Assessment of Depression in Adolescents: Relationship Between IQ, Depression, and Adaptive Behavior.

Ramasamy Manikam

Louisiana State University and Agricultural & Mechanical College

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Assessment of depression in adolescents: Relationship between IQ, depression, and adaptive behavior

Manikam, Ramasamy, Ph.D.

The Louisiana State University and Agricultural and Mechanical Col., 1992
ASSESSMENT OF DEPRESSION IN ADOLESCENTS:
RELATIONSHIP BETWEEN IQ, DEPRESSION,
AND ADAPTIVE BEHAVIOR

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirement for the degree of
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in
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by
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B.S., Northern Illinois University, 1982
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ABSTRACT

The primary focus of this investigation was to examine differences in depression, general psychopathology, and social skills among adolescents, and to identify the role of adaptive behavior between intelligence (I.Q.) and depression. One hundred adolescents, 13 through 17 years of age participated in this study. I.Q.s ranged between 40 to 130. Five levels of I.Q.s were studied (Above normal, Average, Borderline, Mild, Moderate). Three depression measures, the CHILD DEPRESSION INVENTORY (CDI), REYNOLDS ADOLESCENT DEPRESSION SCALE (RADS), BELLEVUE INDEX OF DEPRESSION (BID), one social skills measure MATSON EVALUATION OF SOCIAL SKILLS WITH YOUNGSTERS (MESSY), and one general psychopathology measure PSYCHOPATHOLOGY INSTRUMENT FOR MENTALLY RETARDED ADULTS (PIMRA), were used. Multivariate Analysis of Variance (MANOVA) on the five dependent variables and five levels of I.Q.s, produced significant differences using Wilks Lambda criteria. All Univariate F's were significant. Linear discriminant function analysis produced two significant discriminant functions; depression and general psychopathology. In the first function the mild mentally handicapped group showed higher levels of depressive symptoms. In the second discriminant function the moderate mentally handicapped group showed higher levels of general psychopathology. The
Above normal group evinced high social skills and low general psychopathology. The two discriminant functions combined accounted for 92% of the variance. The grouped cases had a correct classification of 45% (Above normal 75%, average 25%, borderline 25%, mild mentally handicapped 70%, moderate mentally handicapped 40%).

Multivariate Analysis of Variance between normal and mentally handicapped groups showed that the two groups differed significantly on all dependent variables. The mentally handicapped group evinced low social skills, greater general psychopathology, and higher levels of depressive symptoms. The Above normal group showed high social skills, low depression, and low general psychopathology.

Moderated regression between intellectual functioning (IQ), Adaptive behavior (AB), their product term (IQxAB), and depressive symptoms (CDI, BID, RAD) was conducted. A significant interaction between the product term and depression on the Child Depression Inventory (CDI) was obtained. No significant moderating effect was found in the BID and RAD.

Simple regression analysis showed that as the level of adaptive behavior increased the relationship between intelligence and depression weakened on the CDI. This supported the moderator hypothesis.
CHAPTER 1
INTRODUCTION

Depression is a widespread disorder. The suffering that results in terms of pain, family disruption, and economic loss is enormous and requires serious attention. It has been estimated to occur in 18%-23% of all women and 8%-11% of all men at some point in their lives (Szmymanski, 1972). Roughly, four to eight million Americans are thus said to be treated for depression yearly (Reid, 1972). No age group is exempt (Heaton-Ward, 1977).

Depression can be a dangerous problem. It is the most commonly diagnosed emotional disorder in retrospective studies of completed suicides (Murphy, 1975). It is significant that 15% of people with primary depression go on to commit suicide (Guze, & Robins, 1970) with mortality from nonsuicidal causes being higher in depressed persons (Avert, & Winokur, 1976).

Numerous studies on the etiology, symptomatology, and treatment of depression in adults, and normal I.Q. children exist. Diverse theories and models have been formulated about causes of this disorder as a result. Despite the wealth of research on depression in the general population, there has been very little exploration of the topic with mentally retarded individuals (Matson, 1982). This circumstance is made more significant given reports that mentally retarded persons have a higher rate of psychiatric

Disorders in groups of people can be understood by three criteria. A label can be given to a disorder between people, if it has the same etiology, presents with similar symptoms and follows the same course, or is amenable to the same treatment procedures. In the case of depression it is not clear as to which criteria set forth above apply to the mentally retarded population.

The etiology of depression is unclear and is an area that has not been satisfactorily dealt with; there is evidence (though insufficient) to indicate that the symptoms and course of depression in mentally retarded persons could differ from normal I.Q. people (Sovner & Hurley, 1982; Reynolds & Miller, 1985). Treatment studies of depression with mentally retarded individuals are too few to make any comparison with the general population. This state of affairs makes studying depression of mentally retarded persons very important.

The status of depression in mentally retarded persons is unfortunate and lamentable, knowing that this is a disorder that can be effectively treated if identified. Identification requires establishing symptoms specific to depression in mentally retarded persons. In order for this to happen, studies have to be carried out with normal
I.Q. and mentally retarded persons so that similarities and differences can be identified.

To date, there is only one published study comparing the relationship of depression and learned helplessness in mentally retarded and nonmentally retarded adolescents (Reynolds, & Miller, 1985).

This study was designed precisely to address differences in depression and levels of intelligence; and to identify the role of adaptive behavior in the relationship between intelligence and depression; with the hope of contributing to the knowledge base in depression among the adolescent population.

In summary, there is evidence that depression occurs in mentally retarded persons despite long term conventional wisdom that such a relationship could not occur. Yet, the number of studies carried out to better understand this phenomena in mentally retarded individuals lags far behind that of studies of depression in the general population. The weight of these findings supports the need to study depression in mentally retarded and nonmentally retarded adolescents.

**STATEMENT OF THE PROBLEM**

The purpose of this study was to examine depression between normal I.Q. and mentally retarded adolescents. One-hundred adolescents between the ages of 13 through 17, with Intelligence ranging between 40 and 130 were studied.
Based upon research and clinical data (e.g., Eaton & Menolascino, 1982; Philips & Williams, 1975; Reiss & Benson, 1984), it was expected that due to (a) generally lower coping ability and additional negative social condition and stressors, the combination of which exacerbates vulnerability to depression; and (b) findings of generally higher frequency of emotional disorders in mentally retarded persons, mentally retarded adolescents would exhibit significantly higher (i.e. more severe) levels of depressive symptomatology than normal I.Q. adolescents, (c) It was also anticipated that mentally retarded adolescents, as a function of their low intellectual functioning would possess lower social skills, and would differ in the exhibition of depressive symptoms as compared with normal I.Q. adolescents, (d) That mentally retarded adolescents will experience greater psychopathology in comparison to their normal intelligence counterparts, (e) Further, it was anticipated that adaptive behavior would influence and moderate the relationship between intellectual functioning and depressive symptomatology. These issues were examined in the present study.
CHAPTER 2
REVIEW OF LITERATURE

Definition

Before covering definitions of depression, it might be appropriate to look at other terms (feeling, mood, emotion, and affect) that are entwined with this disorder. Authors seem to differ widely from each other on the use of these terms, based on differing criteria. Fish (1974) defines emotion as a stirred up psychological state due to physiological changes occurring as a response to some event. He regarded feelings as the subjective experience of emotion. Affects are viewed as waves of sudden emotional exacerbations, whereas mood is conceived as the emotional state prevailing at any given time. Hinsie and Campbell (1970) define mood as feeling-tone, particularly as experienced internally. Emotions are defined as consciously perceived feelings. The term affect also includes drive and refers both to mood and to external manifestations of the subject's feelings. This definition is in line with the DSM-III-R where affect is described as a pattern of observable behavior expressing a subjective experienced feeling state. Mood is described as a pervasive and sustained emotion that, in the extreme, markedly colors the person's world view.

The difficulty in defining depression stems from the subjective experience and in the wide variety of ways the
term is used. Depression has been used to denote a symptom, a syndrome, a set of physiologic responses, and an illness (Malmquist, 1971). The original Kraepelinian formulation had two types, manic and psychogenic depression. The former is seemingly unrelated to the individual's environment and the latter is an extreme reaction to occurrences in the individual's life. However, Kraepelinian's dualistic approach to depression did not persevere (Matson, 1983).

The most widely accepted description of depression is the DSMIII-R (American Psychiatric Association, 1987) criteria for major depression. Depression in the DSM III-R are discussed under Mood Disorders. Two depressive disorders are listed. Major depression with one or more major depressive episodes, and dysthymia in which depressed mood for most of the days over at least a two year period, but does not meet criteria for a major depressive episode. Nine symptoms are listed (depressed mood; diminished interest or pleasure in all activities; significant weight loss; insomnia or hypersomnia; psychomotor agitation or retardation; fatigue or loss of energy; feelings of worthlessness or excessive inappropriate guilt; diminished ability to think or concentrate; or indecisiveness; and recurrent thoughts of death), of which a minimum of five symptoms have to be present, one of which should be either depressed mood or loss of interest or pleasure.
Depression in children, however, was not unanimously accepted for many years (Cantwell, 1983). Psychoanalytically-oriented authors suggested that classical clinical depressive syndrome cannot occur in children. It was believed that they lack a sufficiently internalized superego (Rie, 1966). Kovacs, and Beck (1977) suggest that depression in children is not manifested in a clinically obvious way, but rather is "masked" by other overtly manifested syndromes such as conduct disorder, hyperactivity, enuresis or learning disabilities. In the face of such an assertion, a strong case was put forward by Sandler and Jaffe (1965) who examined psychoanalytic records of 100 children and set forth nine features which they felt were commonly associated with depressive affect. Posnazki, and Zrull (1970) published a clinical study of 14 children with clear overt depressive symptoms. In 1971, the Fourth Congress of the Union of European Pedopsychiatrists congregated in Sweden to discuss, "Depressive States in Childhood and Adolescence." The first diagnostic nomenclature suitable for depression in children published, was in a report by the GAP Committee on Child Psychiatry. With increasing theoretical arguments and clinical studies the existence of depression in adolescents was accepted. Another major development regarding childhood depression was that of 'masked depression' (Glaser, 1967) or 'depressive equivalents' (Toolan, 1962). The argument was
that depressive affect in children was not directly expressed but rather was masked as behavioral problems. A whole array of behaviors were considered representative of this school of thought. Glaser (1967) identified such behaviors as delinquency, school phobias, and learning difficulties to represent childhood version of depressive symptoms. Toolan (1962) added another list to include eating and sleeping disturbances, boredom, restlessness, and other psychosomatic symptoms as equivalent to depressive symptoms. It is difficult to accept that such a large array of behaviors are equivalents of depressive symptoms. However, one cannot reject the hypothesis. Adults and children may have a number of similar behaviors, and a number of different behaviors making up the gamut of behavioral manifestations of depression. Increased research could well identify a subclass of syndromes in children. Among those who accept that childhood depression does exist, there is further controversy as to whether it is a unique syndrome with characteristic symptoms distinct from the adult syndrome, or whether it is analogous to adult depression. DSM III-R, for example, maintains that the essential features of depression in children are similar to adults.

The definition of depression in mentally retarded persons needs discussion since controversies spring up here as it did with childhood depression. That the mentally
retarded experience depression is accepted (Matson, 1982; Eaton & Menolascino, 1982; Russel & Tanguay, 1981; Sovner & Hurley, 1982). However, symptoms are not well established for mentally retarded individuals. Reid (1976) stated that the presence of mental retardation modifies the clinical features of affective illness. Reid (1972) also reported that two severely/profoundly mentally retarded individuals diagnosed as depressed also exhibited self-injury. Thus, "in a few cases self-injury in severely subnormal patients is an extension of suicidal behavior" (p. 209). Leese (1979) had indicated that mentally retarded children may exhibit depression through rage outbursts, and destructive behavior. Berman (1967) rightfully observed that the operational definition of depression ought to be redefined for mentally retarded persons to include more descriptive behavioral diagnoses, including aggression. The definition of depression and the specific depressive symptomatology presented by mentally retarded persons is still not fully validated. Thus, a great need for studies to better define depression in mentally retarded persons is needed.

