more highly with other factors. These factors were consequently dropped from further analysis. This left three factors each for Rounds 1 and 2 and four factors for Round 3. A correlation matrix was recomputed for the remaining responses and the new set of factors. Responses were dropped if they did not correlate significantly with any of the factors. As before, responses were reassigned to another factor if the correlation with that factor was higher than the one to which they were previously assigned. This procedure was repeated until each factor was comprised of responses that correlated significantly with it and no other. A response could be retained if it correlated significantly with more than one factor, but its primary correlation had to be greater than the correlation with other factors by .10 or more.

The final set of factors. The final set of factors for each round and their associated responses are presented in Tables 2, 3, and 4. Rounds 1 and 2 required three applications of the correlational procedure to reach the final solution, while Round 3 required four such applications. The same three factors appeared in each of the three rounds: Emotional Instability, Aggression, and Withdrawal. A fourth factor, Parental Conflicts, was obtained in Round 3.



Emotional Instability was comprised of items reflecting difficulty handling daily problems, nervousness and anxiety, emotional problems, sleeping difficulties, moodiness, low frustration tolerance, bedwetting, and unhappiness. This factor consisted of 15, 9, and 11 responses, respectively, for the three rounds.

Aggression was comprised of items reflecting disruptiveness, fighting, aggressiveness, trouble with the law, and behavior problems at home and at school. This factor consisted of 8, 14, and 7 responses, respectively, for the three rounds.

Withdrawal was comprised of items reflecting withdrawal, timidity, inability to get along with siblings and peers, dependency on parents, and lack of affection. This factor consisted of 12, 9, and 13 responses, respectively, for the three rounds.

Parental Conflicts was comprised of items reflecting poor relationships with both parents, poor communication with parents, and frequent absence from the home. This factor consisted of five responses.

The intercorrelations of the factors were nearly identical across the three rounds (Table 5). Aggression and Withdrawal were not correlated during any of the rounds, although both were moderately positively correlated with Emotional Instability. In Round 3, Parental Relationships was positively correlated with Emotional Instability and Aggressiveness, but was uncorrelated with Withdrawal.

Validity and reliability. The factors obtained are similar to factors found by Gestin (1976), Kohn (1977), Becker and Krug (1964), and others. The three factors that appeared in all three rounds, Emotional Instability, Aggression, and Withdrawal, reflect three of

Table 2. Factor Composition for Round 1: Parental Interview Responses and Their Significant ( $p < .05$ ) Correlations with Emotional Instability (EI), Aggression (Ag), and Withdrawal (Wd).

		Emotional Instability		
Item No. and (Response No.)	Response	EI	Ag	Wd
32(1)	Restlessness or overactivity	.53	.24	.17
33(1,2)	Undereats or overeats	.33		
34(1)	Sleeping Difficulties	.37	.19	
36(1)	Temper tantrums	.44	.29	.28
37(1)	Rocking back and forth	.24		
39(1)	Bedwetting	.42		
42(13)	Received help for emotional difficulties: Other, combinations	.34	.22	
43(7)	Need help for important difficulties: Anxiety, agitation, nervousness	.21		
43(13)	Need help for important difficulties: Other, combinations	.19		
44(1)	Emotional or behavioral problem	.40		.30
45(11)	Problems at school: Other, combinations	.28		
54(0)	Unhappy child	.53		.26
56(1)	Excitable	.51	.26	
57(1)	Moody	.57	.20	.20
59(1)	Easily frustrated	.62	.28	.22
		Aggression		
31(1)	Stammering or stuttering	.18	.58	
42(6)	Received help for emotional difficulties: Sleeping difficulties		.30	

Table 2, continued

Item No. and (Response No.)	Response	EI	Ag	Wd
42(9)	Need help for important difficulties: Learning or perceptual difficulties		.21	
42(10)	Need help for important difficulties: Problem behavior		.21	
45(4)	Problems at school: Disobedient, disruptive		.54	
46(1)	Problems at home: Disobedient, uncooperative, fresh to parents	.37	.54	
46(7)	Problems at home: Other, combinations	.23	.36	
50(1-4)	Fights with other children	.34	.70	
Withdrawal				
28(1-6)	Allergies			.37
40(1-3)	Non-epileptic seizures			.31
42(3)	Received help for emotional difficulties: Socially withdrawn behavior, apathy			.42
43(3)	Need help for important difficulties: Socially withdrawn behavior, apathy			.37
45(5)	Problems at school: Getting along with other children	.18	.18	.32
46(2)	Problems at home: Cannot get along with other children			.21
47(0,3)	Does not get along with siblings			.24
49(1)	Teased or picked on by peers	.33		.46
51(0)	No best friends			.35
52(0)	Prefers to play alone			.50
55(0)	Not affectionate			.48
58(1)	Timid			.44

Table 3. Factor Composition for Round 2: Parental Interview Responses and Their Significant ( $p < .05$ ) Correlations with Emotional Instability (EI), Aggression (Ag), and Withdrawal (Wd).

		Emotional Instability		
Item No. and (Response No.)	Response	EI	Ag	Wd
9(1)	Stammering and stuttering	.33		
11(1)	Undereats or overeats	.51	.26	.27
15(1)	Rocking back and forth	.33		
18(1)	Bedwetting	.49		
20(13)	Need help for important difficulties: Other, combinations	.49		
22(8)	Reaction to stressful situations: Other, combinations	.56		
23(2)	Emotional or behavioral problems	.45		
27(10)	Problems at school: Learning problems	.42	.27	
36(1-3)	Likes to hurt animals or people	.58	.23	
		Aggression		
10(1)	Restless or over active	.33	.49	.27
14(1)	Temper tantrums	.27	.59	
19(1)	Received help for emotional difficulties: Hyperactivity		.32	
19(13)	Received help for emotional difficulties Other, combinations	.27	.37	
20(2)	Need help for important difficulties: Aggressive behaviors	.27	.44	
22(2)	Reaction to stressful situations: Aggressive or destructive		.28	
22(4)	Reaction to stressful situations: Temper tantrums, cries, pouts, sulks		.33	

Table 3, continued

Item No. and (Response No.)	Response	EI	Ag	Wd
25(1-3)	Remedial class or repeated a grade		.40	
26(1)	Difficulties with school work	.26	.50	
27(11)	Problems at school: Other, combinations		.50	
28(1)	Problems at home: Disobedient, uncooperative, fresh to parents		.24	
28(7)	Problems at home: Other, combinations	.38	.57	
34(1)	Teases or picks on others		.56	
35(1-3)	Fights with others		.47	
Withdrawal				
19(3)	Received help for emotional difficulties: Socially withdrawn behavior, apathy			.63
22(6)	Reaction to stress: Gets physically ill			.35
27(4)	Problems at school: Disobedient, disruptive			.25
27(5)	Problems at school: Getting along with others			.49
28(2)	Problems at home: Getting along with others			.50
29(1)	Prefers to play alone			.61
30(3)	Fewer friends than other children			.64
32(0)	No best friends	.24		.47
33(1)	Picked on by others		.32	.47



Table 4, continued

		Withdrawal			
Item No. and (Response No.)	Response	EI	Ag	Wd	PC
23(2)	Less friends than others	.36		.68	
25(3)	Has no friends			.41	
26(1)	No close friends	.33		.71	
28(1,2)	Trouble getting along with peers			.42	
31(1)	Problem concerning lack of dates			.52	
32(1)	Undereats or overeats	.21		.51	
52(1)	Cries a lot	.21		.36	
57(1)	Unhappy	.34	.29	.53	.27
58(1)	Isolated/Lonely	.28		.74	
63(1)	Timid/Shy			.50	
		Parental Conflicts			
14(2,3)	Poor relationship with interviewed parent	.24	.27		.78
15(2,3)	Poor relationship with other parent	.27			.71
19(2)	Does not discuss things with parents	.42	.37	.26	.55
20(2)	Cannot keep track of child	.27			.60
21(2)	Runs away from home				.36

Table 5. Significant ( $p < .05$ ) Correlations Among Interview Response Factors within Each of the Three Rounds.

	Emotional Instability	Aggression
Aggression	.42	
Withdrawal	.34	

	Emotional Instability	Aggression
Aggression	.34	
Withdrawal		

	Emotional Instability	Aggression	Withdrawal
Aggression	.38		
Withdrawal	.40		
Parental Conflicts	.43	.36	



the most general factors found to date in empirically based behavior classification research. It is therefore presumed that these factors represent valid, independent dimensions of child behavior, and provide a valid measuring instrument for the study of emotional and social adaptation of children at high risk for schizophrenia.

No direct determination of the reliability of the factors was possible since no provisions were made to assess reliability prior to data collection. Some indication of the reliability of parent ratings can be inferred, however, from the results of other studies. The reliability of parent ratings has been shown to reach the same order of magnitude as those of other raters, varying in the range of .70-.90 (Achenbach and Edelbrock, 1978). This does not imply that the present ratings are necessarily reliable, but it is an indication that parents have been dependable sources of information about their children's behavior.

Independent variables. The independent variables were Risk (children of schizophrenic parents and children of normal parents), Sex (male and female), Social Class, and Help (Need Help and No Help). Social Class was calculated by a modified version of the Hollingshead and Redlich (1958) two factor method. The modified method uses occupation and educational attainment to produce a continuous measure of social class (Watt, 1976).

The Help variable was derived from two items on the Round 3 interview: "Have any of your children ever received help for emotional or nervous difficulties?" and "Have any of your children had any important difficulties for which they have not received help?" An

affirmative answer to either of these questions placed a subject in the Need Help group. A negative answer to both questions placed a subject in the No Help group. There were 17 index subjects (33%) and 20 control subjects (24%) in the Need Help group. The Help variable was used as a measure of intermediate outcome. No diagnostic significance is implied by this distinction. It is simply a parental designation of whether a child was disturbed enough to need psychological treatment.

#### Statistical procedure.

All analyses were performed by procedures of the Statistical Analysis System (SAS Institute Inc., 1979). The General Linear Models procedure (PROC GLM) was used for all group comparisons. This procedure computes multivariate and univariate tests of effects using a multiple regression framework. PROC GLM conveniently enters effects in a step-wise manner, making it comparatively easy to calculate the ignoring and eliminating tests referred to earlier.

Three kinds of effects have been calculated for each independent variable in the cross-sectional analyses: (a) a test ignoring all other variables (b) tests eliminating one other variable, and (c) a test elimination all other variables. Interactions can only be tested with method (c). An example is presented below:

	Ignoring Test	Eliminating Risk	Eliminating Social Class (SES)	Eliminating Sex	Eliminating All other effects
Risk	A	-	F	H	J
SES	B	D	-	I	K
Sex	C	E	G	-	L
Risk x Sex					M

Entries A, B, and C indicate the contribution of each variable as if the others did not exist. Entries J, K, and L are the independent contributions of each variable above and beyond the other effects.

Entries D through I are the contribution of each variable with just one other effect removed.\* Entry M is the effect of the interaction of Risk and Social Class above and beyond the main effects.

All independent variables and their interactions were entered into the initial analysis and the effect of each was tested by a multivariate F-test. Interactions were tested first, followed by tests of main effects. All non-significant effects were pooled with the error term, yielding the most parsimonious model as a basis for the ignoring and eliminating tests. Risk, however, was retained in all analyses regardless of significance due to its central role in testing the hypotheses.

Cross-sectional analyses. All the available subjects were used for each of the cross-sectional analyses. There were 178 subjects during Round 1, 143 subjects during Round 2, and 134 subjects during Round 3. The analyses for Rounds 1 and 2 were based on the three major

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\*Note that F is equivalent to the test of Risk in the analysis of covariance with Social Class as the covariate.

dependent variables (Emotional Instability, Aggression, and Withdrawal) and three independent variables: Risk, Social Class, and Sex. The Round 3 analysis added Parental Conflicts as a dependent variable and Help as an independent variable.

Longitudinal analysis. This analysis was based on the ratings of children who were in the study during both Round 1 and Round 3. Round 2 was excluded since it would have restricted the analysis to only those subjects who had participated in all three rounds. The variables used in the longitudinal analysis were the three major dependent variables and these independent variables: Risk, Social Class and Sex.

The dependent variables were rescaled to allow for comparisons across rounds. Each factor scale was transformed to a 0-10 scale by dividing each factor score by the number of responses possible for that factor and multiplying by 10. Thus a score of 8 on a factor with 12 possible responses would become:  $(8/12) \times 10 = 6.67$ .

Prediction of intermediate outcome. As a post hoc test of the ability to predict intermediate outcome from the factor scores of each round, two analyses were performed. First, t-tests between the Help and No Help groups on the major factors for Round 1 were performed to see if there was a relationship between intermediate outcome and individual factors. The analogous test for the Round 3 variables was already available from the cross-sectional analyses. Second, a discriminant analysis was performed using the Round 1 factors as predictor variables and Help as the criterion variable.

Discriminant analysis has two objectives: analysis and classification. In the present study, the latter was of greater interest.

The analysis step produces a linear combination of the predictor variables that maximally discriminates between the Need Help and No Help groups. At some point it will be important to know what weight to give variables that appear to predict future schizophrenia. In the present study, however, the criterion variable is sufficiently crude that it would be important to know if any linear combination of Round 1 variables is related to intermediate outcome.

The classification step provides a test of the predictive efficiency of the discriminant function obtained in the analysis step. The discriminant function assigns subjects to one group or another based on their factor scores. The better the predictive ability, the fewer misclassifications. Optimally, every subject who actually was in the Need Help group would be classified correctly as a member of that group and every subject in the No Help group would be excluded from it.

## C H A P T E R VI

### RESULTS

#### Cross-sectional analyses.

Tables 6, 7 and 8 present the means and standard deviations for Emotional Instability, Aggressiveness, and Withdrawal for all three rounds. Table 9 presents the means and standard deviations for Parental Conflicts for Round 3. These tables present the statistics for the index and control groups broken down separately by Sex and Social Class. The Row Totals are the statistics comparing the index and control groups; the Column Totals compare means and standard deviations for Sex and Social Class groups. The Risk x Sex and Risk x Social Class means are presented graphically in Figures 2, 3, and 4 for the major dependent variables and in Figure 5 for Parental Conflicts.

To facilitate comparison of means and standard deviations, it was necessary to rescale the factor scores. This was accomplished by dividing by the maximum number of responses comprising a given factor and multiplying by ten. All rescaled factor scores consequently ranged from 0 (no "problem" responses ) to 10 (maximum number of "problem" responses). To simplify tabular and graphic presentation, Social Class was divided into High and Low groups by using the sample mean (69) as a cut-off score.