The term mental retardation is applied to individuals who perform at the subnormal level on assessment tools in areas of intelligence, and adaptive behavior. Depression has been described as psychopathology in persons with mental retardation as early as the 19th century (Hurd, 1888). However, Reynolds and Baker (1988) reported it was
not until the 1960's that systematic research and examination of depression was undertaken in this population. Sovner and Hurley (1983) reviewed 25 published studies regarding occurrence of affective illness in mentally retarded individuals. Using the DSM III criteria to assess the standards of diagnoses, Sovner and Hurley reported that mentally retarded persons manifested the full range of affective disorders. Social functioning and intelligence were reported to influence the clinical presentation of depression, but not the development of depressive symptomatology. In addition, mentally retarded individuals at all levels of mental subnormality evinced depression. In fact, Reynolds (1985) reported that the presentation of depressive symptomatology was similar between persons with mild and moderate mental retardation and persons with normal I.Q. Sovner, Hurley, and LaBrie (1982) stated that depression occurs as frequently in mentally retarded persons as it does in the general population.

Identifying depression in mentally retarded persons is based on the classical symptoms of depression. However, identification of systems may be misleading. Since developmentally disabled and mentally retarded individuals often lack the requisite verbal and conceptual skills to communicate their feelings. In fact, the percentage of people with depression among mentally retarded persons is
probably greater than for the normal I.Q. population. Sovner, Hurley, and LaBrie (1982) have presented equivalent symptom presentation among mentally retarded individuals compared to classical symptoms evinced among the normal I.Q. group. These symptoms are presented in Appendix C.

Another factor contributing to underestimates of depression among mentally retarded persons is 'diagnostic overshadowing' (Reiss, Levitan, & Szyszko, 1982). This term is used to express the hypothesis that presence of mental retardation usually shifts the therapist's focus or diagnostician such that emotional disturbances are passed over that would otherwise be considered psychological in nature. As such, emotional problems are seen as a subcategory of mental retardation, which would otherwise be seen as psychiatric disturbances in the nonmentally retarded persons. Reiss, Levitan, and Szyszko (1982) studied the effects of mental retardation on psychologists' impressions of emotional problems of a mentally retarded subject. They found that psychologists' were less likely to consider neurosis, schizophrenia, and personality disorder when the subject was presented as mentally retarded compared to the intellectually average. This study validated the 'overshadowing' phenomena, whose existence has been mentioned previously (Chess, 1970; Garfield, 1963; Phillips, 1967).
Thus far, mentally retarded individuals appear to suffer depressive disorders as much, if not more than their nonmentally retarded counterparts. Yet, few studies on depression have been conducted with mentally retarded persons, no depressive measure has been developed or adequately validated specifically for mentally retarded children (Matson, 1984; Reynolds, 1989), and only one study has been published comparing depression between mentally retarded and normal I.Q. adolescents.

**DIAGNOSIS AND CLASSIFICATION**

The diagnosis and classification of mood disorders have undergone major revisions. Theories of depressive etiology underlying nosological classification may be described in terms of unitary, dichotomous, and pluralistic approaches. The unitary approach was proposed by Gillespie (1926) who emphasized factors for depression to overcome the uncertainties derived from the bipolar concept of manic-depressive psychosis described by Emil Kraepelin.

Dichotomous classification schemes have been enduring, beginning in Kraepelin's (1896) definition of "manic-depressive psychosis." Kraepelin's etiological framework held that mental disorders were either exogenous, caused by bacteria, toxins, or other external agents, or endogenous, arising from internal derangement or degeneration. The term unipolar-bipolar was presented by Winokur (1973) and now is widely used, separating those patients with clear episodes
of mania or hypomania and depression from others who have only depressive illnesses without mania or hypomania. Endogenous-reactive focused on a symptom complex (vegetative signs such as sleep disturbance and weight gain) and those concerned with symptom course. The Primary-Secondary classification was another dichotomy developed by the "St.Louis School," and proposed by Robins et al. (1972). According to their definition, a primary affective disorder occurs in an individual with either no previous history of psychiatric illness or a previous history specific to depression or mania. Secondary affective disorder is defined as an affective condition that develops in the context of a pre-existing psychiatric disorder or medical condition. The primary-secondary distinction rests on relatively unambiguous criteria. They therefore avoid some of the confusion found in other systems, there is no clear evidence regarding its therapeutic or prognostic value relative to other diagnostic systems.

The most recent revision of the Diagnostic and Statistical Manual (DSM III-R, 1987) adopted a pluralistic approach, acknowledging that the group of mood disorders is not homogeneous as to etiology or treatment but rather includes multiple disorders with varying etiologies. DSM III-R classifies depressive disorders under Mood disorders.
Although investigators, clinicians, and theorists generally agree that major depression is heterogeneous, there is no agreement as to the full range of subtypes and how they should be classified. Research has thus far failed to bear out the many proposed subtypes. Matson (1983) rightfully pointed out that no one model is likely to contain all of the disorder's variants. Mood disorders are not given a specific category for children and adolescents in DSM III-R. With only minor modifications they are classified with, and by the same criteria as adult disorders. The diagnostic criteria for depression and mania are still somewhat controversial in children and adolescents (Graham, 1974; Lefkowitz & Burton, 1978; Quay & Lagreca, 1986). One is confronted with a number of problems in relying on the DSM III-R criteria for understanding depression in the mentally retarded population. Mentally retarded individuals due to their cognitive limitations, different developmental outcomes, and limitations in life style choice imposed by the care system, may present symptoms of depression that differ from nonmentally handicapped persons. Clinical history may be shaped by the caretaker and not the mentally retarded person him/herself, due to the fact that things are done for the mentally retarded persons. Vegetative signs may be present, but are not obvious because the individuals daily living skills may be so structured that such signs are not obvious. For
example a person may be brought to meals and forced to eat, and be put to bed or sent to work at the usual times. However, changes in appetite, sleep pattern, and level of energy and social recreational interest and participation may be determined from the patient, caretaker, or family. The withdrawal and decreased verbalizations seen in depression may be missed by caretakers, or worse, may be considered desireable. Also, the DSM III-R system is not designed to address comorbidity, which may be inherent in mentally handicapped people, especially among individuals in the moderate to profound range of intellectual functioning.

An entirely new model of classification of affective disorders has been attempted by Andreasen and Grove (1982), using a mathematical model as opposed to clinical methods. Andreasen and Grove (1982) derived four "subtypes" that bear a striking likeness to the nosology discussed above. Using cluster analysis they delineated categories identified as "endogenous," "psychotic," "bipolar," and "less severe." These statistically derived profiles correspond to the clinically derived classifications. Nevertheless the diagnostic utilities of these dichotomous labels seems 'impure', because of overlap in symptom presentation, and seems more of a continuum rather than categorical variables. Little research on psychopathology
of mentally retarded persons has been conducted on this approach to date.

PREVALENCE

Approximately 4 to 8 million Americans are treated for depression yearly (Hackett, & Adam, 1974). Higher prevalence of the spectrum of affective disorders in the range of 12% to 36% have been reported in medical outpatients and inpatients (McKegney, Aronsons, & Ooi, 1988).

Prevalence of depression among children of normal intelligence range from 2% to 60%. Lefkowitz and Tesiny (1985) reported severe depression in 5.2% of a sample of over 3,000 third, fourth, and fifth-grade children without intellectual deficits. Kaplan, Hong, and Weinhold (1984) found that 7.3% of high school students showed moderate and severe levels of depression. In a randomly selected child population between the ages of 7 and 12 Kashani and Simonds (1979) found 2% to be depressed, while Kashani, Husain, Shekim, Hodges, Cytryn, and McKnew (1981) reported a prevalence of 2% to 60%, contrasting to Puig-antich and Gittelman (1982) reported rate of 10 and 20%.

No difference in prevalence among sexes has been reported in both clinical and non-clinical samples of children between 6 to 12 years old (Lefkowitz, & Tesiny, 1985; Lobovits, & Handal, 1985), though among adolescents,
the prevalence is reported to be greater in females than males (Mezzich, & Mezzich, 1979; Reynolds, 1985).

Prevalence appears to vary with age through childhood. Kashani, Ray, and Carlson (1984) for example report a rate of 1% for major depression among children 1 to 6, and 13% among 9 to 12 year old. Differences in age have also been reported in the Isle of Wight study (Rutter, Tizard, & Whitmore, 1970). They reported a 13% depression rate among 10-11 year old children in their longitudinal study. When the same children were reassessed at 14 and 15 the figure jumped to 40%.

Reported studies of depression among mentally retarded persons are few, ranging from 1.6 to 39.6% with mentally retarded adults (Payne, 1968). Jacobsen (1983) found 6 to 7% of 38,000 mentally retarded persons to be depressed. Point prevalence approximating 1.5 % for affective psychosis has been reported from hospital surveys (Reid, 1972; Heaton-Ward, 1977). Prevalence of depression among mentally retarded children is unfortunately almost nonexistent. Szymanski (1977) evaluated 132 children in a general pediatric hospital, where 54% of the patients manifested emotional disturbances. While Williams (1975) reported that 87% of the 100 children he studied appeared to be emotionally disturbed. However, these samples are not representative of the general population of mentally retarded children. Therefore, these data have little
meaning for establishing rates of psychopathology. However, given that higher prevalence of emotional problems in mentally retarded populations have been reported (Phillips, & Williams, 1975), it is likely that the prevalence of depression among mentally retarded children is greater than for normal I.Q. children.

A number of reasons can be advanced for the paucity of literature on depression of mentally retarded children. These include diagnostic overshadowing (Reiss, Levitan, & Szyszko, 1982), and lack of understanding of emotional disorders in mentally retarded children. In one interesting study supporting this assumption, Rubinson and Asnis (1989) found that 69% of the medical house staff could not name three signs of depression. Forty eight percent and 62% of staff at two teaching institutions believed that the diagnosis of major depression requires the presence of vegetative signs (thus have the potential to overlook a predominantly psychological or cognitive cluster of symptoms). Furthermore, 37% and 45% of the clinicians at these same two institutions equated chronic depression with depressive neurosis and 28% and 48% did not know that both dysthymic disorder with superimposed major depression could be diagnosed on Axis I (thus missing "double depression"). Clinicians frequently confused the criteria for major depression with that of melancholia. Additionally, mental health personnel including psychiatrists are often confused
between when making a differential diagnosis of organic mood syndrome and major depression. Thus a serious lack of knowledge among professionals in the area of depression appears evident.

**Models of Depression**

There are many models of depression. It is important to note that these models have been developed in the context of adult depression with persons of normal intelligence. A review of the primary models of psychopathology follow.

**Biochemical Models**

Much progress has been made in biological views of depression. Neurotransmitters such as monoamines, especially catecholamine and indoleamine have received attention to varying degrees (Gershon, Berrettini, Nurnberger, & Goldin, 1987; Reynolds, Gillin, & Kupfer, 1987; Carroll, Curtis, & Mendels, 1976). The general view is that affective disorders are characterized by a deficit or excess in one or more neurotransmitters or by an imbalance of these transmitters. Of the neurotransmitters implicated in the etiology or pathophysiology of depression, serotonin (5-HT) and norepinephrine (NE) have been the most extensively studied. Serotonin has been reported to be involved in the regulation of many somatic processes that are disturbed in depressed patients, including mood, sleep, appetite, sexual activity, and circadian rhythms (Puig-Antich, 1983;
Puig-Antich, Goetz, Davies, Fein, Hanlon, Chambers, Tabrizi, Sachar, & Weitzman, 1984). Low levels of serotonin have been found in CSF in depressed patients by three separate groups of investigators (Bowers, Heninger, & Gerbode, 1969; Roos & Sjostrom, 1969; Ban Praag, Korf, & Puite, 1970), in suicide attempters who were not depressed (Traskman, Asberg, Bertilsson, & Sjostrand, 1981), and for individuals with outwardly directed aggression (Bioulac, Benezich, Rand, Noel, & Roche, 1980). A summation of these studies suggests low serotonin in CSF to be a stronger indicator of impulsive aggression and depression. These findings while tentative have implications for the study of depression with mentally depressed persons. Controlled studies using mentally retarded individuals could potentially provide important findings on overt symptomatology of mentally depressed persons that could be different from their non-mentally retarded counterparts.