Table 10 presents the F-ratios and probability levels from the multivariate tests of significance for each round. Tables 11, 12 and 13 present the univariate ignoring and eliminating tests for the major

Table 6. Means and Standard Deviations of Emotional Instability Scale Scores for Index and Control Groups for all Three Rounds, Broken Down by Sex and Social Class (SES).

Round 1		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=78)	M	2.49	1.92	1.47	2.27	2.20
	SD	1.59	1.58	1.50	1.63	1.60
Control (N=100)	M	1.84	1.15	1.61	1.46	1.56
	SD	1.36	1.09	1.34	1.22	1.27
Column Total	M	2.09	1.53	1.58	1.98	1.84
	SD	1.41	1.31	1.37	1.54	1.47

Round 2		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=49)	M	.65	.22	.25	.47	.44
	SD	1.04	.55	.50	.89	.86
Control (N=94)	M	.41	.18	.41	.18	.31
	SD	.66	.46	.69	.39	.59
Column Total	M	.48	.19	.39	.32	.39
	SD	.80	.49	.68	.70	.77

Round 3		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=51)	M	3.35	2.17	2.47	2.89	2.83
	SD	2.83	2.52	2.55	2.54	2.52
Control (N=82)	M	2.27	1.97	1.86	2.11	1.97
	SD	2.76	2.43	2.38	2.52	2.43
Column Total	M	2.69	1.82	1.95	2.55	2.61
	SD	2.82	1.91	2.39	2.54	2.48

Figure 2. Graphs of Index and Control Group Means for Emotional Instability Scale Scores for all Three Rounds of Cross-sectional Analyses, Broken Down by Sex and Social Class (SES).

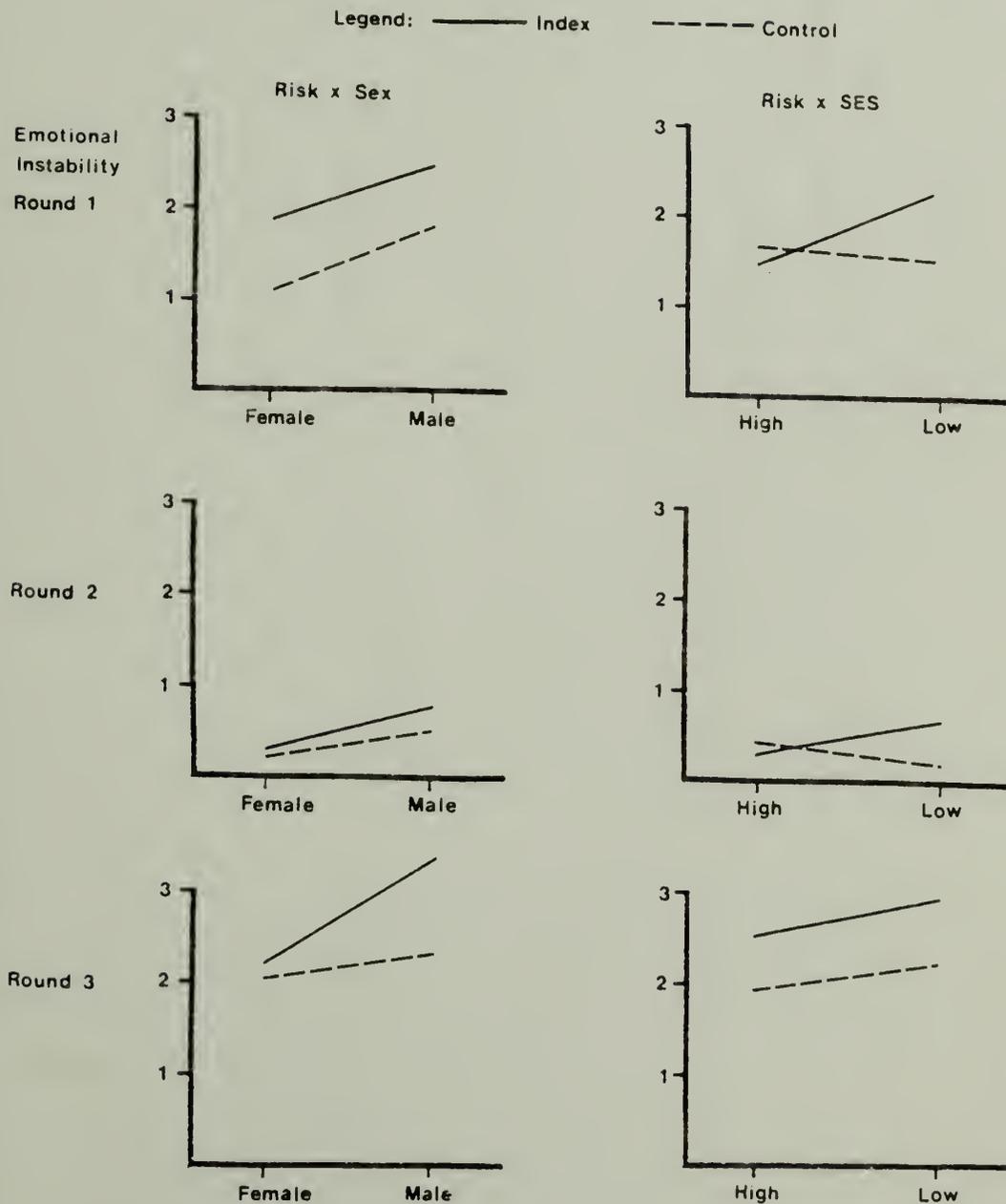




Table 7. Means and Standard Deviations of Aggression Scale Scores for Index and Control Groups for all Three Rounds, Broken Down by Sex and Social Class (SES).

Round 1		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=78)	M	1.02	.59	.26	.91	.80
	SD	1.36	.89	.67	1.21	1.16
Control (N=100)	M	.66	.34	.58	.43	.53
	SD	1.10	.84	1.13	.74	1.01
Column Total	M	.80	.46	.51	.74	.64
	SD	1.15	.86	1.05	1.09	1.08

Round 2		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=49)	M	1.95	.94	.25	1.62	1.47
	SD	1.79	2.24	.50	2.12	2.05
Control (N=94)	M	.91	.41	.64	.76	.69
	SD	1.16	.56	.92	1.05	.97
Column Total	M	1.23	.59	.60	1.19	.96
	SD	1.46	1.39	.89	1.71	1.43

Round 3		Sex		SES		Row Total
		Male	Female	High	Low	
Index (N=51)	M	2.27	1.37	1.22	1.97	1.87
	SD	2.24	1.46	1.28	2.05	1.97
Control (N=82)	M	1.70	1.26	1.34	1.76	1.52
	SD	2.16	1.63	1.68	2.28	1.95
Column Total	M	1.92	1.31	1.32	1.88	1.65
	SD	2.20	1.55	1.62	2.14	1.96

Figure 3. Graphs of Index and Control Group Means for Aggression Scale Scores for all Three Rounds of Cross-sectional Analyses, Broken Down by Sex and Social Class (SES).

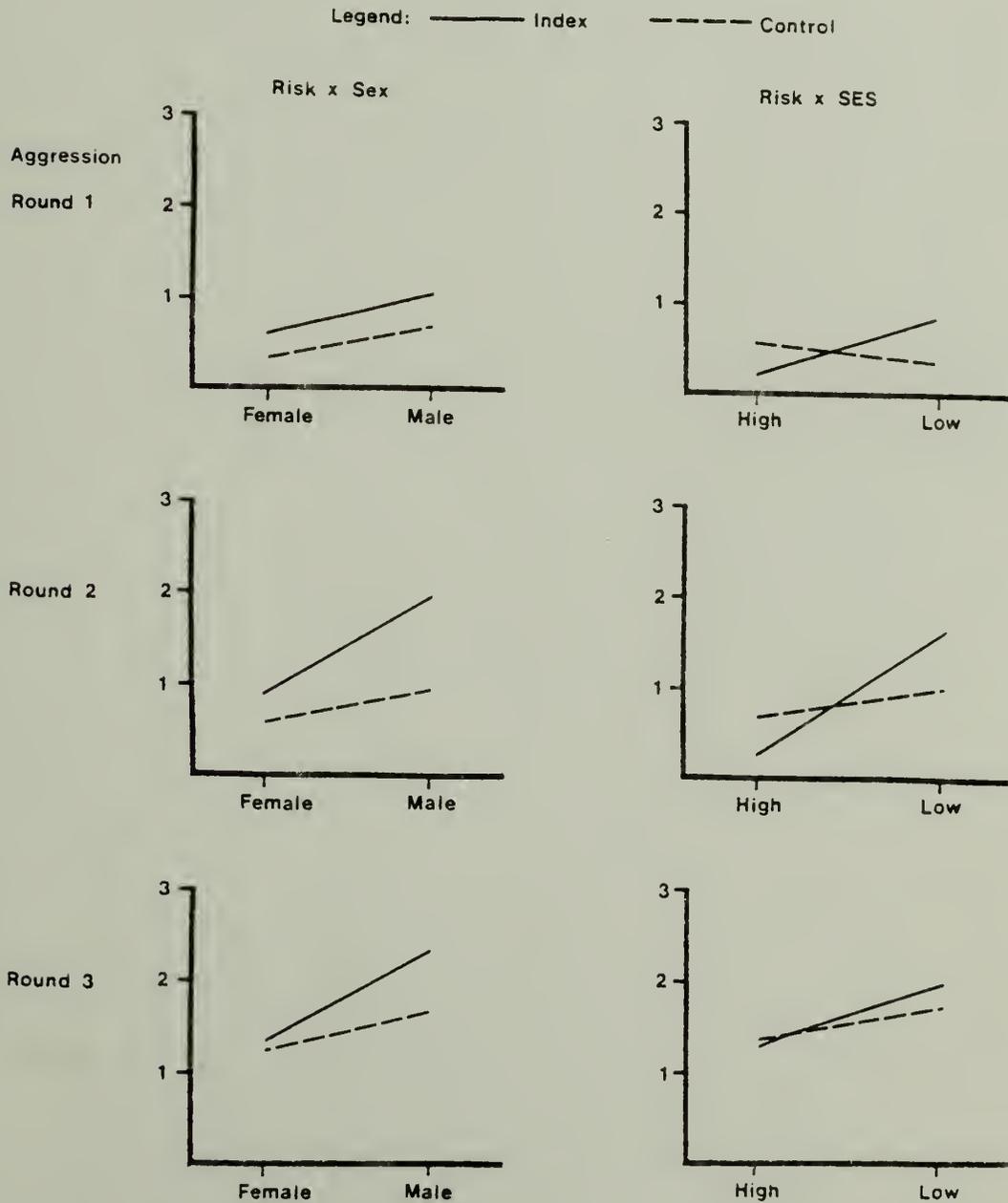


Table 8. Means and Standard Deviations of Withdrawal Scale Scores for Index and Control Groups for all Three Rounds, Broken Down by Sex and Social Class (SES).

Round 1		Sex		SES		Row
		Male	Female	High	Low	Total
Index (N=78)	M	1.16	.98	.70	1.11	1.07
	SD	.96	.96	.97	.94	.96
Control (N=100)	M	1.30	.85	1.14	1.07	1.12
	SD	1.13	.88	1.16	.85	1.05
Column Total	M	1.24	.92	1.04	1.10	1.10
	SD	1.03	.91	1.13	.91	1.01

Round 2		Sex		SES		Row
		Male	Female	High	Low	Total
Index (N=49)	M	1.10	.61	.50	.91	.86
	SD	1.07	.61	.57	.93	.90
Control (N=94)	M	.95	.56	.75	.82	.78
	SD	1.14	.86	1.08	1.06	1.04
Column Total	M	1.00	.58	.72	.87	.80
	SD	1.11	.77	1.05	.96	.98

Round 3		Sex		SES		Row
		Male	Female	High	Low	Total
Index (N=51)	M	1.46	1.61	1.98	1.45	1.52
	SD	1.94	2.15	1.88	2.05	2.02
Control (N=82)	M	1.08	1.07	1.09	1.06	1.07
	SD	1.54	1.33	1.60	1.21	1.44
Column Total	M	1.23	1.28	1.20	1.29	1.25
	SD	1.71	1.70	1.65	1.74	1.71

Figure 4. Graphs of Index and Control Group Means for Withdrawal Scale Scores for all Three Rounds of Cross-sectional Analyses, Broken Down by Sex and Social Class (SES).

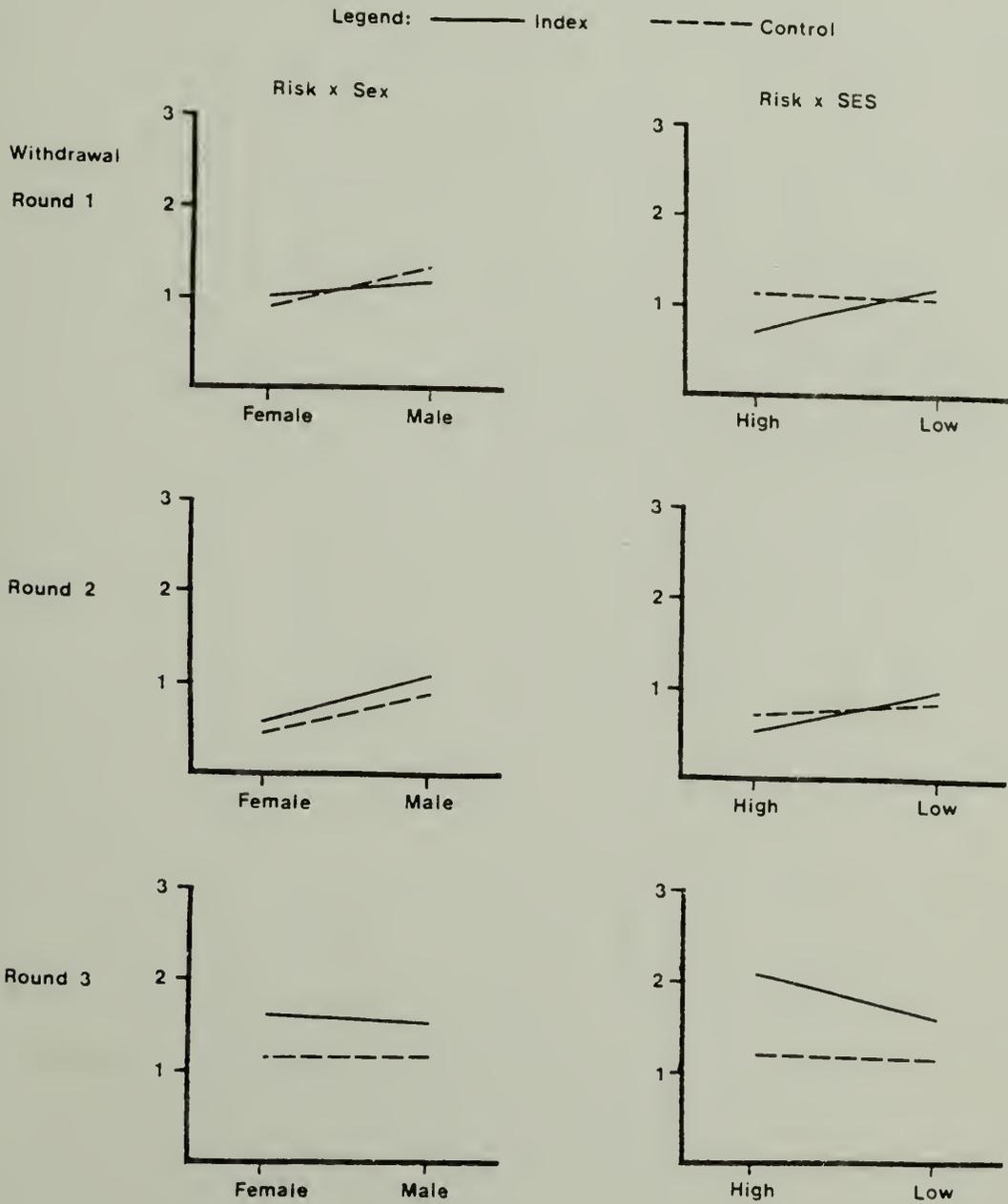


Table 9. Means and Standard Deviations of Parental Conflicts Scale Scores for Round 3, Broken Down by Sex and Social Class (SES).

Round 1		Sex		SES		Row
		Male	Female	High	Low	Total
Index (N=51)	M	1.50	1.75	.80	1.90	1.62
	SD	2.01	2.23	1.40	2.21	2.10
Control (N=82)	M	.70	.56	.72	.48	.63
	SD	1.70	1.32	1.75	1.01	1.53
Column Total	M	.99	1.05	.73	1.22	1.02
	SD	1.84	1.83	1.73	1.88	1.83

Figure 5. Graphs of Index and Control Group Means for Parental Conflicts for the Round 3 Cross-sectional Analysis, Broken Down by Sex and Social Class (SES).

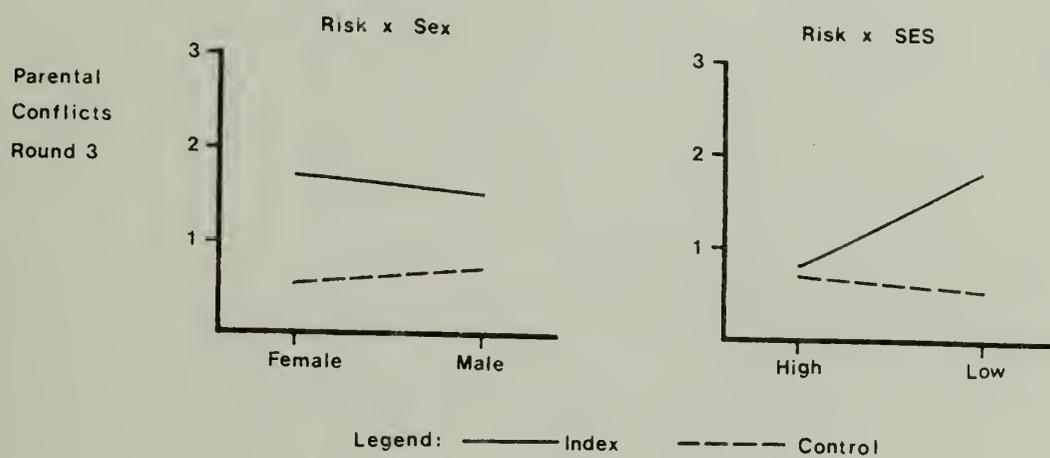


Table 10. Multivariate Tests of Significance for the Cross-sectional Analyses for all Three Rounds.

## Round 1

	F	P
Risk	1.70	.17
Social Class (SES)	4.11	.008
Sex	2.69	.05
Risk x SES	2.71	.05

## Round 2

	F	P
Risk	2.43	.07
Social Class (SES)	2.86	.04
Sex	3.58	.02
Risk x SES	3.59	.02

## Round 3 \*

	F	P
Risk	3.99	.004
Help	7.89	.0001
Sex	2.81	.04

\* Social Class (SES) and Risk x SES were not significant during Round 3 and were dropped from the model.

Table 11. Summary of Multiple Regression Analyses for all Three Rounds: Emotional Instability as a Function of Risk, Social Class (SES), Sex, and Help.

Round 1	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.05***	-	.01	.06****	.01
SES	.06****	.02*	-	.07****	.04**
Sex	.04**	.05***	.04***	-	.04***
Risk x SES					.03*

Round 2	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.01	-	.01	.01	.04*
SES	.00	.00	-	.01	.01
Sex	.02	.02	.02	-	.02
Risk x SES					.05***

Round 3	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	Help	Sex	
Risk	.05***	-	.04***	.05***	.04**
Help	.14****	.13****	-	.14****	.13****
Sex	.03*	.03*	.03*	-	.03*

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .005$     \*\*\*\*  $p < .001$



Table 12. Summary of Multiple Regression Analyses for all Three Rounds: Aggression as a Function of Risk, Social Class (SES), Sex, and Help.

Round 1	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.02	-	.00	.02*	.01
SES	.02*	.01	-	.02*	.02
Sex	.02*	.03*	.03*	-	.03*
Risk x SES					.02

Round 2	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.07****	-	.02	.08	.01
SES	.07****	.02	-	.08****	.05***
Sex	.02*	.03*	.03*	-	.03*
Risk x SES					.03*

Round 3	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	Help	Sex	
Risk	.00	-	.00	.00	.00
Help	.06**	.06**	-	.05**	.05**
Sex	.03	.03	.02	-	.02

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .005$     \*\*\*\*  $p < .001$

Table 13. Summary of Multiple Regression Analyses for all Three Rounds: Withdrawal as a Function of Risk, Social Class (SES), Sex and Help.

Round 1	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.00	-	.00	.00	.00
SES	.00	.00	-	.00	.00
Sex	.03*	.03*	.03*	-	.02*
Risk x SES					.02

Round 2	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	SES	Sex	
Risk	.00	-	.00	.00	.01
SES	.00	.00	-	.00	.01
Sex	.05**	.05**	.05**	-	.04*
Risk x SES					.01

Round 3	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	Help	Sex	
Risk	.01	-	.01	.01	.01
Help	.11****	.11****	-	.11****	.11****
Sex	.00	.00	.00	-	.00

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .005$     \*\*\*\*  $p < .001$

Table 14. Summary of Multiple Regression Analysis for Round 3:  
Parental Conflicts as a Function of Risk, Help, and Sex.

Round 3	Ignoring all other effects	Eliminating one other effect:			Eliminating all other effects
		Risk	Help	Sex	
Risk	.09****	-	.09****	.09****	.09****
Help	.04**	.04**	-	.04**	.04*
Sex	.00	.00	.00	-	.00

\*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .005$     \*\*\*\*  $p < .001$

dependent variables for the three rounds. Table 14 summarizes this information for Parental Conflicts for Round 3. The entries in these tables are the proportions of variance ( $R^2$ ) accounted for by the effects being tested. This statistic was presented rather than sums of squares to allow for comparison of the strength of individual effects both within and between analyses.

Risk and Social Class. These independent variables are presented together because they were confounded during the first two rounds for Emotional Instability (Table 11) and Aggression (Table 12). The confounding of Risk and Social Class did not occur during Round 3. There was no relationship between either variable and Withdrawal during any of the three rounds (Table 13).

For the Round 1 Emotional Instability ratings, Risk was significant when all other effects were ignored. This was also the case for Social Class (Table 11). When the Social Class effect was eliminated from the Risk effect, however, Risk was no longer significant, but Social Class was still significant after the Risk effect was removed. When all of the effects in the model were removed, Social Class was still significant. This effect shows that low social class children were more emotionally unstable than high social class children (Table 6, Figure 2). The effect of Risk is indistinguishable from that of Social Class when the index and control groups are compared across the entire range of social class. A significant interaction, however, indicates that within the low social class range, index children were more emotionally unstable than controls.

During Round 2, neither Risk nor Social Class had a significant

relationship with Emotional Instability (Table 11). There was a significant univariate Risk effect after all other effects were removed, but it was not significant at the multivariate level. The Risk x Social Class interaction which occurred in Round 1 was still present, again indicating that low social class index children were more emotionally unstable than the low social class controls.

During Round 3, Risk became significant in its own right. Index subjects were more emotionally unstable than controls irrespective of Social Class (Table 6, Figure 2). Parental Conflicts was also significant (Table 14), indicating that index subjects had worse relationships with their parents (Table 9, Figure 5). Social Class had been dropped from the Round 3 analysis because it was not significant for any of the dependent variables.

For the Round 1 Aggression ratings, Social Class was significant when all other effects were ignored. The Risk ignoring test approached significance ( $p < .08$ ). The eliminating tests showed, however, that neither effect was significant when all other effects were removed (Table 12). There was a similar pattern during Round 2, with the exception that Social Class was significant after eliminating all other effects. Lower social class subjects were more aggressive than higher social class subjects (Table 7, Figure 3). There was also a significant Risk x Social Class interaction which showed that index children were more aggressive within the lower class group. By Round 3, there was no relationship, individually or interactively, for either Risk or Social Class with Aggression.

Sex. Sex effects were relatively invariant across the ignoring

and eliminating tests for all dependent variables, indicating that sex differences are relatively independent of Risk and Social Class. Males were more emotionally unstable during rounds 1 and 3, with the difference approaching significance ( $p < .08$ ) during Round 2 (Table 11, Table 6, Figure 2). Males were also more aggressive during all three rounds, although the difference for Round 3 was not quite significant,  $p < .07$  (Table 12, Table 7, Figure 3). Males were more withdrawn only during the first two rounds (Table 13, Table 8, Figure 4). There were no sex differences during Round 3 for Parental Conflicts (Table 14, Table 9, Figure 5). There were also no interactions between Sex and Risk for any of the dependent variables during any of the rounds.

Summary. Among the major dependent variables, index and control children differed only on Emotional Instability. Initially this difference was confined to lower class subjects, but by Round 3 it held irrespective of Social Class. Risk and Social Class were also confounded during the early rounds for aggression, but in this case Social Class appeared to have the predominant influence. Males were less socially competent on all measures during the early rounds and were less emotionally stable during Round 3. The hypothesized interaction between Risk and Sex did not occur for Aggression and Withdrawal during Round 3: index males were not found to be more aggressive and index females were not more withdrawn.

#### Longitudinal analysis.

The purpose of the longitudinal analysis was to investigate

changes in the dependent variables over time. A rough estimate of such changes was provided by the series of cross-sectional analyses, but only a repeated measures analysis could provide a formal test of the main effect for Time. Tables 15, 16, and 17 present the Round 1 and Round 3 standard deviations for Emotional Instability, Aggression, and Withdrawal respectively. Comparisons between index and controls are presented separately by Sex and Social Class. These comparisons are presented graphically in Figures 6, 7, and 8. Table 18 presents the results of the longitudinal analysis. Social Class was not significant in any of the analyses and was, therefore, not included in the longitudinal model. With the exception of Risk x Time, none of the interactions involving Time were significant and were consequently dropped from consideration.

As was the case in the cross-sectional analyses, index subjects were less emotionally stable than controls, but they did not differ from controls on either of the other dependent variables (Table 18, Table 15, Figure 6). The significant Risk x Time interaction indicates that differences in emotional stability were greater during Round 3. Males were again shown to be less emotionally stable (Table 18, Table 15, Figure 6) and more aggressive (Table 18, Table 16, and Figure 7). No sex differences were found for Withdrawal (Table 18, Table 17, and Figure 8). The cross-sectional analyses had shown such a difference during Round 1 but not during Round 3.

There was a Time effect for Aggression indicating that aggressiveness increased from Round 1 to Round 3 (Table 18, Table 16, and Figure 7). The Time effect for Emotional Instability was nearly

Table 15. Means and Standard Deviations of Emotional Instability Scale Scores for Index and Control Subjects Who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

## Risk x Sex

		Round 1		Row	Round 3		Row
		Male	Female	Total	Male	Female	Total
Index (N=46)	M	2.18	1.83	2.03	3.35	2.17	2.83
	SD	1.42	1.27	1.36	2.83	1.91	2.52
Control (N=78)	M	1.88	1.11	1.54	2.27	1.59	1.97
	SD	1.41	1.07	1.32	2.76	1.90	2.43
Column Total	M	2.00	1.39	1.72	2.69	1.82	2.29
	SD	1.41	1.20	1.34	2.82	1.91	2.45

## Risk x SES

		Round 1		Row	Round 3		Row
		High SES	Low SES	Total	High SES	Low SES	Total
Index (N=46)	M	.86	2.21	2.03	2.47	2.89	2.83
	SD	.83	1.34	1.36	2.55	2.54	2.54
Control (N=78)	M	1.47	1.65	1.54	1.86	2.11	1.97
	SD	1.31	1.35	1.32	2.38	2.52	2.43
Column Total	M	1.39	1.97	1.72	1.95	2.55	2.29
	SD	1.27	1.36	1.34	2.39	2.54	2.45



Figure 6. Graphs of Index and Control Means for Emotional Instability Scale Scores of Subjects Who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