Patients with Major Depression have been suspected of having significantly higher levels on several basal cortisol measures, including morning plasma cortisol; 24-hour urine-free cortisol; and CSF cortisol (Carroll, Curtis, Davies, Mendels, & Sugerman, 1976; Carroll, Curtis, & Mendels, 1976; Stokes et al. 1984). As such, the involvement of the hypothalamic-anterior pituitary-adrenocortical (HPA) systems in the pathophysiology of depression has been implicated (Whybrow & Hurwitz, 1976).
The most extensively used biological test in establishing the hypothalamic-anterior-pituitary-adrenocortical involvement is the dexamethasone suppression test (DST). Dexamethasone is a potent synthetic steroid (cortisol-like drug); a single dose is said to suppress cortisol production for 24 hours because the brain apparently assumes that the plasma cortisol level is high (Carroll et al., 1981). While this may be a productive line of study with the potential for being a criterion measure of depression, at present the clinical use of the DST is questionable. Many individuals with major depression do not respond to dexamethasone in the normal way, instead they are reported to continue to produce significant amounts of cortisol (Carroll et al., 1981). In addition, other factors such as severe weight loss, acute withdrawal from alcohol, physical illness, and temporal lobe epilepsy, have been implicated in false-positive results with DST (Sovener, Hurley, & LaBrie, 1982). The use of DST with mentally retarded persons has produced results similar to the general population (Wolkowitz, 1990; Pirodsky, Gibbs, Hesse, Hsieh, Krause & Rodriguez, 1985).

Neurophysiological Models

Much of the neurophysiological investigation into childhood depression has focused specifically on lateralization of dysfunction demonstrating the specialized role of the right cerebral hemisphere in the processing of human
emotion and affective cues, along with reports of right hemispheric dysfunction in adults suffering from depression (Tucker, 1980). Impaired nonverbal abilities relative to verbal abilities in children with depression has been reported. For example, Kaslow, Rehm and Siegel (1984) found that higher scores on the Children's Depression Inventory (CDI) were associated with poorer performance on the WISC-R subtests of block Design, Coding, and Digit Span in a mixed group of childhood depressives. No significant relationships were found for WISC-R Vocabulary or the Trail-Making Test of the HRNB. Several studies have reported improvements on neuropsychological measures suggestive of both right hemispheric and frontal lobe dysfunction subsequent to treatment with antidepressant medication (Brumback, Staton, & Wilson, 1980; Wilson & Staton, 1984). There are no studies that have been carried out with mentally retarded individuals on this line of research.

Genetic Models

The genetic influences in depressive disorders have been established for some time. Close relatives of persons with major depression are more likely to have the disorder (Nurnberger & Gershon, 1982). The precise concordance varies with the criteria used to define depression, subtypes of depression, ages of the sample, relatives, and other factors. However, the line of evidence from twin
studies has been relatively consistent. Monozygotic twins show about 65% concordance for affective disorders compared to approximately 14% for dizygotic twins (Gershon, Targum, Kessle, Mazure & Bunney, 1977). These strong familial ties of affective disorders have also been supported by studies of adoptees and studies of children and their biological parents (Morrison, 1983). There is much difficulty in gathering a consensus among these studies because of the variability due to differences used in defining depression, subtypes of depression, ages of the sample, and relatives (Kazdin, 1989). In addition, the mode(s) of transmission for major depression has not been established. Genetic factors that produce depression in mentally retarded persons has not been actively studied and to date lacks data.

Psychoanalytic Models

Freud's original formulation of depression attributed its onset to the real or imagined loss of a love object (Freud, 1917). Abraham (1968) distinguished between appropriate "grief" in response to loss, and inappropriate "melancholia". The latter was said to develop depression when the grief or mourning process was disrupted, presumably by ambivalence toward or excessive dependence on the love object. These formulations precluded the existence of childhood depression since mourning and the process by which rage turned inward were thought to lead to depression
and assumed that cognitive and affective abilities were not yet developed in early childhood. However, Freud (1923) moved closer to allowing that depression might occur in childhood when he formulated a variant of his original model based on conflict between the ego and superego. Subsequently, other analytic authors reaffirmed that depression does occur in children (Birbing, 1953; Fast, 1967; Bowlby, 1960; and Sandler & Joffe 1965). Psychoanalytic theories of depression, while having historical importance, is difficult to study because its various assumptions are difficult to test.

**Cognitive Models**

Cognitive models of depression include the cognitive distortion model of Beck and Kovacs, and attributional style (Abramson, Seligman, & Teasdale, 1978). According to the attributional style model, depressed individuals are said to have cognitive expectations that bad things will probably happen to them regardless of how they behave. These individuals are said to attribute bad events to internal, global, stable causes, and to attribute good events to external, specific, unstable causes. Beck (1970) proposed the 'cognitive triad' of a person's negative view of himself, the world, and the future being responsible for depression. According to his theory, when a person is depressed, (s)he is said to exaggerate or misinterpret events, view events out of context, or
otherwise distort personal experience. Those events confirm the negative views of self, environment, and future. The result being a sense of worthlessness and self-rejection, defeatism, and hopelessness based on evaluations that are not reality-based. Beck further suggested that symptoms such as indecisiveness, suicidal ideations, and increased dependence are traceable to this cognitive triad of negative view of self, world, and future.

This theory suggests that mentally retarded individuals due to their limited cognitive ability would have a greater probability of misinterpreting their environment, thus leading to higher rates of depression than normal I.Q. individual. However, the reaction of mentally retarded individual to incorrect perceptions may not be identical to that of normal I.Q. persons, and may manifest itself in behaviors vastly different from the norm.

Behavioral Models

In the behavioral formulation of a model of depression, Lewinsohn (1981) improved upon an earlier model presented by Ferster (1973). The central feature of the disorder was a reduction in emission of positively reinforced behavior. Whereas in the Lewinsohn's formulation its emphasis was on the concept of total amount of response-contingent positive reinforcement. According to Lewinsohn, the rate of response-contingent reinforcement available is dependent upon three sets of factors: the events that are potentially
reinforcing to a person; of these, those that are available in the immediate environment; and the extent to which the person possesses the necessary skills to receive this reinforcement. This theory postulates that social skills deficits play a crucial mediational role in determining how much response contingent positive reinforcement is received from the environment. Individuals who show affective and cognitive symptoms of depression are said to suffer from the loss or reduction of reinforcement from the environment. The person's behavior does not produce sufficient positive reinforcement from others, and the individual becomes passive, and withdraws from interactions. Support for the view has derived from several studies that show the relationship between mood and other depressive symptoms and the number of reinforcing (pleasant) activities in which persons engage and from treatment outcome studies demonstrating a relationship between increases in pleasing activities and decreases in depressive symptoms (Lewinsohn, 1974; Lewinsohn & Arconad, 1981). Lewinsohn (1980) found that depressed subjects rated themselves and were rated by observers as significantly lower in social competence. Youngren and Lewinsohn (1980) compared depressed patients, psychiatric control subjects, and normal controls during both group and dyadic social interactions. The subjects were noted to have differed significantly on speech rate and volume. The depressed
people spoke significantly slower and more softly than normals. Nonverbal measures in the group interaction indicated that the depressed persons has significantly less eye contact and lower ratings of facial expression-pleasantness and facial expression-arousal than normals. The depressed person is said to be lacking the skills needed to effectively change his circumstances and fails to sufficiently explore the environment for reinforcers. Lewinshon's model has the most applicability to the study of depression with mentally retarded persons because their intellectual deficits affect their social competence.

Kanfer (1970) proposed a behavioral model of self-control, where an individual engages in a three-stage sequence of behaviors. These involve active observation of one's own behavior (self-monitoring). Information gathered is compared to an internal standard (self-evaluation), and results in the comparison being judged as success or failure (self-reinforcement). Rehm (1977) took Kanfer's theory one step further and added the internal-external attribution dimension. If the individual attributes outcome to an external source, then the performance is considered neither praise nor blameworthy.

The learned helplessness model of depression was proposed by Seligman (1975). Accordingly, depression results from people's experiences and expectations. The
depressed person does not have the power to influence events in their lives.

The experimental paradigm for learned helplessness is a dog strapped in a harness who receives traumatic and uncontrollable electrical shocks. When the animal is no longer harnessed and receives electrical shocks, it will typically sit or lie, quietly whining until the shock terminates, making no attempt to cross a barrier and thus escape shock. Whereas, an animal not previously subjected to inescapable and uncontrollable shocks will typically run and howl, quickly learning to cross the barrier to escape the pain. In this case the dogs which were shocked, typically made fewer attempts to escape shock. Second, the dog's failed to learn from occasional successful escape responses; and third, they showed emotional deficits, passively enduring shock without expressive actions. Helplessness is said to lead to passivity, social impairment, slowed activity and other symptoms of depression (Kazdin, 1989).

This theory would seem to have relevance to the study of depression among mentally retarded individuals. Mentally retarded individuals for the most part are institutionalized, or are under the care of significant others. They are not as a result given greater independence, and are subject to economic dependence on others. These factors could strongly affect the mentally retarded individual's
perception of power to influence their life, and severely limit their expectations of the future. The behavioral model for depression is new compared with other depression theories. Thus, little research has been carried out with depressed individuals using a behavioral model. There is still no standardized methodology for measuring specific overt behaviors associated with depression. A number of investigators have developed observational checklists and coding systems (e.g., Hersen, Eisler, Alford, & Agras, 1973; Johansson, Lewinsohn, & Flippo, 1969; Lierman & Roberts, 1974; Robinson & Lewinson, 1973). Investigators have also attempted to identify conversational behaviors specific to depression (Matson, Senatore, Kazdin, & Helsel, 1983). In the study of 30 depressed and 30 nondepressed adults in various dimensions of verbal behavior, they found no difference between the two groups.

More studies are warranted before normative data can be established. There are two distinct schools of thought with regards to depression among children, symptoms are either quite different from adults, or are similar. Those who contended that children's expression of depression were different from adult advanced their arguments citing the inability of children to verbally and effectively express themselves in an adult manner. Glaser (1967) argued that children masked their depression behind such depressive behavioral equivalents as truancy and aggressive acting—
out. Cytryn and McKnew (1972) proposed a classification system of childhood depression including three categories; acute, chronic, and masked. However, Cytryn, McKnew, and Bunney (1980) retracted their assertion on masked depression and redefined their own position on masked depression, conceding that the concept had only contributed to confusion about the nosology of childhood depression. Instead, in that same article Cytryn et. al. (1980) provided arguments for classifying depressed children according to adult criteria. This idea that adult criteria might be applicable as a diagnostic and research tool in childhood depression was supported by Poznanski (1982). Poznanski, Carroll, Banegas, Cook, and Grossman (1982) reported that children diagnosed as depressed by Research diagnostic Criteria for adult expression reacted to a dexamethasone suppression test (DST) in a manner similar to that of adults with the same diagnosis.

Assessment of Depression in Adolescents

In this section, various methods that have been used to assess adolescent depression will be briefly discussed, followed by a critical review of studies conducted using assessment tools selected for this study.

A number of techniques for assessing depression in children and adolescents have been developed (Kazdin, 1988), including self-report, informant rating, peer nomination, projective testing, and psychophysiological
measures/electrophysiological recordings (Kazdin, 1990). A review of measures and possible adaptations for mentally retarded persons will be considered.

Self-Report Measures

Self-report measures have been the most frequently utilized form of assessment for depression. In 1981, McLean estimated that there were more than 30 self-report scales for detecting the presence of depression. Obviously, this number has grown in recent years. However, the proliferation of self-rating measures of depression has not reached the mentally retarded individuals, who have been ignored. Self-report measures pose problems since they rely on feelings and experiences of the individual which in many cases are not observable to others, sometimes lack correspondence between self-report and observable behavior (e.g. someone who laughs in certain situations, but would report to be unhappy when asked). This problem obviously is greater when studying depression in children and mentally retarded individuals in particular, because of their inability, or limited ability to accurately report about themselves. However, one should note Atkeson and Forehand's (1978) argument that different assessment approaches may yield different information. Therefore, these data should be considered complementary rather than competitive.