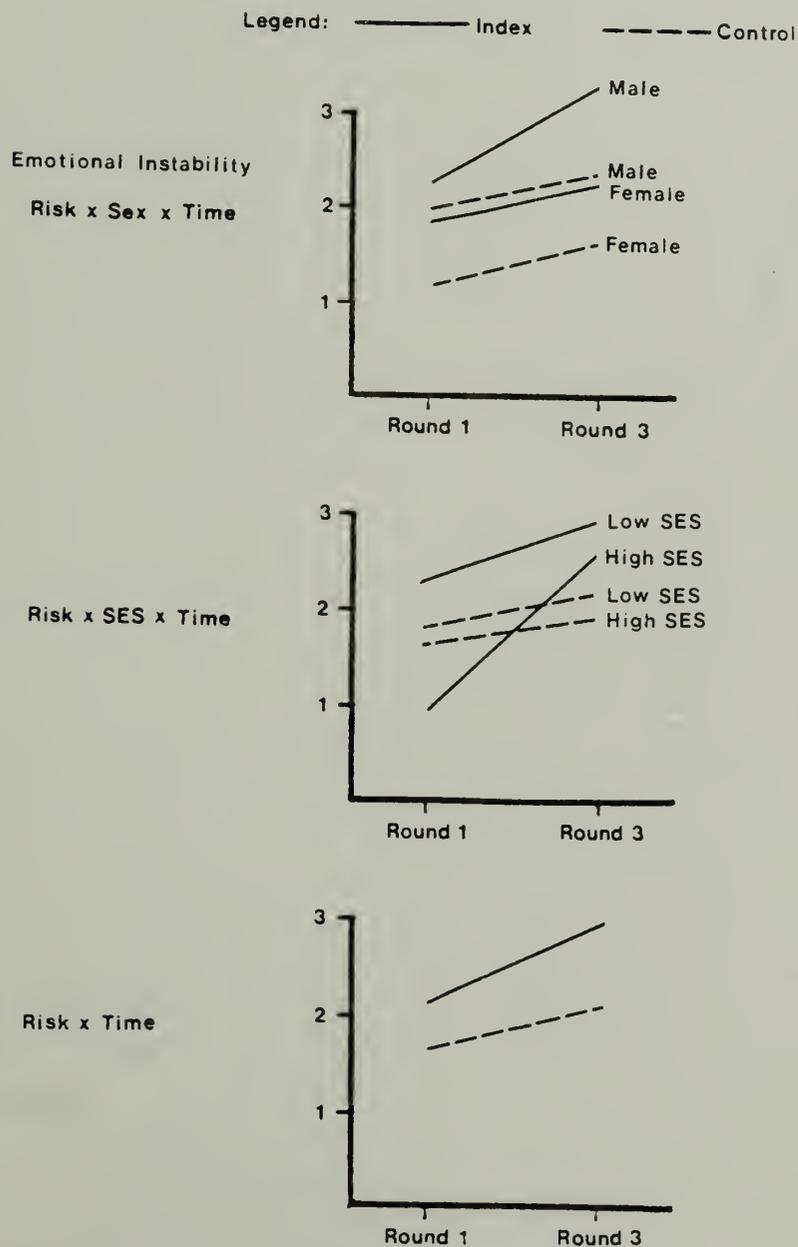


Table 16. Means and Standard Deviations of Aggression Scale Scores for Index and Control Subjects who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

Risk x Sex

		Round 1		Row Total	Round 1		Row Total
		Male	Female		Male	Female	
Index (N=46)	M	.86	.49	.70	2.27	1.37	1.87
	SD	1.25	.90	1.12	2.24	1.46	1.97
Control (N=78)	M	.68	.35	.53	1.70	1.26	1.52
	SD	1.11	.88	1.02	2.16	1.63	1.95
Column Totals	M	.75	.40	.59	1.92	1.31	1.65
	SD	1.16	.88	1.06	2.20	1.55	1.96

Risk x SES

		Round 1		Row Total	Round 3		Row Total
		High SES	Low SES		High SES	Low SES	
Index (N=46)	M	.17	.78	.70	1.22	1.97	1.87
	SD	.47	1.17	1.12	1.28	2.05	1.97
Control (N=78)	M	.54	.51	.53	1.34	1.76	1.52
	SD	1.15	.82	1.02	1.68	2.28	1.95
Column Totals	M	.50	.66	.59	1.32	1.88	1.65
	SD	1.09	1.04	1.06	1.62	2.14	1.76

Figure 7. Graphs of Index and Control Means for Aggression Scale Scores of Subjects Who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

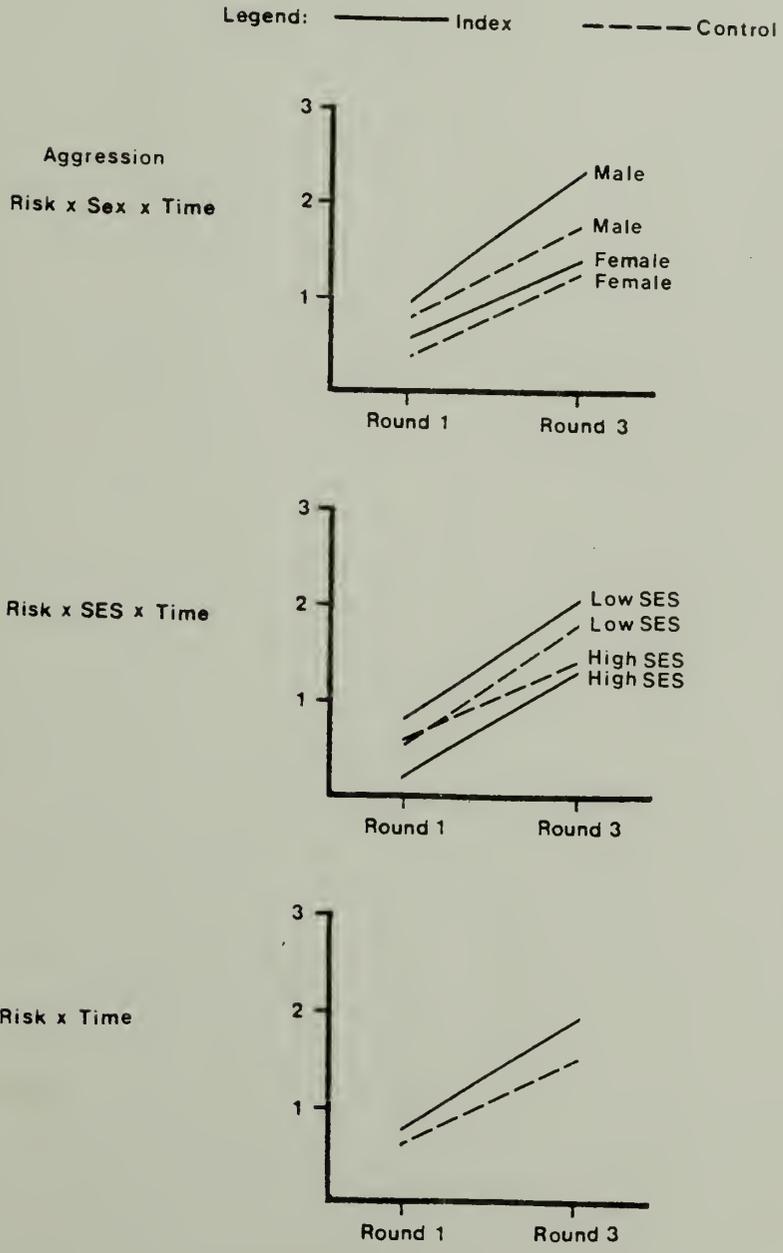


Table 17. Means and Standard Deviations for Withdrawal Scale Scores for Index and Control Subjects who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

## Risk x Sex

		Round 1		Row Total	Round 3		Row Total
		Male	Female		Male	Female	
Index (N=46)	M	1.12	.94	1.04	1.46	1.61	1.52
	SD	.97	.84	.92	1.94	2.15	2.02
Control (N=78)	M	1.34	.90	1.15	1.08	1.07	1.07
	SD	1.10	.92	1.04	1.54	1.33	1.44
Column Total	M	1.26	.92	1.11	1.23	1.28	1.24
	SD	1.06	.88	.98	1.71	1.70	1.70

## Risk x SES

		Round 1		Row Total	Round 3		Row Total
		High SES	Low SES		High SES	Low SES	
Index (N=46)	M	1.07	1.04	1.04	1.98	1.45	1.52
	SD	1.15	.89	.92	1.88	2.05	2.02
Control (N=78)	M	1.15	1.15	1.15	1.09	1.06	1.07
	SD	1.16	.87	1.04	1.60	1.21	1.44
Column Total	M	1.14	1.09	1.11	1.20	1.29	1.24
	SD	1.15	.88	.98	1.65	1.74	1.70

Figure 8. Graphs of Index and Control Means for Withdrawal Scale Scores of Subjects Who Participated in Rounds 1 and 3, Broken Down by Sex and Social Class (SES).

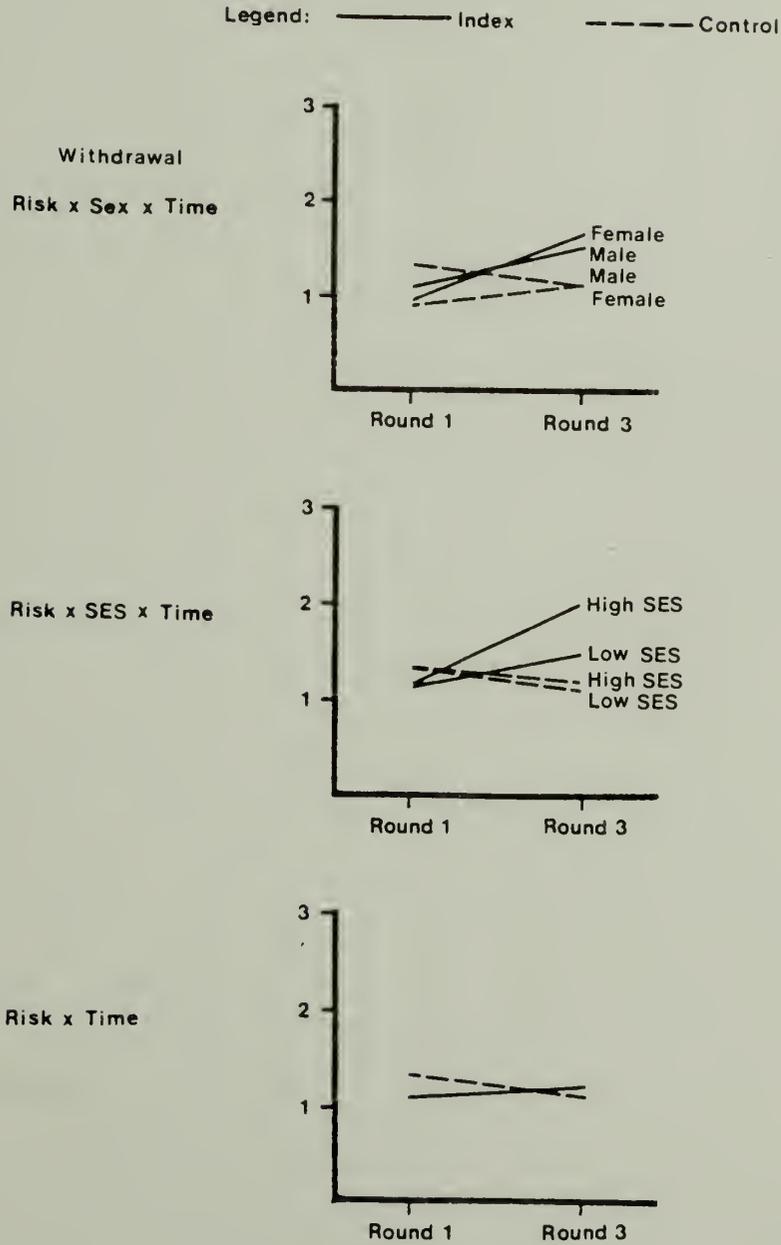


Table 18. Summary of Repeated Measures Analysis of Variance for Subjects Participating in Rounds 1 and 3: Emotional Instability, Aggression, and Withdrawal as a Function of Risk, Sex, and Time.

		F	P
Emotional Instability	Risk	5.74	.05
	Sex	7.27	.01
	Time	3.54	.06
	Risk x Time	4.91	.03

		F	P
Aggression	Risk	1.69	.25
	Sex	6.05	.05
	Time	21.76	.0001
	Risk x Time	1.40	.25

		F	P
Withdrawal	Risk	.71	.50
	Sex	.55	.50
	Time	.47	.50
	Risk x Time	1.32	.25

significant ( $p < .06$ ) and definitely not significant for Withdrawal (Table 18).

Taken together, the results of the cross-sectional and longitudinal analyses indicate that Emotional Instability and Aggression are the variables which most effectively discriminate Risk groups and Sex groups. Index subjects become progressively more emotionally unstable over time while control subjects remain about the same. All subjects become increasingly aggressive, with males being more aggressive at both time periods. Males are also more emotionally unstable at both time periods. As in the cross-sectional analyses, there were no interactions between Risk and Sex for Aggression or Withdrawal.

One qualification should be mentioned regarding the probability levels of the longitudinal effects. PROC GLM was not capable of computing multivariate tests of significance within a repeated measures analysis. Thus, the univariate analyses presented in Table 18 are not necessarily significant at the multivariate level. In the case of three uncorrelated dependent variables tested at the .05 univariate level, the overall probability of a Type I error would be .14. If the independent variables were correlated (as they are in the present case), this value would be smaller, but by an unknown amount.

Three effects in the longitudinal analysis (Risk and Risk  $\times$  Time for Emotional Instability and Sex for Aggression) are significant at the .05 level. It is conceivable that these effects were significant by chance. Note, however, that all three involve within-subject variables. Tests of within-subject effects are less sensitive to group differences than tests of between-subjects effects in repeated

measures analysis (Winer, 1971), and are, therefore, more conservative. Given the convergence of the cross-sectional and longitudinal results, the threat of Type I error is small in this case.

#### Intermediate Outcome.

Tables 11-14 present the results of the comparison on the four Round 3 dependent variables between subjects needing help for emotional problems and those who did not. All means for these comparisons are broken down by Risk and Sex in Table 19 (Emotional Instability and Aggression) and Table 20 (Withdrawal and Parental Conflicts). These means are presented graphically in Figures 9 and 10. The Need Help group was rated significantly more troubled on all of the Round 3 comparisons, that is, as more emotionally disturbed, more aggressive, and more withdrawn, and having more parental conflicts.

To determine if need for help could be predicted by earlier ratings, t-tests were performed on the Need Help and No Help means for the Round 1 factors. Table 21 presents the results of these tests with the corresponding cell means and standard deviations. There were no significant differences between the Need Help and the No Help groups on any of the individual Round 1 factors. To see if some linear combination of these factors predicted need for help, the Round 1 factor scores were used as predictor variables in a discriminant function analysis. Table 22 presents the results of the classifications based on the resulting discriminant function. The table describes the number of subjects that were designated by parents as needing help or not ("Parental Determination") and that were classified by the



Table 19. Means and Standard Deviations of Round 3 Emotional Instability and Aggression Scale Scores for No Help and Need Help Groups, Broken Down by Risk and Sex.