Mendel, Weinstein, and Cochrane (1972) reviewed the correlations among a number of self-report scales purported
to measure depression and anxiety. One hundred female inpatients completed self-report inventories/scales (Beck Depression Inventory, Self-Rating Depression Scale, Costello-Comrey Scales for Depression and Anxiety, Multiple Affect Adjective Checklist, and four MMPI scales measuring depression, anxiety, and repression). Correlations .50 and greater in all but one measure were reported. Gotlieb (1984) in his review also found high correlations between depression scales and numerous self-report measures of other forms of psychopathology. Measures of depression completed by the same person have been highly intercorrelated (Kazdin, French, Unis, & Esveldt-Dawson, 1983; Weissman, Orvaschel, & Padian, 1980). A number of self-report depression measures designed for use with the general population has been used with the mentally retarded population (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Prout & Schaefer, 1985; Hamilton, 1960). However, the psychometric validation of these instruments with the mentally retarded population is not satisfactory. The one measure that was specifically developed for use with the mentally retarded persons is the Psychopathology Instrument for Mentally Retarded Adults (PIMRA) (Kazdin, Senatore, Matson, 1983). The PIMRA is a multidimensional measure that includes an affective subscale. Senatore, Matson, and Kazdin (1985) reported a test-retest reliability of .69 for the depression subscale; Kazdin, Senatore, and Matson
(1983) reported a correlation of .20 between the depression subscale and the Hamilton Depression Scale. A detailed description of the PIMRA follows.

**Interviews and Rating Scales**

A number of measures have been developed to use interview as a means of diagnosing childhood depression (e.g. Kiddie-SADS; Puig-Antich & Chambers, 1978; Children's Assessment Schedule, Hodges, Kline, Fitch, McKnew, & Cytryn, 1981). In an interview format both the parent and child were questioned. If the parent or child reported a symptom at any time in the past, the interviewer probed further to see if the symptom was current. Puig-Antich, Chambers, Tabrizi, and Johnson (1982) used the K-SADS-E in blind evaluations of 17 children diagnosed as depressed versus nondepressed using the K-SADS-P 6 to 24 months earlier. Raters correctly diagnosed 16 of 17 children. The interview format does not totally eliminate the possibility of response bias, secondly the interview format is lengthy and can be awkward when faced with subjects who perceive the probing to be intrusive. This method may be the best method yet in attempting to assess depression in mentally retarded persons. This method allows the interviewer to explain the meanings of words, or rephrase questions to the mentally retarded individual thereby providing the most valid response. Such studies have been carried out with mentally retarded adults (Senatore, Matson, & Kazdin, 1985;
Kazdin, Matson, & Senatore, 1983; Reynolds & Baker, 1988; Reynolds & Miller, 1985) and children (Matson, Barrett, & Helsel, 1988). These studies are too few, especially with children, and require many more studies to better validate the procedures.

**Peer Nomination**

Peer rating is another method utilized in the search for alternative sources of information about depression in children. Lefkowitz and Tesiny (1980) introduced the Peer Nomination Inventory for Depression (PNID). This measure was developed using a nonclinical population of one-thousand children in the fourth and fifth grades in a New York City school. The children were asked to identify "who" fit 13 depression, 4 happiness, and 2 popularity items. Psychometric properties have been shown to be good. However, this method is not useful beyond a classroom setting, and even in a classroom setting it may be difficult to utilize with mentally retarded individuals who may not be able to evaluate others accurately. Secondly, one has to raise with the question of ethics of conducting such a procedure that may affect the individuals social interaction, self-image and self-concept. Nevertheless, this method is untested with mentally retarded persons.
Behavioral Assessment

Many characteristics of depressive individuals have been measured using observable overt behaviors. Direct observational codes have been developed to assess depression in children (Kazdin, Esveldt-Dawson, Sherick & Colbus, 1985); direct observation of social interaction (Altmann & Gotlib, 1988); verbal and nonverbal-behavior (Frame, Matson, Sonis, Fialkov & Kazdin, 1982). In studies it has been shown that there is a strong correlation between depression assessed through rating scales and interviews of self and others, and overt behavior. However, for the present, behavioral measures do not have standardized codes, or adequate validation of psychometric properties (Kazdin, 1990). Furthermore, enormous amounts of time are required to administer them. Nevertheless, this could eventually be a very useful technique.

Projective Techniques

Projective techniques have received scant attention in assessing depression. Some projectives used included the Rorschach Test, Thematic Apperception Test, Children's Apperception Test, and The Draw-A-Person Test (Kazdin, 1988). The general outcome using projective instruments have been very poor, and most of them have not resulted in findings that would allow the tester to differentiate depressed from nondepressed individuals with consistency. Projective techniques have not been used with mentally
retarded persons in any data based studies although authors have recommended them based on 'clinical judgement'.

**Children's Depression Inventory**

The Children's Depression Inventory (CDI) developed by Kovacs and her colleagues has been the most used depression inventory with children (Kovacs, 1980). This 27-item measure is a downward extension of the Beck Depression Inventory (Beck & Beamesderfer, 1974), with both self and informant versions. The scale is designed to measure severity by asking children to choose one item from a three-item set that best describes them for the past two weeks. Items cover a number of the overt symptoms of childhood depression such as sadness, sleep disturbances, and suicidal ideation. Each item is designed to assess one symptom with selected items ranging from a weight of 0 to 2 in the direction of increasing psychopathology. The range of scores that are possible on the CDI are from 0 to 54. A large number of studies have been carried out with the CDI. The CDI is reported to have a test-retest reliability of .87 (Finch, Sooirito, & Bennet, 1984), Spearman-Brown correlation of .85, and Guttman split-half correlation of .84 (Helsel & Matson, 1984). Kovacs (1981) reported an internal consistency reliability of .86; a correlation of .55 between the CDI and clinician's independent global ratings of depression; and correlations of .65 and -.59 with anxiety and self-esteem respectively. Further, the CDI
Total Scores -11, 12, and 13 demonstrate differentiation between depressed and nondepressed cases with varying degrees of sensitivity, specificity, and diagnostic confidence (Kovacs, 1983).

Reynolds Assessment of Depression Scale

The Reynolds Assessment of Depression Scale (RADS) is a 30 item rating scale with a four-point rating scale. The items for the RADS were drawn from symptoms of depression specified in DSM III for major depression and dysthymic disorders. Each item gives a statement about a feeling, and the subject indicates how often (s)he feels this way by marking one of four phrases following the item: almost never, hardly ever, sometimes, or most of the time. Higher scores are indicative of depression. The measure was normed on 9,000 adolescents and has good internal, and test-retest reliability (Reynolds, 1987). The RADS has some data available on mildly mentally retarded children (N=26). Test-retest reliability of .84 over a 6 week interval was reported.

Bellevue Index of Depression

The Bellevue Index of Depression (BID, Petti, 1978) is a 40 item, semistructured interview modified from an interview initially created by Ling et al. (1970). The interview is appropriate for children ages 6-12. The 40 items are ones characteristic of adult depression and are delineated into 10 headings: sleep disturbance, somatic
complaints, dysphoric mood, self-deprecatory ideas, aggressive behavior, change in school performance, diminished socialization, change in attitude towards school, loss of usual energy, and unusual changes in appetite and/or weight. The items are rated for their absence or degree of severity on a 4-point scale ranging from 0 (absent) to 3 (severe). A child is considered to be depressed if (s)he received a total score of 20. Petti (1978) found the BID to have high convergent validity with the CDI (r=.65).

Matson Evaluation of Social Skills in Youngsters

The Matson Evaluation of Social Skills in Youngsters (MESSY) was originally normed on a sample of 744 children and youth between the ages of 4 and 18 years of age (Matson, Rotatori, & Helsel, 1983) and had 92 items. Further validation reduced the MESSY to 62 for the self-report, and 64 for the teacher/parent report. Two-week test-retest reliability yielded acceptable results (self-report r=.50; teacher/parent r=.55). Factor analysis was carried out and items with a factor loading of .30 and greater were retained. At present the self-report forms contain the following factors: social skills, impulsive/recalcitrant, inappropriate assertiveness, overconfident, and jealousy/withdrawal. The teacher/parent report contains two factors: inappropriate assertiveness/impulsiveness, and appropriate social skills. Presently the
MESSY is being field tested nationally. One of the outstanding features of the MESSY is that items can be used as targets for intervention (Matson, 1988). The MESSY is also the only social skills measure extensively used with a wide variety of populations both normal, special, and clinical; psychiatric inpatients (Kazdin, Rogers, & Colbus, 1986), hearing impaired (Matson, Macklin, & Helsel, 1985), and the visually impaired (Matson, Heinze, Helsel, Kapperman, & Rotatori, 1986). This seems to be a useful instrument to be used in the assessment of social skills and depression of mentally retarded persons.

Psychopathology Instrument for Mentally Retarded Adults (PIMRA)

The Psychopathology Instrument for Mentally Retarded Adults (PIMRA, Senatore, Matson, & Kazdin, 1985) is a multidimensional measure (seven types of psychopathology) including a depression subscale, specifically developed to screen persons with mental retardation. The instrument contains 57-items, divided into seven subscales of psychopathology: schizophrenia, affective, psychosexual, adjustment, anxiety, somatoform and personality disorders. Seven to eight items are included for each disorder based upon DSM-III (American Psychiatric Association, 1980) criteria. There are seven items on the depression subscale. This measure has both self- and informant rating versions. The informant or subject respond to a "yes" or "no" format.
Studies that have been carried out using this instrument show adequate psychometric properties. Senatore, Matson, and Kazdin (1985) reported a test-retest reliability of .69 for this subscale based on a sample of 22 subjects using a 23-week retest interval. Kazdin et al. (1983) reported a correlation of .20 between the depression subscale and the Hamilton, and correlations of .33 and .10 between the depression subscale and the Beck Depression Index. Coefficient alpha for self-report version of .85, with a split-half reliability of .88 was reported (Matson et al., 1984; Senatore et al., 1985; Watson, Aman, & Singh, 1988). Fox (1989) studied 165 adults, and found that 35.9% of the sample had at least one psychopathological disorder. Further, presence of psychopathology was found to be related to level of retardation, but not to living environment, sex, or age. The PIMRA is a relatively new instrument, and awaits further validation as to its strengths. However, it is the only instrument to date that has been developed for mentally retarded persons. An additional attraction of this instrument is that it is a general psychopathology measure with depression as one subscale. It seems the future trend in assessing psychopathology with mentally retarded population should follow the PIMRA. Therefore it is important to study associative and comorbid disorders that may confound the presentation of depression in this population. Secondly,
the PIMRA could also be utilized to conduct differential and dual diagnosis

Summary

Depression exists in normal I.Q. and mentally retarded children. The present criteria applied to the classification, diagnosis, and assessment procedures of depressed children are those that were developed for the adult population. Some evidence such as cortisol, and growth hormone abnormalities studies (Puig-Antich, 1983); cognitive features of depression (Haley, Fine, Marriage, Moretti, & Freeman, 1985); and diminished social interaction (Kazdin, Esveldt-Dawson, et al., 1985) points to the similarities and consistencies of depressed adults and children. However, these studies were exclusively conducted with the normal I.Q. population, and tell nothing about the mentally retarded population. In fact present evidence from research suggests that mentally retarded persons, in some aspects differ from normal I.Q. persons (Sovner & Hurley; 1982) in the presentation of depressive symptoms. This finding has significant implications in assessment and treatment selection.

This study was intended to advance the knowledge base of depression in mentally retarded and persons of normal intelligence. Specifically, this study addressed whether there was a difference in depressive symptomatology among individuals with varying level of intellectual functioning,
and were there differences in social skills, and general psychopathology. In addition, the role of adaptive behavior in the relationship between intellectual functioning and depression was also studied.
CHAPTER 3

METHOD

Study Design

The design used in this study was a Between Subject Comparison Study (above normal, average, borderline, mild, and moderate intelligence). Through this design one-hundred subjects (with 5 levels of intellectual functioning were contrasted on five instruments (CDI, BID, RADS, PIMRA and MESSY). The purpose of this study was to examine differences in depression, social skills, and general psychopathology among individuals of varying intellectual levels. Further, the effect of varying levels of adaptive behavior on the relationship between intellectual functioning and depression was studied.