Emotional Instability

	Risk		Sex		Row	
	Index	Cont.	Male	Female	Total	
No Help M (N=97)	M	2.26	1.45	2.07	1.35	1.75
	SD	2.08	1.74	2.28	1.21	1.83
Need Help M (N=37)	M	4.01	3.59	4.28	3.13	3.78
	SD	2.96	3.42	3.58	2.63	3.15
Column Total	M	2.83	1.97	2.70	1.82	2.31
	SD	2.52	2.43	3.01	2.05	2.32

Aggression

	Risk		Sex		Row	
	Index	Cont.	Male	Female	Total	
No Help M (N=97)	M	1.67	1.20	1.61	1.07	1.37
	SD	1.94	1.72	2.17	1.28	1.73
Need Help M (N=37)	M	2.27	2.50	2.71	1.97	2.40
	SD	2.02	2.31	2.32	2.00	2.16
Column Total	M	1.87	1.52	1.93	1.31	1.65
	SD	1.97	1.95	2.24	1.64	1.96

Figure 9. Graphs of Need Help and No Help Group Means for Round 3 Emotional Instability and Aggression Scale Scores, Broken Down by Risk and Sex.

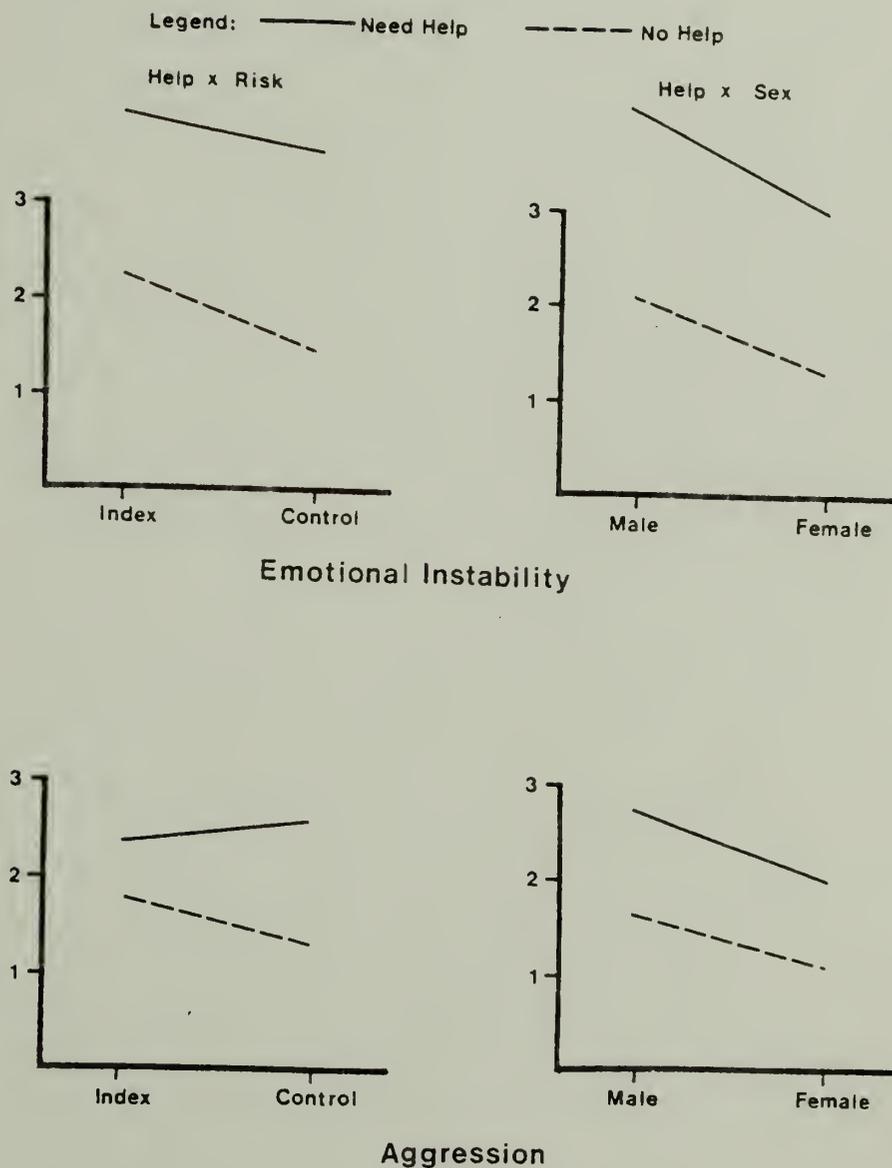


Table 20. Means and Standard Deviations of Round 3 Withdrawal and Parental Conflicts Scale Scores for No Help and Need Help Groups, Broken Down by Risk and Sex.

## Withdrawal

	Risk		Sex		Row	
	Index	Cont.	Male	Female	Total	
No Help	M	1.01	.84	1.03	.75	.91
(N=97)	SD	1.42	1.18	1.52	1.00	1.26
Need Help	M	2.58	1.80	1.62	2.88	2.16
(N=37)	SD	2.64	1.92	2.22	2.12	2.17
Column	M	1.52	1.07	1.19	1.32	1.26
Total	SD	2.02	1.44	1.87	1.56	1.64

## Parental Conflicts

	Risk		Sex		Row	
	Index	Cont.	Male	Female	Total	
No Help	M	1.20	.55	.80	.78	.78
(N=97)	SD	2.23	1.46	1.92	1.64	1.78
Need Help	M	2.47	.90	1.52	1.76	1.62
(N=37)	SD	1.50	1.77	1.58	1.78	1.68
Column	M	1.62	.63	1.00	1.04	1.01
Total	SD	2.10	1.53	1.76	1.72	1.73

Figure 10. Graphs of Need Help and No Help Group Means for Round 3 Withdrawal and Parental Conflicts Scale Scores, Broken Down by Risk and Sex.

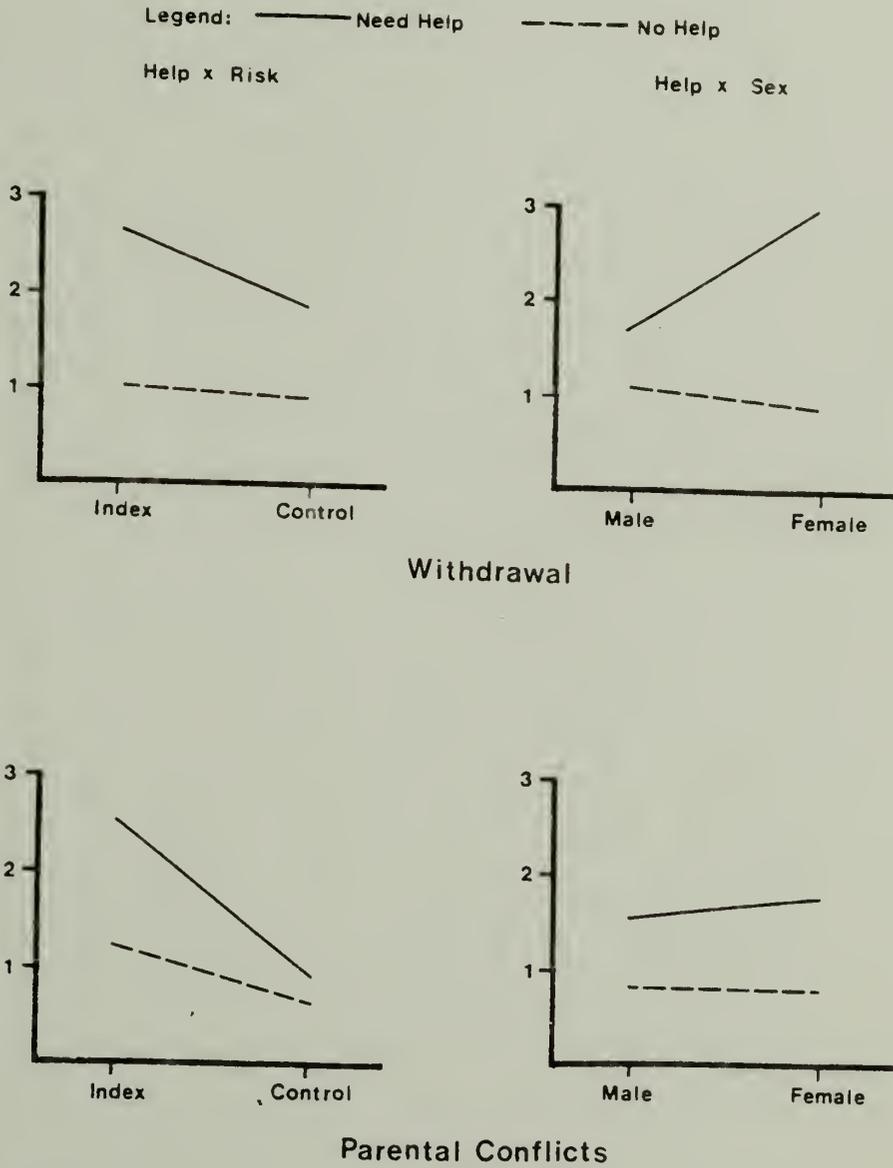


Table 21. Means, Standard Deviations, and Statistical Contrasts of Round 1 Emotional Instability, Aggression, and Withdrawal Raw Scores for Need Help and No Help Groups.

		Need Help	No Help	T	P
Emotional Instability	M	2.87	2.40	1.71	n.s.
	SD	2.20	1.95		
Aggression	M	.48	.47	.06	n.s.
	SD	.73	.90		
Withdrawal	M	1.48	1.24	1.13	n.s.
	SD	1.56	1.07		

Table 22. Summary of Discriminant Function Analysis of Parental Interview Responses Contrasting Need of Psychological Help from Those Not in Need.

Round 1

Classification by Discriminant Function\*

		No Help	Need Help
Parental Determination	No Help	97	0
	Need Help	37	0

Round 3

Classification by Discriminant Function

		No Help	Need Help
Parental Determination	No Help	89	8
	Need Help	18	19

\*The Round 1 discriminant function was not able to discriminate between the parent-defined groups.

discriminant function as needing help or not ("Classification by Discriminant Function"). The discriminant function was unable to discriminate between children in the two groups, with all subjects being classified as not needing help. This implies that no linear combination of Round 1 variables was capable of predicting need for help during Round 3.

The question arose whether there was a relationship of any kind between Round 1 ratings and characteristics of the subjects during Round 3. Correlation coefficients were calculated between Round 1 and Round 3 factor scores. There were significant correlations for Emotional Instability ( $r=.39$ ,  $p<.0001$ ) and Withdrawal ( $r = .41$ ,  $p<.0001$ ). The correlation for Aggression, however, was not significant ( $r=.08$ ,  $p<.20$ ), which indicates that adolescent aggressive behavior emerged de novo, without aggressive antecedents.

Given the marked difference between the Need Help and No Help groups on the Round 3 ratings, it seemed unusual that Round 1 Emotional Instability and Withdrawal would correlate with the corresponding Round 3 ratings but had no relationship with the Help variable. In order to investigate this discrepancy, it was necessary to determine what criteria parents used when judging need for treatment. This was accomplished by performing a discriminant function analysis using Help as the criterion variable and Round 3 Emotional Instability, Aggression, and Withdrawal as predictor variables.

Table 22 presents the results of this analysis. Only 8 (9%) of the children from the No Help group were classified by the discriminant function as needing help, whereas 19 (51%) of the Need Help group were

correctly classified. Table 23 presents the scale scores and group means for the computer-defined Need Help group, broken down by Risk. The corresponding means of the parentally-defined group are also given. Looking at the pattern of scale scores, a crude estimate of the discriminant function's classification rule seems to be "emotionally unstable and aggressive" or "emotionally unstable and withdrawn". This is born out by a high Emotional Instability mean for both the index and control groups, but relatively low means for Aggressiveness and Withdrawal. This latter result is produced by subjects who are high on Aggressiveness and tend to be low on Withdrawal and vice versa, producing low means for both variables. Nearly all subjects in both groups are high on Emotional Instability, which is reflected in the high means for this variable.

The discriminant function failed to classify as needing help 49% of the subjects who were so classified by their parents. The scale scores for this misclassified subgroup are presented in Table 24. Note that with only a few exceptions, all of these subjects have very low scores on all factors. The means of the misclassified sub-group are all lower than the parent defined Need Help group. It is unclear from these data what criteria the parents used in deciding that these children need help.

#### Predicting need for help using the computer-defined criterion.

The discriminant function appears to use a plausible behaviorally based decision rule for judging need for psychological treatment. Comparisons were made between the computer-defined Need Help and No Help groups to see if this criterion was related to Round 1 factors. Because this



Table 23. Round 3 Emotional Instability (EI), Aggression (Ag), and Withdrawal (Wd) Scale Scores of Index and Control Subjects who were Classified into the Need Help Group by Discriminant Function Analysis.

	Index Need Help			Control Need Help		
	EI	Ag	Wd	EI	Ag	Wd
	3.64	0	6.92	9.09	2.68	3.08
	7.27	2.86	4.62	9.09	4.29	1.54
	4.55	0	6.92	5.45	4.29	2.31
	7.27	4.29	1.54	10.00	1.43	1.54
	7.27	5.71	.77	8.18	5.71	.77
	8.18	0	6.92	1.82	8.57	1.54
	8.18	1.43	6.92	10.00	4.29	.77
	7.27	4.29	3.08	7.27	1.43	3.85
	9.09	4.29	0	7.27	4.29	6.92
	9.09	5.71	.77	6.36	5.71	2.31
	6.36	1.43	3.85	2.73	0	5.38
	8.18	2.86	3.08	8.18	5.71	0
	9.09	5.71	.77	2.73	0	6.15
				2.73	2.86	4.62
Mean of computer-defined group	7.34	2.97	3.55	6.49	3.67	2.92
Mean of parent-defined group	4.01	2.26	2.58	3.59	2.50	1.81

Table 24. Round 3 Emotional Instability (EI), Aggression (Ag), and Withdrawal (Wd) Scale Scores of Index and Control Subjects who were Judged as Needing Psychological Treatment by Their Parents, but Misclassified as Such by the Discriminant Function.

	Index No Help			Control No Help		
	EI	Ag	Wd	EI	Ag	Wd
	0	2.86	0	.91	0	.77
	.91	0	0	1.82	0	0
	0	1.43	0	0	8.57	.77
	1.82	0	0	0	1.43	.77
	0	0	0	3.64	4.29	1.54
	1.82	1.43	3.85	0	2.86	0
	.91	4.29	3.08	3.64	1.43	1.54
				0	0	0
				2.73	1.43	0
Mean of computer-defined group	.78	1.43	.99	1.16	1.94	.70
Mean of parent-defined Need Help group	4.01	2.26	2.58	3.59	2.50	1.81

criterion was based on a combination of Round 3 factors, the comparisons between groups were also made using two Round 1 composite scores: Emotional Instability plus Aggression and Emotional Instability plus Withdrawal.

Table 25 presents the results of the t-tests for each of the factors individually and for the two composite scores. Using a .01 level of confidence to rule out multivariate Type I error, the difference for Emotional Instability is highly significant ( $t_{132}=3.85$ ,  $p<.0001$ ), whereas the differences were not significant for either of the other variables. Combining Emotional Instability and Aggression resulted in a significant difference ( $t_{132}=4.63$ ,  $p<.0001$ ) as did the combination of Emotional Instability and Withdrawal ( $t_{132}=4.92$ ,  $p<.0001$ ). It appears that combining the variables in this manner differentiates the Need Help and the No Help groups more effectively than when using Emotional Instability alone.

Table 25. Means, Standard Deviations, and Statistical Contrasts of Round 1 Factor Scores and Composite Scores for the Computer-defined Need Help and No Help Groups.

		Need Help	No Help	T	P
Emotional Instability	M	3.56	2.43	3.85	.0001
	SD	2.40	1.84		
Aggression	M	.56	.47	.45	n.s.
	SD	.80	.86		
Withdrawal	M	1.74	1.25	2.12	.04
	SD	1.65	1.02		
Emotional Instability plus Aggression	M	4.44	2.88	4.63	.0001
	SD	2.89	2.31		
Emotional Instability plus Withdrawal	M	5.30	3.61	4.92	.0001
	SD	3.35	2.31		

## C H A P T E R VII

### DISCUSSION

The results partially confirm the hypotheses stated in Chapter IV. Differences in social competence were slight during the early rounds but only one characteristic, Emotional Instability, showed progressive changes over time. Index subjects were less emotionally stable and had more parental conflicts during Round 3. The predicted interaction of Sex and Risk did not occur; males were less socially competent on all factors irrespective of Risk status. It was true that children whose parents considered them in need of help for emotional problems were less socially competent during Round 3, but this measure of intermediate outcome was not predictable from Round 1 ratings.

Failure to find index subjects more withdrawn or more aggressive reflects the inconsistency with which these characteristics have been found in studies of preschizophrenics and high risk subjects. This inconsistency is most dramatically evident in the longitudinal study of Mednick and Schulsinger (1970). In this study, comparisons were made according to both risk status and later outcome. When the Sick group was compared to the Well group and normal controls, Sick group subjects were more easily upset and more disturbing, aggressive, and greater disciplinary problems in class. When the entire sample of high risk subjects was compared to controls, however, they were characterized as more withdrawn and passive. Like the Sick group, they were seen as more easily upset.

Findings of other studies have ranged from Woerner et al. (1972),

who found 80% of preschizophrenics to be withdrawn, lethargic, and having few friends, to Landau et al. (1972), who reported that parents, teachers, and psychiatric raters concurred on the high degree of destructive behavior, delinquency, and aggressiveness found in the index group. The consistency across studies is that one or the other (or occasionally both) of these dimensions is present in preschizophrenics or high risk children.

The current finding regarding the emotional instability of the index group is consistent with similar findings in the majority of follow-back and high risk studies. As has been stated previously, this emotional instability is not manifested in severe psychopathology, but rather more generally by anxiety, sleep disturbance, moodiness, and difficulty handling daily problems.

A striking feature of the present findings is how minimally social class was related to any of the variables in Round 3. It has been taken for granted that social class must be controlled in order for prodromal signs to become apparent. As Meehl (1971) points out, there may be relationships that social class has with the development of schizophrenia other than the nuisance role so commonly accorded it. By including social class as an independent variable rather than as a covariate in the present study, it was shown that low social class potentiates emotional instability in younger index children. Had social class simply been "controlled", this relationship would have never been discovered. The decline of the relationship of social class with social competence would have also gone unnoticed. Clearly it is preferable to investigate the effects of social class in its

own right rather than disguise its contribution through statistical control.

Summary of findings.

It is important to place these findings in a larger developmental perspective. The first two rounds of parental interviews took place when their offspring were in middle childhood, roughly ages 7 to 14, and the third round assessed adolescent functioning, approximately ages 14 to 19. There was a general sex difference favoring girls on most adjustment variables at all ages, but no noteworthy interactions with sex to indicate differential patterns for boys and girls that might relate to schizophrenic development. Low social class was associated with Emotional Instability and Aggression in the middle childhood years, which might reflect intrinsically greater maladjustment in the children or systematic class differences in the evaluation standards or reporting habits of parents. The absence of social class differences in adolescents suggests that the earlier differences were not measurement artifacts and implies that individual variations in emotional instability and aggression transcended broad social class variations by the time of adolescence.

It was not possible to distinguish between the effects of risk status and social class on Emotional Instability and Aggression in middle childhood, but children of schizophrenic parents were clearly distinguished by Emotional Instability ratings in adolescence. There was an indication of aggression among lower-class children at risk in the middle period, but it did not hold in adolescence. Withdrawal was

not associated with risk status or social class at any time. It may be inferred from this that social isolation does not characterize the early development of children at high risk for schizophrenia. Such children do have poorer relationships with their parents.

From the longitudinal analyses we conclude that Emotional Instability and Withdrawal are reasonably stable over time, but Aggression is not; it increases markedly in adolescent children generally. Some parents judge need for psychological treatment in their adolescent children in a way that is not readily ascertainable from the present ratings. Other parents, however, judge the need for such services on the basis of a combination of perceived emotional instability and either aggression or withdrawal. The vulnerability of these children appears to be the result of developmental patterns of long standing. If there is any relationship between this definition of vulnerability and later schizophrenia, early prediction from childhood behavior may be possible.

#### Limitations of the present findings.

The central weakness of the present study is the measurement instrument. Many of the items were phrased in terms of presence or absence of problems, e.g., "Has your child had any particular difficulty with ..." and "Have there been any behavioral or discipline problems..." Such wording excludes comment about behaviors which may not be serious enough to characterize as "difficulties" or "problems" but nonetheless are worth distinguishing from the total absence of such behaviors. The wording of these questions increases



the likelihood that parents would answer in a way that minimizes the problems of their children. Similarly, the dichotomous scaling prevents measuring variability among subjects on the interview items. Items should have been phrased in terms of observable behaviors (rather than inferences about behaviors) and should have been measured by a multiple interval Likert Scale.

A second factor which may have affected the internal validity of the results was the use of different interview protocols for each round. Although the same factors were represented at each round, each factor was defined by a different set of items. Changes in results from round to round may have reflected changes in factor composition rather than changes in behavior. The cross-sectional analyses are more likely to be internally valid than the longitudinal analyses since all subjects were rated on the same items within rounds. It certainly would have been preferable to have used the same interview items for all three rounds.

Another possible threat to the internal validity of both cross-sectional and longitudinal analyses is the attrition of subjects. The largest amount of attrition (33%) was among the index group which declined from 78 during Round 1 to 51 during Round 3. The control group decreased by 18%, from 100 to 82 during the same period. Given that only 6%-15% of the index subjects are expected to become schizophrenic, there is some likelihood that a number of these children were among the 26 index subjects who did not remain in the study.

The high risk method relies on the deviant scores of the incipient schizophrenics to pull the index mean far enough from the con-

trol mean so that prodromal signs can be detected. If sufficient numbers of these children do not remain after attrition, then group differences will be too subtle to detect. It was, of course, impossible to test this hypothesis directly. But it was possible to see if the subjects who remained in the study were less deviant on Round 1 scores than the children who left. There were no significant differences on the t-tests for any of the dependent variables (Table 26). Thus, there is no indication that children who drop out of the study are more disturbed than those who remain. It is still possible, however, that these children became more deviant after they dropped out.

Finally, interpretation of these results as prodromal signs of schizophrenia is limited by the fact that none of the index subjects was known to be schizophrenic at the time of assessment. Emotional instability and poor parental relationships may be signs of developing schizophrenia, effects of being reared by a psychiatrically disturbed parent, or perhaps both. Emotional instability in preschizophrenics has been found by follow-back studies and in the premorbid ratings of the Sick Group in Mednick and Schulsinger's (1970) high risk study. Watt et al. (1979) found preschizophrenics to be less emotionally stable than controls while there was no such difference between future personality disorder patients and their controls. Preschizophrenics, however, were found to be equally as low on personal adjustment as future personality disorder patients by Woerner et al. (1972). High risk studies which have compared children of schizophrenics to children of other psychiatric patients have generally found no differences between the two groups. An

Table 26. Means, Standard Deviations, and Statistical Contrasts of Round 1 Factor Scores for Children who Remained in the Study and for Those who Dropped Out before Round 3.

		Emotional Instability			
		Remained	Drop-out	T	P
Index	M	2.11	2.06	.08	n.s.
	SD	1.32	2.05		
Control	M	1.55	1.63	.25	n.s.
	SD	1.32	1.28		

		Aggression			
		Remained	Drop-out	T	P
Index	M	.73	.83	.37	n.s.
	SD	1.14	.89		
Control	M	.54	.49	.04	n.s.
	SD	1.03	.98		

		Withdrawal			
		Remained	Drop-out	T	P
Index	M	1.08	.94	.67	n.s.
	SD	.91	.89		
Control	M	1.15	.98	.58	n.s.
	SD	1.04	1.12		

exception is Rolf (1976) who found that peers rated children of depressed mothers less negatively than children of schizophrenic mothers. Thus the role of emotional instability in the development of schizophrenia remains inconclusive.

#### Implications for future research.

When need for help is defined according to a behavioral criterion, membership in that group during adolescence was predictable from ratings made in childhood. Using a composite score yielded a better prediction than using individual scores. Before discussing the implications of this finding, several qualifications should be raised. First, the parental assessment of need for help was based on two rather general questions in the Round 3 interview and cannot be construed as a reliable diagnostic assessment. Second, the discriminant function developed from this assessment cannot be considered more prescient than the parents themselves. Third, neither assessment is necessarily related in any way to schizophrenia, although it will be interesting someday to note if any future schizophrenics have been "caught" with either of these "nets". Fourth, index and control subjects are represented nearly equally in both groups. In the parentally defined group there are 17 index subjects (33%) and 20 controls (24%). There are 13 index subjects (25%) and 14 control subjects (17%) in the computer-defined group.

With these qualifications in mind, consider the effect that two subtypes, emotionally unstable/aggressive and emotionally unstable/withdrawn might have when comparing index and control groups on each

variable individually. The majority of high risk subjects are expected to be indistinguishable from control subjects. A relatively small minority are expected to deviate from these "normal" index subjects. Group differences are most likely to be found for those attributes which are shared by the deviant index subjects. Group differences would be less likely to occur for those attributes not shared by all of the deviant index subjects. Only if the latter characteristics are related to some other subject variable (e.g., sex, social class, or IQ) can group differences be detected. In this case the differences could be discovered by a significant interaction between Risk and the relevant subject variable.

Another possible circumstance is that specific subgroups exist within the index group which share some characteristics (e.g., emotional instability) but have other characteristics (e.g., withdrawal or aggression) which are unique to specific subgroups. If these latter characteristics are not related to subject variables such as sex, social class, or IQ, then their existence would not be detected by group comparisons or tests of interactions.

This circumstance may account for the failure of school records and high risk studies to produce a consistent picture of the developing schizophrenic. The presence of distinct subgroups may be due to a variable course in the development of schizophrenia. One such theory has been offered by Ricks and Berry (1970). It is a developmental theory that specifies a sequence of stages leading to the eventual onset of schizophrenia. The first stage, protest, occurs after a child has experienced a long period of failure, loss or

rejection. The child tries to deal with these circumstances by confrontation, demands for attention, and temper tantrums that test the tolerance of others and the limits to which he will be loved in spite of his failures. The second stage, despair, is characterized by withdrawal and hopelessness. Rather than engage others, the child increasingly avoids contact with others. Periods of protest may still occur, but the child is primarily depressed and isolated. This leads to the final stage of detachment and apathy. Protest ceases, and feelings of depression and self-blame give way to apathy and lack of concern. "Restititional efforts, which in the two earlier stages of withdrawal could lead back to some form of adjustment to societal expectations, seem now to be directed toward the creation of an imaginary world" (Ricks and Berry, 1970, p. 46).

If such a sequence is correct, it would support findings of both aggression and withdrawal in groups of preschizophrenics and high risk subjects. Emotional instability would conceivably accompany both behavioral styles. An index group might contain subjects at various points along the developmental sequence, with some subjects being emotionally unstable and aggressive, and others who are emotionally unstable and withdrawn. The numbers of each might vary from study to study, with the results of group comparisons reflecting the relative proportions within a given sample.

A method such as the maximizing Chi-square technique of Hanson, Gottesman, and Heston (1976) or a cluster-analytic procedure would be more appropriate than the group comparison method for locating subgroups. Repeated assessments could be used to investigate

whether deviant subgroups change over time and would eventually lead to the discovery of which combinations of characteristics and what developmental sequence leads to eventual schizophrenia.

## C H A P T E R VIII

### SUMMARY

A central premise of schizophrenia development research is that early signs of the disorder are observable before the actual onset of symptoms. Measurement instruments based on valid dimensions of child behavior are necessary in order to detect the prodromal signs of schizophrenia. An extensive body of research has investigated behavioral dimensions in both psychologically normal and disturbed children. These studies have repeatedly found three bipolar clusters which define continuous behavioral dimensions, anchored by socially competent behaviors at one end and by psychological symptoms at the other: academic achievement vs. learning disability, compliance-cooperation vs. aggression, and social participation vs. withdrawal. A fourth, unipolar, dimension describes emotional instability. Empirically derived scales have been infrequently used in schizophrenia development research, although the measures which have been used tend to reflect these dimensions.

Four research methods have been used to investigate the etiology of schizophrenia. Of these, only the school records and high risk method are free of retrospective bias, are capable of testing specific hypotheses, and produce results which are generalizable to the schizophrenic "universe". Studies using these methods have consistently shown that preschizophrenics and high risk subjects are less emotionally stable than normal controls. They have variously shown that index subjects are aggressive or withdrawn. Findings of sex differences



have varied from study to study, but with some consistency: index males have been found to be more aggressive and index females have been found to be more withdrawn. There is a question whether differences between index and control groups are specific to the development of schizophrenia, however. Such differences have frequently been found, but differences between index and psychiatric controls have been few.