Statistical Power Analysis

A power analysis was conducted to ascertain that the test will detect an effect in the sample when, in fact, a true effect exists in the population. The analysis was that suggested by Cohen (1988) and Jaccard, Turrisi, and Wan (1990). Following their guidelines, the sample size needed for power of .80 at alpha .05 for a test of XZ (Intelligence and Adaptive Behavior) interaction, with the squared multiple correlation of the main effect model at .10, and the corresponding squared multiple correlation of the full model (that includes the product term) at .20 is 65.

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**Subjects**

One-hundred students, 13 through 17 years of age, from racially integrated middle and high schools located in a southern urban community participated in this study. I.Q.s ranged from 40 to 130, with 20 subjects in each of five levels. The I.Q. ranges for each of these five groups were: Superior (above normal) = 120 - 130, Average = 80 - 119, Borderline = 70 - 79, Mild Mentally Handicapped = 55 - 69, Moderate Mentally Handicapped = 40 - 55.

The final pool of subjects in this study consisted of 55 males and 45 females. Seventeen of the 20 mild mentally handicapped adolescents were mainstreamed in regular schools. Eighteen of the moderate mentally handicapped adolescents were from special schools for the handicapped. The remaining two moderate mentally handicapped adolescents were from self-contained classrooms in a regular school campus. All remaining subjects were in regular classes or gifted classes on a regular campus.

**Instrumentation**

Assessment was conducted via self-report for subjects with I.Q.'s 70 and above. Adolescents with I.Q.s below 70 were assessed through semi-structured interview. Descriptions of each measure of depression, general psychopathology, and social skills follows. Sample copies of all measures used in this study are provided in Appendix A.
Children's Depression Inventory (CDI)

The CDI is a 27 item scale modeled after the Beck Depression Inventory. It may be completed by an adult who knows the child or by the child. The scale has been found to correlate with global ratings and diagnoses of depression in normal I.Q. children suggesting adequate construct validity for children of normal intelligence (Carlson, & Cantinell, 1980; Kovacs, 1981). The CDI utilizes a three-alternative forced-choice response format. It has been used with children ranging in age form 7-17 years of age. Internal consistency reliability has been moderately high ($\rho = .74$ to $.90$) (Kovacs, 1981) and adequate test-retest reliability has been demonstrated ($\rho = .74$ to $.83$) (Kovacs, 1981). Normative data drawn in 1985 are available based on 1,463 children in grades 2 through 8 (Finch, Saylor, & Edwards, 1985).

Reynolds Adolescent Depression Scale (RADS)

The RADS is a 30 item depression scale employing a forced choice four-point format (almost never, hardly ever, sometimes, most of the time). The instrument was specifically designed to assess the depression symptoms of school children and clinical populations. Over 8,000 adolescents have completed the scale with results demonstrating good reliability and validity. Internal consistency reliability estimates using coefficient alpha have been high ($\rho = .92$ to $.96$) with depressed and normal
population. Test-retest reliability coefficients ranged from .84 for a six-week interval to .81 for 12 weeks. The validity of the scale for measuring depression appears promising, it has been compared with other self-report scales and clinical interviews producing moderately high correlations obtained ($r = .71$ to .83). In addition, since the RADS is sensitive to treatment changes in depressive symptomatology (Reynolds, & Coats, 1986), it is appropriate for both assessment and treatment outcome evaluation purposes.

**Bellevue Index of Depression (BID)**

The BID is a 29-item, semi-structured interview, modified from an interview initially created by Ling et al. (1970). The interview is appropriate for children ranging in ages from 6 to 12 years. The 29 items include primarily characteristics of adult depression grouped into 10 headings: sleep disturbance, somatic complaints, dysphoric mood, self-deprecatory ideas, aggressive behavior, change in school performance, diminished socialization, change in attitude toward school, loss of usual energy, and unusual changes in appetite and or weight. The items are rated for severity on a five-point scale ("no problem" to "very much of a problem") and duration on a three-point scale ("recent or new," "long time," and "always"). An individual is considered to be depressed if he/she receives a total score of 20 (Petti, 1978).
The CDI showed strong concurrent validity, when 73 children were rated for depression on the BID, the Weinberg et al. Index of Depressive Symptomatology (WIDS) and clinicians' judgements. Chi-square analyses showed 89% agreement between the BID and WIDS (Petti, 1978). Shultz (1981) reported good convergent validity for the Child Depression Inventory and the BID ($r = .65$).

**Matson Evaluation of Social Skills with Youngsters (MESSY)**

The MESSY is a rating scale intended for assessing the social behavior of children (Matson et al., 1983). The normative sample for the MESSY consisted of 744 children between 4 and 18 years of age. The self-report form was completed by 422 children. Teacher ratings were obtained for 322 children. The 92 original items were reduced to 62 for the self-report form, and 64 for the teacher/parent report form after calculation of inter-rater reliability. Two-week test-retest reliability yielded adequate results (self-report $r = .50$; parent report $r = .55$). Both report forms were factor analyzed. Items with a loading of 0.30 or greater on a factor were retained. The five factors obtained on the self-report form are: Appropriate Social Skills, Inappropriate Assertiveness, Impulsive/Recalcitrant, Overconfident, and Jealousy/Withdrawal. The parent report yielded only two factors: Inappropriate Assertiveness/Impulsiveness, Appropriate Social Skills).
The MESSY has adequate norms and reliability for children and adolescents of normal intelligence. The MESSY was found to correlate strongly with depression (Helsel & Matson, 1983). For purposes of this study, the items in the MESSY that tapped the depressive dimension were deleted when the social skills composite scores were obtained. This was done in effect to keep the social skills domain 'pure'.

**Psychopathology Instrument for Mentally Retarded Adults (PIMRA)**

The PIMRA is a recently developed screening tool designed for assessing seven types of psychopathology in persons with mental retardation (Kazdin et al., 1983; Matson et al., 1984; Senatore et al., 1985). The PIMRA consists of 57-items. These are divided into seven subscales of psychopathology: schizophrenia, affective, psychosexual, adjustment, anxiety, somatoform and personality disorders. Seven or eight items are included for each disorder based upon DSM III (American Psychiatric Association, 1980) criteria. An additional seven items assess inappropriate mental adjustment. Items are summed to achieve a score for each subscale disorder as well as a total psychopathology score. Both informant and self-report versions are available. The self-report version was modified to include simple sentences and concrete words that can be easily understood by many retarded adults (Senatore et al., 1985).
**Vineland Adaptive Behavior Scales (VABS)**

The VABS (Interview edition) has a 297-item Survey Form which can be used for individuals from birth through 18 years. The interview with parents or caregivers is conducted by asking general questions followed by specific probes. Through the use of different starting points and the application of basal and ceiling rules, only items appropriate to the individual's functioning level are covered. The VABS focus on what the individual typically does, not on what (s)he can do. The items are classified under four major adaptive domains: Communication, Daily Living Skills, Socialization, and Motor Skills.

**Procedure**

**Initial Subject Identification**

Children from various classes were explained to about the nature and purpose of the study. Informed consent was obtained from parents of the students who volunteered. Sample consent forms can be found in Appendix B.

**Intellectual Assessment**

Intellectual functioning scores using the Verbal portion of the Wechsler Intelligence Scale for Children-Revised (WISC-R) were obtained for all subjects.

**Adaptive Behavior**

Subjects' adaptive behavior scores were derived through the Vineland Adaptive Behavior Scale (VABS) (Sparrow,
Balla, & Cicchetti, 1984). Information was gathered through interview from primary caretakers of the subjects.

**Self-Report Scales**

The following scales were administered to the subjects: 1) *Child Depression Inventory (CDI)*, 2) *Bellevue Index of Depression (BID)*, 3) *Reynolds Adolescent Depression Scale (RADS)*, 4) *Watson Evaluation of Social Skills in Youngsters (MESSY)*, 5) *Psychopathology Instrument for Mentally Retarded Adults (PIMRA)*. Semi-structured interview was conducted for subjects with I.Q.s below 70. Subjects with I.Q.s 70 and over responded through self-report, however, examiner was present to assist should the subjects have questions. The semi-structured interview with the individuals with low intellectual functioning allowed the examiner to seek further elaboration if necessary to permit rating the appropriate answer. All assessments were conducted individually.

**Confidentiality**

To ensure confidentiality, no information verbal or written, was released without the consent of the subjects and their parents. Future publication of this study will preserve the identity of the subjects.

**Debriefing**

After completion of the assessment, subjects and their parents were reimbursed (if applicable) and thanked. They were allowed to ask questions pertinent to their
participation in this study. They were informed of their rights to confidentiality and that they could tell others to contact the examiner or the supervisor of this study if any problems and or concerns arose due to any students participation in this study.

**Data Analyses**

Several statistical analyses were employed to address the study's two hypotheses. First, descriptive statistics of means and standard deviations were obtained. Second, Pearson product-moment correlations were obtained to assess intercorrelation between the measures used in this study. Third, multivariate analysis of variance to identify and describe the differences between group means was conducted, and discriminant analysis was conducted as followup to a significant MANOVA. Fourth, multiple regression analysis using adaptive behavior as a moderating variable between the relationship of intellectual functioning and depression was carried out. Fifth, post-hoc analysis upon a significant moderated regression analysis was conducted to explain the nature of the interaction.

All data analysis was conducted using the *Statistical Package for the Social Sciences-Version X (SPSS-X)*. The analyses took place at the Louisiana State University System Network Computing Center (SNCC).
CHAPTER 4

RESULTS

Descriptive data

The means and standard deviations of the study variables for various groups are presented in Table 1. The MESSY was scored one to five, the PIMRA was scored one and two, the CDI was scored one to three, the BID (severity) was scored one to five and BID (duration) was scored one to three, the RAD was scored from one to five.

High scores on the MESSY indicate preferred (positive) levels and low scores are least preferred (negative) levels of social skills. High scores on the PIMRA show high levels of psychopathology and low scores show low levels of psychopathology. High scores on the CDI, BID, and RAD indicate significant depression.

Reliability of the Scales

Cronbach's alpha internal consistency reliabilities were calculated for all dependent measures and are presented in Table 2. All alpha coefficients were equal to or greater than .80 except the PIMRA (alpha=.75). Because these coefficients were considered acceptable, all measures were used for inferential analyses.

Relationship between variables

As part of the preliminary analyses, Pearson Product-Moment Correlations were calculated between all major independent and dependent measures. The intercorrelations
## TABLE 1

**Means and Standard Deviations of Sample by Groups for All Measures**

<table>
<thead>
<tr>
<th>MEASURE/GROUPS</th>
<th>ABOVE NORMAL</th>
<th>AVERAGE</th>
<th>BORDERLINE</th>
<th>MILD MENTALLY HANDICAPPED</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=</td>
<td>(20)</td>
<td>(20)</td>
<td>(20)</td>
<td>(20)</td>
</tr>
<tr>
<td>MESSY</td>
<td>247.50</td>
<td>204.20</td>
<td>195.50</td>
<td>176.50</td>
</tr>
<tr>
<td></td>
<td>(23.17)</td>
<td>(23.90)</td>
<td>(25.57)</td>
<td>(32.29)</td>
</tr>
<tr>
<td>PIMRA</td>
<td>87.80</td>
<td>83.35</td>
<td>82.10</td>
<td>84.05</td>
</tr>
<tr>
<td></td>
<td>(3.42)</td>
<td>(5.48)</td>
<td>(4.03)</td>
<td>(6.40)</td>
</tr>
<tr>
<td>CDI</td>
<td>34.30</td>
<td>38.95</td>
<td>37.85</td>
<td>47.55</td>
</tr>
<tr>
<td></td>
<td>(5.62)</td>
<td>(9.97)</td>
<td>(8.88)</td>
<td>(9.30)</td>
</tr>
<tr>
<td>BID</td>
<td>44.70</td>
<td>58.30</td>
<td>59.50</td>
<td>68.15</td>
</tr>
<tr>
<td></td>
<td>(17.21)</td>
<td>(24.81)</td>
<td>(20.85)</td>
<td>(17.81)</td>
</tr>
<tr>
<td>RAD</td>
<td>57.15</td>
<td>62.70</td>
<td>60.30</td>
<td>73.75</td>
</tr>
<tr>
<td></td>
<td>(6.26)</td>
<td>(10.17)</td>
<td>(6.86)</td>
<td>(11.22)</td>
</tr>
<tr>
<td>IQ</td>
<td>132.00</td>
<td>101.45</td>
<td>79.25</td>
<td>62.00</td>
</tr>
<tr>
<td></td>
<td>(3.99)</td>
<td>(10.76)</td>
<td>(5.04)</td>
<td>(4.97)</td>
</tr>
<tr>
<td>AB</td>
<td>135.50</td>
<td>116.15</td>
<td>93.90</td>
<td>62.00</td>
</tr>
<tr>
<td></td>
<td>(6.73)</td>
<td>(12.95)</td>
<td>(16.56)</td>
<td>(0.48)</td>
</tr>
</tbody>
</table>
## TABLE 2