It was hypothesized in the present study that the index group would show progressive deterioration over time on all measures, with index males becoming particularly aggressive and index females becoming particularly withdrawn. Using parents' determination of need for psychological treatment as a measure of intermediate outcome, it was predicted that children in need of help would be rated more poorly on all measures. A correlational technique was used to construct three factors which appeared in three rounds of parental interviews: Emotional Instability, Aggressiveness, and Withdrawal. A fourth factor, Parental Conflicts was obtained from the third round interview.

There is nothing resembling "experimental treatment" in schizophrenia development research. Thus, there are no true independent variables to be manipulated as there are in true experiments. Because of the nonexperimental nature of research in this field, several statistical and logical issues come into play which must be considered when comparing index and control groups. A method was devised that takes these issues into account within a multiple regression framework.

Group differences were investigated in a series of cross-sectional analyses and a single longitudinal analysis. The results showed that during childhood, index subjects were higher on Emotional Instability

than controls within the low social class range. By adolescence, there was a full fledged difference between the groups that was unrelated to social class. Index subjects had worse relationships with their parents during adolescence. Males were more emotionally unstable and more aggressive than females during all three rating periods.

Children whose parents described as needing psychological help were rated higher on all four factors in Round 3. Intermediate outcome was not predictable from Round 1 factors either individually or in combination. Round 1 ratings of Emotional Instability and Withdrawal were significantly correlated with the corresponding Round 3 ratings, suggesting some degree of stability in behavior. When need for help was defined by discriminant function analysis, the criterion was "emotionally unstable and aggressive" or "emotionally unstable and withdrawn". The group needing help according to this criterion was more emotionally unstable in Round 1 than the group that did not need help. The difference between these groups was greatest on composite scores of Emotional Instability/Aggression and Emotional Instability/Withdrawal.

### Conclusions.

1. Emotional instability becomes increasingly greater within the index group over time. A corresponding increase does not occur within the control group. Index children also have worse relationships with their parents during adolescence. There are no group differences on degree of aggression or withdrawal.

2. Males are more emotionally unstable and more aggressive than girls across time. There are no differences between the sexes on

withdrawal or quality of relationship with parents.

3. Social class is confounded with risk status during the early rounds, but this relationship does not persist in adolescence. Sex effects are independent of both variables. It is preferable to include social class as an independent variable, rather than as a covariate, in order to investigate its relationship with other variables.

4. Parents may use criteria other than emotional instability, aggression, and withdrawal when deciding whether their children need psychological help. Whatever their criterion is, it is related to their ratings of these factors during adolescence, but not during childhood.

5. Ratings of emotional instability and withdrawal in adolescence are predictable from ratings made during childhood. When need for help in adolescence is defined by extreme scores on Emotional Instability combined with Aggression or Withdrawal, need for treatment is predictable from childhood ratings of Emotional Instability. This prediction is improved by creating composite scores of Emotional Instability plus Aggression and Emotional Instability plus Withdrawal.

6. Prodromal signs of schizophrenia may not appear as distinct behaviors but may occur in specific combinations. The group comparison method is not always sensitive to the presence of these subgroups, particularly for those characteristics not shared by all deviant index subjects.

7. The apparent inconsistency with which aggression and withdrawal have been found in schizophrenia development research may be due to a sequence of developmental changes in which aggression and withdrawal

are both prominent.

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APPENDIX

The interview protocols covered a wide range of developmental, medical, and behavioral topics. The behaviorally-oriented items are presented here. Responses selected for the initial factor construction are noted, indicating their factor assignments. These assignments are denoted with the following abbreviations:

- EI - Emotional Instability
- Hy - Hyperactivity
- Ag - Aggression/Conduct Problems
- Wd - Withdrawal/Isolation
- Lh - Learning/Academic Problems
- Pc - Parental Conflicts
- NA - Not Applicable
- DK - Do Not Know



Round 1 Interview Protocol

28. Has child had any allergies?

- 0 None
- EI 1 Asthma
- EI 2 Other respiratory reactions
- EI 3 Reactions leading to rashes, other skin disturbances
- EI 4 Reactions leading to digestive disturbances
- EI 5 Unspecified reactions
- EI 6 Other, combinations
- 9 DK

29. Did child like to be held or cuddled?

- 0 No, disliked
- 1 Indifferent
- 2 Liked
- 9 DK

30. Did cuddle attitude change as he grew older?

- 0 No change
- 1 More cuddly
- 2 Less cuddly
- 9 DK

31. Behaviors: Stammering or stuttering

- 0 No
- EI 1 Yes
- 9 DK

32. Restlessness or overactivity

- 0 No
- Hy 1 Yes
- 9 DK

33. Undereats or overeats

- 0 No
- EI 1 Undereats
- EI 2 Overeats
- 9 DK

34. Sleeping difficulties

- 0 No
- EI 1 Yes
- 9 DK

## 35. Headbanging

0 No  
 EI 1 Yes  
 9 DK

## 36. Temper tantrums

0 No  
 EI 1 Yes  
 9 DK

## 37. Rocking back and forth

0 No  
 EI 1 Yes  
 9 DK

## 38. Unusual habits

0 No  
 1 Yes  
 9 DK

## 39. Bedwetting

0 No  
 EI 1 Yes  
 9 DK

## 40. Has child ever had any seizures (convulsions, fits, epilepsy)?

0 No  
 EI 1 Yes, 1 seizure (not epilepsy)  
 EI 2 Yes, 2-3 seizures (not epilepsy)  
 EI 3 Yes, more than 3 seizures (not epilepsy)  
 4 Epilepsy  
 9 DK

## 41. Would you say that child is clumsy when compared to others his age?

0 No  
 1 Yes  
 9 DK

## 42. Has child received any help for emotional difficulties?

0 None  
 Hy 1 Hyperactivity  
 Ag 2 Aggressive behavior  
 Wd 3 Socially withdrawn behavior, apathy  
 EI 4 Eneuresis  
 EI 5 Anorexia

- EI 6 Sleeping difficulties
- EI 7 Anxiety, agitation, nervousness
- EI 8 Phobias, obsessions, compulsions
- Ln 9 Learning or perceptual difficulties
- Ag 10 Problem behavior
- EI 11 Depression
- EI 12 Suicidal thoughts and/or attempts
- EI 13 Other, combinations
- 99 DK

43. Have there been any important difficulties for which child has not received help?

- 0 None
- Hy 1 Hyperactivity
- Ag 2 Aggressive behavior
- Wd 3 Socially withdrawn behavior, apathy
- EI 4 Eneuresis
- EI 5 Anorexia
- EI 6 Sleeping difficulties
- EI 7 Anxiety, agitation, nervousness
- EI 8 Phobias, obsessions, compulsions
- Ln 9 Learning or perceptual difficulties
- Ag 10 Problem behavior
- EI 11 Depression
- EI 12 Suicidal thoughts and/or attempts
- EI 13 Other, combinations
- 99 DK

44. Is there anything else about child's development that you think is important?

- 0 No
- 1 Physical problem
- EI 2 Emotional or behavioral problem
- 3 Problems relating to parent's illness
- 4 Positive aspects of child
- 5 Other
- 9 DK

45. Any particular difficulties with schoolwork or behavioral problems at school?

- 0 No
- Ln 1 Concentration
- Hy 2 Hyperactive
- Ag 3 Aggressive, destructive
- Ag 4 Disobedient, disruptive
- Wd 5 Getting along with other kids
- Wd 6 Withdrawn, timid
- Ag 7 Cheating

- Ag 8 Lying
- Ag 9 Stealing
- Ln 10 Learning problems (difficulty with schoolwork)
- 88 NA (not in school)
- 99 DK

46. Are there any behavioral or discipline problems at home?

- 0 No
- Ag 1 Disobedient, uncooperative, fresh to parents
- Wd 2 Can't get along with other kids
- Hy 3 Hyperactive
- Ag 4 Aggressive, destructive
- Ag 5 Lying
- Ag 6 Stealing
- Ag 7 Other, combinations
- 9 DK

47. Has child always gotten along well with brothers and sisters?

- Wd 0 Never
- 1 Always well
- 2 Now well
- Wd 3 Past well
- 8 NA (no sibs)
- 9 DK

48. Has child always gotten along well with other children?

- Wd 0 Never
- 1 Always well
- 2 Now well
- Wd 3 Past well
- 9 DK

49. Have other children teased child much or picked on him/her much?

- 0 No
- Wd 1 Yes
- 9 DK

50. Has child fought much with other children?

- 0 No
- Ag 1 Yes, always
- Ag 2 Yes, past
- Ag 3 Yes, present
- 4 Other
- 9 DK

51. Does child have any best friends?

Wd 0 No  
1 Yes  
9 DK

52. Does child usually prefer to play with other children or alone?

Wd 0 Alone  
1 With others  
2 Both  
9 DK

53. (If prefers to play alone) What does child usually do?

1 Watch TV, sedentary hobby, read, etc.  
2 Play outside  
3 Spend time with adults  
4 Daydream, imaginary companions  
5 Other, combinations  
8 NA (child does not prefer to play alone)  
9 DK

54. Would you describe child as generally happy?

EI 0 No  
1 Yes  
9 DK

55. Affectionate?

EI 0 No  
1 Yes  
9 DK

56. Excitable?

0 No  
EI 1 Yes  
9 DK

57. Moody?

0 No  
EI 1 Yes  
9 DK

58. Timid?

0 No  
Wd 1 Yes  
9 DK

59. Easily frustrated?

0 No  
EI 1 Yes  
9 DK

Round 2 Interview Protocol

4. Have any of your children any seizures or convulsions?

- 0 No  
 EI 1 Yes  
 9 DK

5. Have any gained or lost a great deal of weight?

- 0 No  
 1 Gained weight  
 2 Lost weight  
 9 DK

6. Have any of them been hospitalized? If yes, why?

- 0 No  
 1 Physical illness  
 2 Accident  
 EI 3 Emotional disorders  
 4 Other, combinations  
 9 DK

7. Have any of them taken any medications regularly since we last saw you? If yes, under doctor's orders?

- 0 No  
 1 Not under doctor's orders  
 2 Under doctor's orders  
 3 Sometimes under doctor's orders and sometimes not  
 9 DK

(If yes) What medication? \_\_\_\_\_

8. How about drugs?

- 0 No  
 Ag 1 Yes  
 9 DK

(If yes) Which drugs? \_\_\_\_\_

We know that we asked you at our last interview about various behaviors that children can have. However, we'd like to know if at this time any of your children show any of the following behaviors:

9. Stammering or stuttering?

- 0 No  
 EI 1 Yes  
 9 DK

10. Restlessness or overactivity?

0 No  
Hy 1 Yes  
9 DK

11. Undereats or overeats?

0 No  
EI 1 Yes  
9 DK

12. Sleeping difficulties?

0 No  
EI 1 Yes  
9 DK

13. Headbanging?

0 No  
EI 1 Yes  
9 DK

14. Temper tantrums?

0 No  
EI 1 Yes  
9 DK

15. Rocking back and forth?

0 No  
EI 1 Yes  
9 DK

16. Clumsiness?

0 No  
1 Yes  
9 DK

17. Unusual habits or mannerisms?

0 No  
1 Yes  
9 DK

18. Bedwetting?

0 No



- EI 1 Yes  
9 DK
19. Since we last saw you have any of the children received help for emotional or nervous difficulties?
- 0 No difficulties  
Hy 1 Hyperactivity  
Ag 2 Aggressive behavior  
Wd 3 Socially withdrawn behavior, apathy  
EI 4 Eneuresis  
EI 5 Anorexia  
EI 6 Sleeping difficulties  
EI 7 Anxiety, agitation, nervousness  
EI 8 Phobias, obsessions, compulsions  
Ln 9 Learning or perceptual difficulties  
Ag 10 Problem behavior  
EI 11 Depression  
EI 12 Suicidal thoughts and/or attempts  
EI 13 Other, combinations  
99 DK
20. Have any of them had any important difficulties for which they have not received help?
- 0 No difficulties  
Hy 1 Hyperactivity  
Ag 2 Aggressive behavior  
Wd 3 Socially withdrawn behavior, apathy  
EI 4 Eneuresis  
EI 5 Anorexia  
EI 6 Sleeping difficulties  
EI 7 Anxiety, agitation, nervousness  
EI 8 Phobias, obsessions, convulsions  
Ln 9 Learning or perceptual difficulties  
Ag 10 Problem behavior  
EI 11 Depression  
EI 12 Suicidal thoughts and/or attempts  
EI 13 Other, combinations  
99 DK
21. Would you say that child has a sense of humor?
- 0 No  
1 Yes  
9 DK
22. Do any of your children seem to have some problem handling stressful situations?
- 0 No problem

- 1 Yes
- 9 DK

22a. (If yes) How does he/she react to them?

- EI 1 Depressed
- Ag 2 Aggressive or destructive (e.g., throws things, hits people)
- Wd 3 Withdrawn
- Ag 4 Temper tantrums, cries, pouts, sulks
- EI 5 Becomes disorganized
- EI 6 Gets physically ill
- EI 7 Overcompensates (e.g., tackles problem beyond self limitations)
- EI 8 Other, combinations
- 9 DK

23. Is there anything else about any of your children's development or health that you feel is important?

- 0 No
- 1 Physical problem
- EI 2 Emotional or behavioral problem
- 3 Problems relating to parents illness
- 4 Positive aspects of child
- 5 Other, combinations
- 9 DK

24. What grades are your children in?

- 0 Under school age, not in preschool
- Enter actual grade 1-12
- 13 Preschool
- 14 Kindergarten
- 15 Special, ungraded class
- 16 Institution, other
- 17 Dropped out of school
- 18 Graduated high school, not in school
- 19 In training (vocational) school
- 20 In college
- 21 In graduate school or medical school
- 22 Other
- 99 DK

25. Have any of the children ever taken a remedial class or ever repeated a grade?

- 0 No
- Ln 1 Remedial class
- Ln 2 Repeated a grade
- Ln 3 Both
- 8 NA
- 9 DK

26. Are any of your children having particular difficulties with their school work?

- 0 No
- Ln 1 Yes
- 8 NA (not in school)
- 9 DK

26a. (If yes) In what area is he/she having difficulties?