**Internal Consistency Reliabilities of the Depression, Social Skills, and General Psychopathology Measures**

*(CRONBACH'S ALPHA)*

<table>
<thead>
<tr>
<th>Self Report</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matson's Evaluation of Social Skills for Youngsters</td>
<td>.87</td>
</tr>
<tr>
<td>Psychopathology Instrument for Mentally Retarded Adults</td>
<td>.74</td>
</tr>
<tr>
<td>Children's Depression Inventory</td>
<td>.90</td>
</tr>
<tr>
<td>Bellevue Index of Depression</td>
<td>.92</td>
</tr>
<tr>
<td>Reynold's Adolescent Depression Scales</td>
<td>.82</td>
</tr>
</tbody>
</table>
among measures used in the study are presented in Table 3. The depression scales (CDI, BID, RAD) were significantly negatively correlated (p<.05) with the social skills scale (MESSY), indicating that individuals with high social skills had lower levels of depression scores. I.Q. scores and MESSY rating and Adaptive Behavior scores and the MESSY rating were significantly positively correlated (p< .05), suggesting that individuals with higher I.Q. scores and higher adaptive behavior scores had higher social skills rating. The PIMRA did not correlate significantly with the MESSY. The PIMRA also did not significantly correlate with any depression measure (CDI, BID, or RAD). However, it was significantly negatively correlated with I.Q. scores and adaptive behavior scores, suggesting that individuals with high IQ scores and high adaptive behavior experienced low general psychopathology.

Adaptive behavior was significantly positively correlated with I.Q. scores indicating that individuals with high I.Q. scores had high adaptive behavior scores (p<.05).

The pattern of correlations found are as expected, and reliable as shown by the reliability coefficients (Coefficient alpha; Cronbach, 1951). An important consideration is also the examination of the validity of the measures. The relationships of the measures of the same construct are evidence of the validity.
### TABLE 3

**Intercorrelations Among the Variables**

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IQ</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SF</td>
<td>.954**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 MESSY</td>
<td>.285**</td>
<td>.277</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 PIMRA</td>
<td>-.382**</td>
<td>-.334</td>
<td>-.003</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 CDI</td>
<td>-.219*</td>
<td>-.198*</td>
<td>-.465**</td>
<td>.052</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 BID</td>
<td>-.267**</td>
<td>-.232*</td>
<td>-.526**</td>
<td>-.063</td>
<td>-.697**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>7 RAD</td>
<td>-.272**</td>
<td>-.278**</td>
<td>-.386**</td>
<td>-.170</td>
<td>.632**</td>
<td>.627**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Relationship Between Obtained I.Q. Scores and Reported Social Skills Scores, General Psychopathology, and Depression Scores.

To determine the relationship between the independent (IQ) and dependent variables (CDI, BID, RAD, MESSY, PIMRA), One-way Multivariate Analysis of Variance (MANOVA) was conducted on the five dependent variables. The Independent variable I.Q. had five levels (Above normal, Average, Borderline, Mild, Moderate). Results are presented in Table 4. With the use of Wilks' criterion, the combined dependent variables were significantly affected by I.Q. (F(4,95) =3.24, p<.001). Examination of the univariate F-tests shows that all of the dependent variables made unique contributions to the composite dependent variable.

Discriminant Analysis

Group differences on responses to dependent variables were assessed via discriminant analysis, as followup to a significant MANOVA. Factors assessed were each independent variable's contribution to group classification of members within levels and to determine which pairs of I.Q. groups differed significantly.

A direct discriminant function analysis was performed using the five dependent variables as predictors of membership in five groups. Predictor variables were MESSY, PIMRA, CDI, BID, and RAD. Groups were Above normal, Average,
**TABLE 4**

Multivariate Analysis of Variance of MESSY, PIMRA, CDI, BID, and RAD

<table>
<thead>
<tr>
<th>TEST NAME</th>
<th>VALUE</th>
<th>HYPOTHESIS DF</th>
<th>ERROR DF</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais</td>
<td>.99785</td>
<td>5.00</td>
<td>95</td>
<td>6157.52**</td>
</tr>
<tr>
<td>Hotellings</td>
<td>463.46</td>
<td>5.00</td>
<td>95</td>
<td>6157.52**</td>
</tr>
<tr>
<td>Wilks</td>
<td>.0025</td>
<td>5.00</td>
<td>95</td>
<td>6157.52**</td>
</tr>
<tr>
<td>Roys</td>
<td>.99875</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Univariate F-tests DF(1,99)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>SS</th>
<th>Error</th>
<th>Hypothesis</th>
<th>Error</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>MESSY</td>
<td>3797431.69</td>
<td>79439.31</td>
<td>3797431.69</td>
<td>802.41</td>
<td>4732.48**</td>
</tr>
<tr>
<td>PIMRA</td>
<td>695389.21</td>
<td>3821.79</td>
<td>695389.21</td>
<td>38.60</td>
<td>18013.42**</td>
</tr>
<tr>
<td>CDI</td>
<td>152100.00</td>
<td>8192.00</td>
<td>152100.00</td>
<td>82.74</td>
<td>1838.12**</td>
</tr>
<tr>
<td>BID</td>
<td>1704591.36</td>
<td>34150.64</td>
<td>1704591.36</td>
<td>344.95</td>
<td>4941.47**</td>
</tr>
<tr>
<td>RAD</td>
<td>400689.00</td>
<td>13125.00</td>
<td>400689.00</td>
<td>132.57</td>
<td>3022.33**</td>
</tr>
</tbody>
</table>

**p<.01**
Borderline, Mild, and Moderate. These results are presented in Table 5. The analysis produced four discriminant functions. Only the first two functions resulted in F ratios at less than the .05 level of significance with a combined chi square (20)=60.49, p<.001. After removal of the first function there was still highly significant discriminating power, chi square (12)=26.01, p<.01. The two discriminating functions accounted for 59.38% and 32.55% of the variance respectively, of the between group variability.

The first discriminant function maximally separated mild mentally handicapped and above normal groups. The second discriminant function discriminated the moderately mentally handicapped and the above normal group.

A loading matrix of correlations between predictor variables and discriminant functions suggested that the primary variables, distinguishing mild mentally handicapped group and the above normal group, were the three depression measures (CDI, RAD, BID). The mild mentally handicapped group (mean scores: CDI=47.55; RAD=73.75; BID=143.35) presented greater depressive symptoms than the above normal group (mean scores: CDI=34.30; RAD=57.15; BID=120.85).

The second discriminant function distinguished between the moderate mentally handicapped group and the above normal. The predictor variable that contributed to the separation was the PIMRA. The moderate mentally handicapped
TABLE 5

**Discrimination Function Analysis of Dependent Variables by Groups**

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Standardized weighted Coefficient Functions</th>
<th>Univariate F (4, 95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MESSY</td>
<td>-0.235</td>
<td>0.171</td>
</tr>
<tr>
<td>PIMRA</td>
<td>-0.140</td>
<td>0.983</td>
</tr>
<tr>
<td>CDI</td>
<td>0.601</td>
<td>0.161</td>
</tr>
<tr>
<td>BID</td>
<td>-0.151</td>
<td>-0.235</td>
</tr>
<tr>
<td>RAD</td>
<td>0.518</td>
<td>0.310</td>
</tr>
<tr>
<td>Canonical R</td>
<td>0.554</td>
<td>0.442</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>0.443</td>
<td>0.242</td>
</tr>
</tbody>
</table>

**p < .01

**Pooled Within Group Correlations Between Variables and Discriminant Functions**

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td>0.853</td>
<td>0.189</td>
<td>0.353</td>
<td>-0.269</td>
</tr>
<tr>
<td>RAD</td>
<td>0.837</td>
<td>0.052</td>
<td>-0.090</td>
<td>0.340</td>
</tr>
<tr>
<td>BID</td>
<td>0.629</td>
<td>-0.060</td>
<td>0.209</td>
<td>-0.516</td>
</tr>
<tr>
<td>PIMRA</td>
<td>-0.160</td>
<td>0.940</td>
<td>-0.088</td>
<td>-0.284</td>
</tr>
<tr>
<td>MESSY</td>
<td>-0.533</td>
<td>0.078</td>
<td>0.624</td>
<td>0.561</td>
</tr>
</tbody>
</table>
group had a mean of 87.80, and the above normal group had a mean of 79.65. The moderate mentally handicapped group showed a significantly higher number of general psychopathology symptoms than that of the above normal group.

An examination of the classification results (table 6) showed an overall correct classification of 45% (45/100). The correct classification of the above normal group was 75% (15/20), the mild mentally handicapped group was 70% (14/20), the moderate mentally handicapped group was 40% (8/20), and the Average and Borderline groups were each correctly classified at 25% (5/20).

Relationship Between Mentally Handicapped and Nonmentally Handicapped Groups Among the Dependent Measures

MANOVA between mentally handicapped and nonmentally handicapped groups was conducted across dependent variables. Group one was formed by combining the above normal, average, and borderline groups; and group two was formed by combining the mild and moderate groups.

Results of the analysis (table 7) showed that the Wilks lambda criterion was significant $F(1,98)=8.00$, $p<.001$, indicating that the two groups significantly affected the combined dependent variable. Examination of the univariate $F$'s showed that all of the dependent variables uniquely contributed to the combined dependent variable.
### TABLE 6

**Classification Results L.O. Groups for CDI**

<table>
<thead>
<tr>
<th>ACTUAL GROUP</th>
<th>NO. OF CASES</th>
<th>PREDICTED GROUP MEMBERSHIP (PERCENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>ABOVE NORMAL</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(75)</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(30)</td>
</tr>
<tr>
<td>BORDERLINE</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(20)</td>
</tr>
<tr>
<td>MILD</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5)</td>
</tr>
<tr>
<td>MODERATE</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(25)</td>
</tr>
</tbody>
</table>
### TABLE 7

**Multivariate Analysis of Variance of Nonmentally Handicapped vs Mentally Handicapped Groups**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Value</th>
<th>Hypothesis DF</th>
<th>Error DF</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais</td>
<td>.30110</td>
<td>5</td>
<td>94</td>
<td>6.37**</td>
</tr>
<tr>
<td>Hotellings</td>
<td>.43083</td>
<td>5</td>
<td>94</td>
<td>6.37**</td>
</tr>
<tr>
<td>Wilks</td>
<td>.69890</td>
<td>5</td>
<td>94</td>
<td>6.37**</td>
</tr>
</tbody>
</table>

**p<.01

### Univariate F-tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis mean square</th>
<th>Error mean square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>MESSY</td>
<td>7624.512</td>
<td>735.357</td>
<td>10.36**</td>
</tr>
<tr>
<td>PIMRA</td>
<td>277.512</td>
<td>40.934</td>
<td>6.77*</td>
</tr>
<tr>
<td>CDI</td>
<td>567.112</td>
<td>78.093</td>
<td>7.26**</td>
</tr>
<tr>
<td>BID</td>
<td>414.050</td>
<td>431.280</td>
<td>4.92*</td>
</tr>
<tr>
<td>RAD</td>
<td>1361.250</td>
<td>129.571</td>
<td>10.50**</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
As a followup to the significant MANOVA, a two-group discriminant analysis on the five dependent variables was conducted to assess which of the dependent variables contributed significantly to the variance. Results are presented in Table 8. Examination of the standard discriminant function coefficients reveals that all of the five variables were strong contributors. Pooled correlations show that all of the variables significantly correlated in the function. The two groups were maximally separated on all of the five variables. The nonmentally handicapped (NMH) group had higher mean scores than the mentally handicapped (MH) group on the MESSY ($X_{\text{NMH}}=200.78$, $X_{\text{MH}}=184.50$); had lower scores on the PIMRA ($X_{\text{NMH}}=93.75$, $X_{\text{MH}}=96.11$); had lower scores in the CDI ($X_{\text{NMH}}=37.26$, $X_{\text{MH}}=41.95$); had lower scores on the BID ($X_{\text{NMH}}=127.56$, $X_{\text{MH}}=135.82$); had lower scores on the RAD ($X_{\text{NMH}}=60.21$, $X_{\text{MH}}=68.17$). These results show that the mentally handicapped group as a whole evidenced significantly poorer social skills, more symptoms indicating general psychopathology, and higher levels of depressive symptoms when compared to their nonmentally handicapped peers.
TABLE 8