- 1 Reading
- 2 Other than reading
- 3 Reading and other
- 8 NA
- 9 DK

27. Have there been any behavioral problems at school?

- 0 No problems
- Ln 1 Concentration
- Hy 2 Hyperative
- Ag 3 Aggressive, destructive
- Ag 4 Disobedient, disruptive
- Wd 5 Getting along with other kids
- Wd 6 Withdrawn, timid
- Ag 7 Cheating
- Ag 8 Lying
- Ag 9 Stealing
- Ln 10 Learning problems (difficulty with school work)
- Ln 11 Other, combinations
- 88 NA (not in school)
- 99 DK

28. Are there any behavioral or discipline problems at home?

- 0 No problems
- Ag 1 Disobedient, uncooperative, fresh to parents
- Wd 2 Can't get along with other kids
- Hy 3 Hyperactive
- Ag 4 Aggressive, destructive
- Ag 5 Lying
- Ag 6 Stealing
- Ag 7 Other, combinations
- 8 NA (not living at home)
- 9 DK

29. Do any of your children prefer to play by themselves?

- 0 No, prefers to play with others
- Wd 1 Yes, prefers to play alone
- 2 Likes to play alone and with other children

9 DK

30. Would you say that child has more friends, less friends, or about the same number of friends as other children?

1 More

2 Same

Wd 3 Less

9 DK

31. Do you like your children's friends? Do any of your children have a group of friends who you don't like?

1 Like friends

2 Don't like friends

Wd 8 NA (child doesn't have any friends)

9 DK

32. Do any of your children have any best friends now?

Wd 0 No

1 Yes

9 DK

33. Recently have any of your children been picked on or teased a lot?

0 No

Wd 1 Yes

9 DK

33a. (If yes) Does he/she get picked on by a number of different people or by the same child(ren) all the time?

1 Same child(ren)

2 Different children

8 NA

9 DK

33b. (If yes to 33) And what does he/she usually do when he/she is picked on?

1 Walk away indifferently

2 Walk away upset

3 Fight verbally

4 Fight physically

5 Cry or pout

6 Tattle

8 NA

9 DK

34. Do any of your children pick on or tease other kids a lot?

- 0 No
- Ag 1 Yes
- 9 DK

35. Recently have any of the children been fighting a lot? If yes, who starts the fights?

- 0 No
- Ag 1 Yes, others start the fights
- Ag 2 Yes, child starts fights
- Ag 3 Yes, both start fights
- 9 DK

36. Would you say that any of your children like to hurt animals or other people?

- 0 No
- Ag 1 Likes to hurt animals
- Ag 2 Likes to hurt people
- Ag 3 Likes to hurt animals and people
- 9 DK

37. Since we last saw you, has anything happened that has particularly affected any of your children in either a positive or negative way?

- 0 Nothing happened
- 1 Positive happening
- 2 Negative happening
- 9 DK

38. Have any of your children had a run-in with the law?

- 0 No
- Ag 1 Yes
- 9 DK

For children 13 years and older:

39. Do any of them date? If yes, does he/she have a boy/girl friend or does he/she date other people?

- 0 Doesn't date
- 1 Dates boy/girl friend
- 2 Dates different people
- 8 NA
- 9 DK

40. (If boy/girl friend) Do you like his/her boy/girl friend?

- 0 No

- 1 Yes
- 8 NA
- 9 DK

41. Do any of these children smoke cigarettes? If yes, how much?

- 0 No
- 1 Not daily
- 2 Less than  $\frac{1}{2}$  pack a day
- 3  $\frac{1}{2}$  to 1 pack a day
- 4 Over 1 pack a day
- 8 NA
- 9 DK

42. Do they drink alcohol? If yes, has drinking ever been a problem?

- 0 No
- 1 Never a problem
- 2 Once a problem
- Ag 3 Frequently a problem
- 8 NA
- 9 DK

43. Do any of them have a job?

- 0 No
- 1 Part-time job
- 2 Full-time job
- 8 NA
- 9 DK

Round 3 Interview Protocol

6. How often on the average have each of your children complained of:

Headaches (exact answer: \_\_\_\_\_)

- 0 3-4 times per year or less
- 1 More than 4 times per year but less than once a month
- EI 2 About once a month
- EI 3 More than once a month but less than once a week
- EI 4 At least once a week
- 9 DK

7. Stomachaches (exact answer: \_\_\_\_\_)

- 0 3-4 times per year or less
- 1 More than 4 times per year but less than once a month
- EI 2 About once a month
- EI 3 More than once a month but less than once a week
- EI 4 At least once a week
- 9 DK

8. Bodily aches and pains (for no apparent physical illness)  
(exact answer: \_\_\_\_\_)

- 0 3-4 times per year or less
- 1 More than 4 times per year but less than once a month
- EI 2 About once a month
- EI 3 More than once a month but less than once a week
- EI 4 At least once a week
- 9 DK

9. Tiredness (exact answer: \_\_\_\_\_)

- 0 3-4 times per year or less
- 1 More than 4 times per year but less than once a month
- EI 2 About once a month
- EI 3 More than once a month but less than once a week
- EI 4 At least once a week
- 9 DK

Some of the parents in our study have been telling us about their children's experimenting with alcohol and various kinds of drugs.

10. Do you know if any of your children have ever taken drugs, even occasionally?

- 0 No
- Ag 1 Yes
- 9 DK

11. Do any of your children drink alcohol?

- 0 No
- 1 Yes
- 9 DK

12. (If yes) Does he/she drink enough to get drunk? If yes, how often?

- 0 No or rarely (e.g., once or twice)
- Ag 1 Yes (specify how often)
- 8 NA
- 9 DK

13. (If yes to 12) With friends or by themselves?

- 0 Never alone (always with friends)
- 1 Sometimes alone
- 2 Mostly alone
- 8 NA
- 9 DK

14. How well do you get along with each of your children?

- 0 Very well
- 1 Usually well
- PC 2 Usually not well
- PC 3 Very poorly
- 9 DK

15. And how would you say your husband/wife gets along with each of your children?

- 0 Very well
- 1 Usually well
- PC 2 Usually not well
- PC 3 Very poorly
- 9 DK

16. Have any of your children been a behavior problem or discipline problem at home?

- 0 No
- PC 1 Somewhat of a problem
- PC 2 Very much of a problem
- 8 NA
- 9 DK

17. Would you say that any of your children are more dependent on you or your husband/wife than you'd like them to be?

- 0 No
- Wd 1 Yes
- 9 DK



19. Do your children come to talk to you about school, their friends or things like that?
- 0 Often
  - 1 Occasionally
  - PC 2 Rarely or never
  - 9 DK
20. Do you find that there are times that you don't know where any one of your children are or who they are off with?
- 0 No
  - 1 Occasionally
  - PC 2 Often
  - 9 DK
21. Have any of your children ever run away from home?
- 0 No
  - 1 Once
  - PC 2 More than once (specify how many times: \_\_\_\_\_)
  - 9 DK
22. Do any of your children prefer to be by themselves rather than with other children?
- 0 Rarely or never
  - 1 Sometimes
  - Wd 2 Often
  - 9 DK
23. Would you say that child has more friends, less friends, or about the same number of friends as other children his/her age?
- 0 More
  - 1 Same
  - Wd 2 Less
  - 9 DK
24. Would you say that child has more friends, less friends, or about the same number of friends now as compared to a year ago?
- 0 More
  - 1 Same
  - 2 Less
  - 9 DK
25. Do you like your children's friends? Do any of your children have a group of friends that you don't like?
- 0 Likes friends
  - 1 Don't like some of their friends

- 2 Don't like most of their friends  
 Wd 8 NA (child doesn't have any friends)  
 9 DK
26. Do any of your children have any close friends now?
- 0 Yes  
 Wd 1 No  
 9 DK
27. Does it seem to you that any of your children are being ignored or avoided by others?
- 0 No  
 1 Sometimes  
 Wd 2 Often  
 9 DK
28. Recently have any of your children been having difficulties getting along with other children their age?
- 0 No  
 Wd 1 Some difficulties  
 Wd 2 A lot of difficulties  
 9 DK
29. Would you say that any of your children like to hurt animals or other people?
- 0 No  
 Ag 1 Likes to hurt animals  
 Ag 2 Likes to hurt people  
 Ag 3 Likes to hurt animals and people  
 9 DK
30. Do any of your children date?
- 0 Doesn't date  
 1 Dates boy/girl friend  
 2 Dates different people  
 9 DK
31. (If doesn't date) Do his/her friends date? If yes, do you have any feelings why he/she hasn't started dating yet?
- 0 Doesn't seem to be indicative of a problem  
 Wd 1 Does seem to be indicative of a problem  
 8 NA  
 9 DK
32. Are all your children still in school and what grades are they in?

- 0 Not old enough for school
- Fill in grade 1-12
- 13 Kindergarten
- 14 College
- 15 Graduated high school and no longer in school
- 16 Dropped out of school before high school graduation
- 99 DK

33. (If still a student) What kind of student is he/she?

- 0 Mostly A's
- 1 Mostly B's
- 2 Mostly C's
- Ln 3 Mostly D's
- Ln 4 Failing
- 8 NA
- 9 DK

34. (If still a student) Has anyone from school called in the past year because child was having problems?

- 0 No
- 1 Once
- Ag 2 More than once (specify number of times: \_\_\_\_\_)
- 8 NA
- 9 DK

35. (If still a student) In the past year or so, do you know if any of your children have been playing hookey or cutting classes?

- 0 No
- 1 Yes, but not seen as a problem
- 2 Yes, seen as a problem
- 8 NA
- 9 DK

36. (If still a student) On the whole, would you say that your children find school to be an enjoyable experience?

- 0 Yes
- 1 Not particularly
- Ln 2 Definitely not
- 8 NA
- 9 DK

37. Have any of your children had a run-in with the law?

- 0 No
- Ag 1 Yes
- 9 DK

38. Do any of your children have a job?

- 0 Full-time
- 1 Part-time
- 2 No
- 9 DK

39. (If full-time job) Does he/she seem to enjoy working?

- 0 Yes
- 1 No
- 8 NA
- 9 DK

40. (If full time job) How does he/she get along with the people at work?

- 0 Very well
- 1 Usually well (or well with most people)
- 2 Usually not well (or not well with most people)
- 3 Very poorly
- 8 NA
- 9 DK

41. If not going to school and not working, what is child doing with him/herself? \_\_\_\_\_

42. How do each of your children seem to handle the everyday sorts of problems? For example, if something doesn't go their way or if something unexpected comes up.

- 0 Very well
- 1 Well most of the time
- EI 2 Not well most of the time
- EI 3 Very poorly
- 9 DK

43. Would you say that any of your children have difficulty handling stressful situations?

- 0 Handles stress very well
- 1 Handles stress well most of the time
- EI 2 Does not handle stress well most of the time
- EI 3 Handles stress very poorly
- 9 DK

44. Do any of your children have any special talents or are especially creative?

- 0 Yes
- 1 No
- 9 DK

45. Are there any things about any of your children that make you feel particularly pleased or proud?

- 0 Yes
- 1 No
- 9 DK

46. Problem behaviors: Stammering or stuttering?

- 0 No
- EI 1 Yes
- 9 DK

47. Restlessness or overactivity?

- 0 No
- Hy 1 Yes
- 9 DK

48. Undereats or overeats?

- 0 No
- EI 1 Yes
- 9 DK

49. Sleeping difficulty?

- 0 No
- EI 1 Yes
- 9 DK

50. Temper tantrums?

- 0 No
- EI 1 Yes
- 9 DK

51. Clumsiness?

- 0 No
- 1 Yes
- 9 DK

52. Cries a lot?

- 0 No
- EI 1 Yes
- 9 DK

53. Bedwetting

- 0 No

EI 1 Yes  
9 DK

54. Frequent accidents?

0 No  
1 Yes  
9 DK

55. Unusual habits or mannerisms?

0 No  
1 Yes  
9 DK

56. Would you say that any of the following descriptions describe your children: Moody?

0 No  
EI 1 Yes  
9 DK

57. Unhappy?

0 No  
EI 1 Yes  
9 DK

58. Isolated/Lonely?

0 No  
Wd 1 Yes  
9 DK

59. Excitable?

0 No  
EI 1 Yes  
9 DK

60. Fidgety?

0 No  
EI 1 Yes  
9 DK

61. Angry/Blows up a lot?

0 No  
EI 1 Yes  
9 DK

62. Tense/Nervous

0 No  
EI 1 Yes  
9 DK

63. Timid/Shy

0 No  
Wd 1 Yes  
9 DK

64. Easily frustrated

0 No  
EI 1 Yes  
9 DK

65. Have any of your children ever received help for emotional or nervous difficulties?

0 No  
1 Yes  
9 DK

66. Have any of your children had any important difficulties for which they have not received help?

0 No  
1 Yes  
9 DK

## RAW DATA

The factor scores for all three rounds are provided as well as the sex and social class score for each subject. These data are presented in the following format:

## Column

1	Sex 1= male 0= female
2-4	Social Class: Scores range from 20 (high social class standing) to 127 (low social class standing).
5	Rounds subject participated in: 1= Round 1 only 2= Rounds 1 and 2 3= Rounds 1 and 3 4= All three rounds 5= Round 2 only 6= Rounds 2 and 3
6-7	Round 1 Emotional Instability
8-9	Round 1 Aggression
10-11	Round 1 Withdrawal
12-13	Round 2 Emotional Instability
14-15	Round 2 Aggression
16-17	Round 2 Withdrawal
18-19	Round 3 Emotional Instability
20-21	Round 3 Aggression



22-23 Round 3 Withdrawal

24-25 Round 3 Parental Conflicts

26 Help variable: 1= Need Help group  
0= No Help group.

## Index Group

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01014	5 2 1 0 0 1 2 1 0 00		100102
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0 894	3 0 1 1 1 1 2 2 1 30		100302
0 894	2 0 1 0 0 1 3 1 3 20		100303
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1 632	4 0 0 0 2 0		100502
0 632	1 0 0 0 1 0		100503
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1 771	4 2 3		100701
0 824	2 0 4 2 3 1 4 0 9 11		100801
1 824	3 9 4 9 1 1 3 2 4 10		100802
1 973	8 2 1	8 3 2 30	100901
1 973	4 0 3	8 4 1 30	100902
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1 962	9 1 2 0 3 1		101201
0 962	5 0 3 0 1 0		101202
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1 894	3 0 3 2 1 4 8 4 1 11		101304
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0 654 0 0 0 0 0 1 0 0 0 00		200402
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11014 2 1 0 0 4 1 8 4 1 21		200604
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0 821 0 1 0		200902
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11203 5 1 3 2 1 2 00		901202
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01083 6 1 2 1 3 4 11		901802
1 706 1 3 1 4 0 3 00		101102
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## Control Group

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