Discriminant Analysis of Nonmentally vs Mentally Handicapped Groups

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Standardized Coefficient Function</th>
<th>Univariate F (1,98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MESSY</td>
<td>-0.709</td>
<td>8.136**</td>
</tr>
<tr>
<td>PIMRA</td>
<td>-0.598</td>
<td>3.368</td>
</tr>
<tr>
<td>CDI</td>
<td>0.641</td>
<td>6.781*</td>
</tr>
<tr>
<td>BID</td>
<td>0.677</td>
<td>4.926*</td>
</tr>
<tr>
<td>RAD</td>
<td>0.893</td>
<td>12.91**</td>
</tr>
<tr>
<td>Canonical R</td>
<td>0.376</td>
<td></td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>0.164</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Relationship Between Depression, Intellectual Functioning, and Adaptive Behavior

Preliminary Diagnostic Analyses

It was hypothesized that adaptive behavior plays a moderating role in the relationship between intellectual functioning and depression. Prior to undertaking this analysis, the data were subjected to diagnostic analysis to check for violations of assumptions. Three assumptions were evaluated in order to make sure that the parameters conformed to acceptable forms for further analyses. The assumptions tested were: test of linearity, independence, and homoscedasticity (Cohen & Cohen, 1983; Wittink, 1988).

The SPSSX statistics of linearity indicated that nonlinearity was not significant between variables in raw score form. The standardized scatterplot between the residuals and predicted scores did not show observable trends, thus negating the violations of homogeneity of variance. Plot of normal probability between the observed and expected values indicated that the observed values were proximal to the expected value line, thus showing acceptable distribution parameter. Examination of the histogram showed two outliers, these were not considered to be obstructive to the outcome of further analyses and were included in all of the analyses.

Examination of the regression plots between the residuals and predicted values showed a single bend
nonlinear trend. This was further tested through regression analysis using higher order polynomial terms. Analysis of these data showed that the explained variance was not significantly different using higher order terms. The transformed variables failed to perform better than the untransformed variables.

Though all the assumptions were not met precisely the deviations were not significant. Thus, the untransformed variables were utilized for further analyses in the interest of parsimony and ease of interpretation (Cohen & Cohen, 1983).

**Moderated Regression Analysis**

Moderated multiple regression was estimated for each of the three depression measures (CDI, BID, RAD). The objective was to understand the manner in which the explanatory variables influenced the responses of the subjects on the depression measures. The interacting term was obtained by multiplying the two independent variables (IQxAB). The SPSSX multiple regression program was used to conduct the analyses. The procedure followed was that suggested by Zedeck (1971) and Sharma, Durand, and Gur-Arie (1981). Three different equations were examined for each depression measure. To determine the presence of an interaction through the use of the cross-product term, the variance associated with the main effects of the variables I.Q. and AB, used in forming the interaction term were
partialled out (Zedeck, 1971; Sharma, Durand, & Gur-Arie, 1981).

Moderated regression analysis of the dependent variable Child Depression Inventory (CDI) is presented in Table 9. Examination of this table shows that all three equations were significant. In the I.Q. only model, I.Q. had a significant linear relationship with CDI scores ($t=-1.945$, $p<.05$). In the I.Q. and AB model, the variables by themselves were not linearly related to the CDI scores (I.Q.: $t=-1.79$, $p>.05$; AB: $t=1.20$, $p>.05$). In the full model the interaction term evidenced significant linearity to the depressive scores ($F(3,96)=3.44$, $p<.05$).

Intellectual functioning taken alone accounts for a significant portion (3.7%) of the variance, while IQ and adaptive behavior together explain 5.1% ($R^2 = .051$) of the variance. However, the addition of the multiplicative term (IQxAB) increases significantly the explanation to 11.8% ($R^2 = .118$) of the variance in the dependent variable (CDI). This yields $0.118-0.051=0.067$. The interaction effect accounts for 6.7% of the variance in depression symptoms, a relatively large effect size. So the moderator effect is supported.

Thus, the relationship between I.Q. and depression, as measured by the CDI, is dependent on the level of adaptive behavior. Specifically, the relationship is conditional, the effect of adaptive behavior on intellectual functioning
### TABLE 9

**Moderated Multiple Regression for Dependent Variable: CDI**

Results for IQ

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>STANDARD-B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>-0.055</td>
<td>-0.193</td>
<td>-1.945*</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>43.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R = .193  
R² = .037  
ADJ. R² = .027  
F = 3.78*(df:1,98)

Results of IQ, SF

<table>
<thead>
<tr>
<th></th>
<th>B</th>
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<th>T</th>
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</thead>
<tbody>
<tr>
<td>IQ</td>
<td>-0.149</td>
<td>-0.525</td>
<td>-1.79</td>
</tr>
<tr>
<td>SF</td>
<td>0.084</td>
<td>0.3525</td>
<td>1.20</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>44.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R = .227  
R² = .051  
ADJ. R² = .032  
F = 2.62*(df:2,97)

Results of IQ, SF, IQ*SF

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>STANDARD-B</th>
<th>SR²</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>0.105</td>
<td>0.574</td>
<td>0.098</td>
<td>1.018</td>
</tr>
<tr>
<td>SF</td>
<td>0.209</td>
<td>0.865</td>
<td>0.018</td>
<td>2.263*</td>
</tr>
<tr>
<td>IQ*SF</td>
<td>-0.002</td>
<td>-1.631</td>
<td>0.050</td>
<td>-2.211*</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>27.48</td>
<td>3.573**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R = .342  
R² = .118  
ADJ. R² = .090  
F = 3.44*(df:3,96)
is not constant across all levels, rather it varies at different levels of intellectual functioning. The nature of the interaction was further explored through post-hoc analysis.

In Figure 1 the geometrical representation of the main effect of IQ and AB in their influence to responses on the CDI measure are presented. The regression lines are not parallel to the abscissa indicating that there is a linear relationship between the two regression lines and depression variable. In addition, the two regression lines are not parallel to each other suggesting a higher order interaction effect. At low levels of I.Q. and AB, subjects evidence greater depressive symptoms, however, as both I.Q. and AB increase, the degree of symptoms decreases; this decrease suggests an inverse relationship between depression and the levels of I.Q. and AB. However, the slope for I.Q. is steeper than that for AB suggesting that by itself I.Q. is the stronger predictor of depressive symptoms of the two. This relationship contributed to the significant moderator interaction that was obtained in the full model regression analysis.

Table 10 presents the results of the moderated regression analysis of the dependent variable Bellevue Index of Depression (BID). All three equations were significant. In the restrictive models IQ was significant \( (t=-2.389, p<.05); t=-2.603, p<.05) \). In the full model the
FIGURE 1

Depiction of the main effect of adaptive behavior, intellectual functioning, and moderator interaction on depressive symptomatology.
# TABLE 10

**Moderated Multiple Regression for Dependent Variable: BID**

## Results for IQ

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>STANDARD-B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>-.137</td>
<td>-.2345</td>
<td>2.389*</td>
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<tr>
<td>(CONSTANT)</td>
<td>142.383</td>
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</table>

R = .235  \( R^2 = .055 \)  \( \text{ADJ. R}^2 = .045 \)  \( F = 5.706^* \)

## Results of IQ, SF

<table>
<thead>
<tr>
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<th>STANDARD-B</th>
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<tr>
<td>IQ</td>
<td>-.439</td>
<td>-.749</td>
<td>2.603*</td>
</tr>
<tr>
<td>SF</td>
<td>.269</td>
<td>.546</td>
<td>1.899</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>143.438</td>
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</tbody>
</table>

R = .298  \( R^2 = .089 \)  \( \text{ADJ. R}^2 = .070 \)  \( F = 4.732^* \)

## Results of IQ, SF, IQ*SF

<table>
<thead>
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<th>B</th>
<th>STANDARD-B</th>
<th>SR2</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>-.172</td>
<td>-.294</td>
<td>.070</td>
<td>-.475</td>
</tr>
<tr>
<td>SF</td>
<td>.402</td>
<td>.816</td>
<td>.041</td>
<td>2.094*</td>
</tr>
<tr>
<td>IQ*SF</td>
<td>-.002</td>
<td>-.750</td>
<td>.010</td>
<td>-.937</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td>128.57</td>
<td>.750</td>
<td>.010</td>
<td>3.573**</td>
</tr>
</tbody>
</table>

R = .349  \( R^2 = .112 \)  \( \text{ADJ. R}^2 = .094 \)  \( F = 3.44^* \)
overall equation was significant ($F=3.45, p<.05$), however, neither the interaction coefficient ($t=1.27, p>.05$) nor the coefficients of the independent variables were significant ($I.Q.: t=-.02, p>.05; AB:t=185, p>.05$). This suggests that the variables both alone and interacted have an effect, though the interactive effect itself was not significant. For the dependent variable BID, AB did not function as a moderator variable between I.Q. and the expression of depressive symptoms.

Analyses of the independent variables (IQ,AB), their product term (IQxAB), and the dependent variable (RAD) is presented in Table 11. Examination of the results indicate that all three equations were significant. In the I.Q. alone equation, I.Q. evidenced a significant linear relationship with RAD scores ($-2.630, p<.05$). In the I.Q. and AB equation, I.Q. significantly contributed to the equation ($t=2.183, p<.05$). In the full model, however, the interactive term was not significant ($t=-1.272, p>.05$); neither were the coefficients of I.Q. and AB statistically significant in their respective t-ratios. This suggests that the variables both alone and interacted had an effect on the RAD scores, though the interactive term itself was not significant. Again, as with the BID, AB did not function as a moderator variable between I.Q. and depressive symptoms as measured by the RAD scale. Because the dependent variables BID and RAD failed to be
TABLE 11

Moderated Multiple Regression for Dependent Variable: RAD

Results for IQ

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>STANDARD-B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>-.093</td>
<td>-.257</td>
<td>-2.630*</td>
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<tr>
<td>(CONSTANT)</td>
<td></td>
<td>71.189</td>
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</tr>
</tbody>
</table>

R=.256  R2=.066  ADJ.R2=.056  F=6.91**

Results of IQ, SF

<table>
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<th>B</th>
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<tr>
<td>IQ</td>
<td>-.228</td>
<td>-.630</td>
<td>-2.183*</td>
</tr>
<tr>
<td>SF</td>
<td>.121</td>
<td>.397</td>
<td>1.374</td>
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<tr>
<td>(CONSTANT)</td>
<td></td>
<td>71.661</td>
<td></td>
</tr>
</tbody>
</table>

R=.289  R2=.084  ADJ.R2=.065  F=4.43*

Results of IQ, SF, IQ*SF

<table>
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<th>B</th>
<th>STANDARD-B</th>
<th>SR2</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>.010</td>
<td>-.012</td>
<td>.074</td>
<td>.020</td>
</tr>
<tr>
<td>SF</td>
<td>.211</td>
<td>.690</td>
<td>.021</td>
<td>1.857</td>
</tr>
<tr>
<td>IQ*SF</td>
<td>-.002</td>
<td>-.937</td>
<td>.017</td>
<td>-1.272</td>
</tr>
<tr>
<td>(CONSTANT)</td>
<td></td>
<td>59.57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R=.332  R2=.110  ADJ.R2=.083  F=3.45*
statistically significant, they were eliminated from further analysis. 

**Simple Effect Analysis**

Having identified a significant interaction between the product term (IQxAB) on the dependent variable CDI, further examination was conducted to better understand the meaning of the moderation. This evaluation was carried out through simple effect analyses using plotting and post-hoc statistical testing (Aiken & West, 1991).

To examine the exact nature of this moderation between the variables, three representative members of this family of regression lines were calculated; one for low AB score (1sd below the mean), an average AB score (at the mean), and one for a high AB score (1sd above the mean). The results are presented in graphic form in Figure 2 which presents three simple regression lines of the regression of CDI(Y) on IQ(X) as a function of three values of adaptive behavior (AB_L, AB_M, AB_H). The simple regression equations presented in the figure indicate a strong regression of depression on IQ at AB_L and AB_M, but essentially no relationship between IQ and depression for AB_H. Thus, as adaptive behavior decreases the slope of CDI and IQ becomes steeper. Specifically, when adaptive behavior is minimal, intellectual functioning exerts a clear-cut effect on depression symptoms. However, when adaptive behavior is strong, the influence of intellectual functioning on
depression symptoms is much less. This finding is in accord with the moderating interaction that was identified in the main regression analysis.

**Ordinal Versus Disordinal Interaction**

Figure 2. shows that the two simple effect lines (\(Z_H\) and \(Z_L\)) crossover within the range of scores obtained in this study. This indicates that the interaction is a disordinal (crossover) interaction. Calculation was conducted to identify the value at which the two simple effect lines crossover. Table 12(iii) shows that the lines crossover at -.211 standard deviation.

**Relationship Between Slopes of Simple Regression Lines**

The test to examine if the simple slope differs from zero was conducted. The calculation is presented in Table 12(ii). The value of the t-test indicates that the slopes were not statistically significant.

Further examination was conducted to assess if the simple slopes of depression on I.Q. significantly differed at low and high values of adaptive behavior. The results of the calculation is presented in Table 12(iv). Examination of the calculation and the t-value indicates that the regression of depression on I.Q., though varied as a function of AB, was not statistically significant.
Simple Regression Analysis (Post Hoc)

\[
SF_L = 52.065; \quad Y = 0.256(IQ) + 20.62
\]

\[
SF_E = 89.71; \quad Y = 0.169(IQ) + 27.79
\]

\[
SF_H = 127.35; \quad Y = 0.082(IQ) + 34.98
\]

**FIGURE 2**

Depiction of interaction between levels of adaptive behaviors and intellectual functioning in predicting depressive symptomatology
TABLE 12

Covariance Matrix of Regression Coefficient for: CDI

(i) $S_b = \begin{bmatrix} b_1 & b_2 & b_3 \\ b_1 & 1007.55 & 1125.17 & 190674.79 \\ b_2 & 1125.17 & 1417.13 & 221294.26 \\ b_3 & 190674.79 & 221294.26 & 37129138.66 \end{bmatrix}$

Simple Slopes, Standard Errors of Simple Slopes and t-tests

(ii) Simple slope Standard error t-test

- $b_L = .256$ 72518.49 0.00000353
- $b_H = .169$ 19273.89 0.00000876
- $b_H = .082$ 3788.79 0.00002164

(iii) $X_{cross} = -\frac{b_2}{b_3} = -0.209/-0.002 = -2.11$

(iv) $d = (Z_H - Z_L)b_3 = 0.147$;
$t = \frac{d}{S_{b_3}} = 0.000$
CHAPTER 5
DISCUSSION

This is the first study to examine specific levels of intellectual functioning and their relationships to depression, general psychopathology, and social skills. In addition, this may be the only study to have assessed the role of adaptive behavior in the relationship between intellectual functioning and depression.

This investigation examined adolescent depression via three depression measures (CDI, BID, RAD), social skills via the MESSY, and General Psychopathology via the PIMRA. The independent groups were formed by level of intellectual functioning I.Q.) obtained through the verbal subtests of the Wechsler Intelligence Scale for Children-Revised (WISC-R). An investigation of the role of adaptive behavior in the relationship between intellectual functioning and depression was also investigated through moderated regression. The adaptive behavior (AB) scores were obtained via the Vineland Adaptive Behavior Scales. The pattern of correlations obtained between the independent variables, the dependent variables, and the independent and dependent variables was as expected. The two independent variables were significantly and positively correlated, indicating that those who had higher intelligence also had higher adaptive behaviors. The depression measures were significantly and positively correlated, indicating that
those who had higher depression symptoms in one depression measure also had higher depression symptoms in the other depression measures. The independent variables were significantly positively correlated with social skills, indicating that those who had higher intellectual functioning and higher adaptive behavior had higher social skills. The independent variables were significantly negatively correlated with general psychopathology, indicating that those who had higher intellectual functioning and adaptive behavior evinced lower general psychopathology. The independent variables were significantly negatively correlated, indicating that those who had higher intellectual functioning and higher adaptive behavior experienced lower depressive symptoms. The pattern of correlations among the measures demonstrated adequate reliability, a prerequisite of validity.

The first hypothesis posited that there would be lower social skills, greater general psychopathology, and greater depressive symptoms among adolescents with lower intellectual functioning. It was established through multivariate analysis of variance that the mentally handicapped group performed poorly on all of the variables when compared to the nonmentally handicapped group. This result is in accord with a number of studies that have looked into the differences between the nonmentally handicapped and mentally handicapped individuals in areas
of emotional disorders, social skills, and psychopathology (Sovner & Hurley, 1982; Jacobson & Schwartz, 1983). Thus, persons with mental handicap are indeed at greater risk for more serious pathology and maladjustment (Reynolds & Baker, 1988). When multivariate analysis was applied to groups by intellectual functioning levels, the above normal group evidenced significantly higher social skills, lower general psychopathology, and lower depressive symptoms. The mild mentally handicapped group evidenced lowest level of social skills and highest level of depressive symptoms, whereas the moderate mentally handicapped group evinced highest level of general psychopathology. These pattern of results need further research, as there is no previous research to compare with, except with that of adult studies (Jacobson, 1982; Reiss, 1982).

A follow-up investigation using discriminant analysis detailed two significant discriminant functions: a depression measure and a general psychopathology measure. The mild mentally handicapped group was most highly correlated with the first function. The above normal and moderately mentally handicapped group were highly correlated with the second discriminant function. However, the above normal group was negatively correlated whereas the moderate mentally handicapped group was positively correlated. Examination of pairs of groups revealed that the mild mentally handicapped group was significantly
different from all other groups for the CDI and RAD, and from the above normal group for the BID. The mild mentally handicapped group exhibited greater depression symptoms. The mild mentally handicapped group was significantly different from the above normal group on the MESSY, the above normal had better social skills. The above normal group was also significantly different from the borderline and moderate mentally handicapped groups on the PIMRA, with the above normal group presenting significantly fewer symptoms of psychopathology. The results in this study varied somewhat from Brumback and Jackoway (1980) who had published the only study that looked into the relationship between levels of intellectual functioning and depression. No significant relationship between intelligence and depression was found in their study. However, their study did not include intelligence scores below 75, and their subjects ranged in ages from 5 ½ years to 12 ½ years.

The moderate mentally handicapped group failed to show greater depressive symptoms than the mild mentally handicapped group in this study. This pattern of results is consistent with results of similar research with adult populations (Jacobson, 1982; Reiss, 1982). Jacobson (1982) and Reiss (1982) in their studies found that the mild mentally handicapped group experienced greater emotional disorder than any other group. Neither study cited,
however, provided any hypothesis for explaining their results.

The adolescent data in this study suggest plausible causes. Mild mentally handicapped individuals are acutely aware of negative social conditions (Reiss & Benson, 1984), probably much more so than individuals in the moderate and lower levels of mentally handicapping conditions. Reiss and Benson (1984) postulated seven negative social conditions (labeling, rejection and ridicule, segregation, infantilism, social discrimination, and restricted opportunities) within mental retardation. Being aware of these negative social conditions may predispose the mildly mentally handicapped individuals to emotional problems particularly to depression.

In the case of the moderate mentally handicapped group, not only may they not be aware of negative social conditions (this hypothesis awaits empirical study), but they may not be subjected to the negative social factors identified by Reiss and Benson (1984). The mild mentally handicapped adolescents are more likely to be placed on regular campuses with maximum exposure to nonmentally handicapped students where they can engage in more social comparisons which may result in many failures and experiences and observations that their academic performance is different from that of others. Here they are subjected to the same daily hassles as the nonmentally
handicapped peers. Their differential performance can become the subject of ridicule and grounds for labeling, peer rejection, social discrimination, and restricted opportunities. Since the mild mentally handicapped individuals are aware of these negative conditions, they can develop low self-esteem and low self-concept, leading to high frustration, learned helplessness, hopelessness and worthlessness.

The moderate mentally handicapped individuals may not be subjected to these same daily hassles that the nonmentally handicapped and the mild mentally handicapped individuals are faced with because they are more likely to be found in the protected environment offered by a special school where they have fewer demands placed upon them and may also receive greater social support, mediation, and protection from faculty and staff in these schools. Thus, the moderate mentally handicapped adolescents have fewer opportunities for social comparisons and fewer negative situations (discussed by Reiss and Benson, 1984) to deal with. Even if they did, they may not be as aware of the negative situations as the mild mentally handicapped adolescents (Reiss & Benson, 1984) due to their degree of mental retardation. Thus, the responses by the moderate mentally handicapped individuals to questions asked of them on various measures, especially depression, could be due to: providing socially acceptable responses, lack of
awareness of negative conditions, or not encountering many negative events because of social support and caretaker mediation, or a combination of these factors.

An in-depth knowledge of the adolescents and the academic environment of the adolescents who participated in this study provides confidence in the results and the interpretations made thereof. In short, though the moderate mentally handicapped are certainly vulnerable to depression and psychopathology they look resilient because of the buffering effects of social support and caretaker mediation. In future studies involving individuals with low intellectual functioning, assessing for social support and awareness of negative events will certainly be useful to better explain the lower depression symptoms exhibited by the moderate mentally handicapped adolescents.

The second hypothesis in this study was that adaptive behavior played a moderating role in the relationship between intellectual functioning and depression symptoms. Moderated regression analysis supported this hypothesis for the Child Depression Inventory, but not the Bellevue Index of Depression or the Reynolds Adolescent Depression Scale. For further followup analyses with the CDI as dependent variable simple analysis of slopes were used in order to define the nature of the interaction. The linear relationship between intellectual functioning and depression was weaker among adolescents who had higher
levels of adaptive behavior than among adolescents who had lower levels of adaptive behavior. As a result, adolescents who had limited intellectual functioning exhibited less depressive symptoms if they also had higher adaptive behavior.

The moderating effect of adaptive behavior with respect to the CDI observed in this study accounted for a small but statistically significant amount of variance. It is acceptable for an area of research that is new in which there are no prior research data for comparison. Although the strength of the relationship in the moderator regression has been quite modest, this is not surprising, however, when one considers the multitude of factors influencing the depressive process; some of which have been identified here and others that are yet to be identified. The present study examined one particular factor, adaptive behavior, which proved to be a significant moderator of the intellectual functioning-depression relationship for the Child Depression Inventory for the particular sample in this study.

Fewer variables, if any, act in isolation in the real world. There are numerous factors that could be contributing to the final outcome of a certain event with depressed adolescents. Poor academic performance, peer rejection, and poor self-esteem (Matson, 1989; Zeifman, 1979), are examples other than adaptive behavior. Adaptive
behavior was selected as one factor for the purposes of the present study. Adaptive behavior would be considerably easier to teach to mentally handicapped individuals than would be social skills. Adaptive behavior can be targeted as a variable for instruction with the mentally handicapped individuals, since it has been identified through this study, as a variable that reduces depressive symptomatology. Increase in adaptive behavior could conceivably bring forth increased reinforcer, attention, and social interaction (Lewinshon, 1974), this in turn could improve the outlook of the mentally handicapped individuals about themselves, about the world, and self-efficacy, which are conditions that are considered as factors leading to depression by Beck (1970).

Though there is no precedence with children, adult research has been conducted to justify such studies. Cassel (1976) and Cobb (1976) have shown that social support buffered against deleterious effects of stressful events. Arling (1987) found that instrumental social support protected elderly individuals suffering from physical infirmity against depressive symptoms. Krause (1986) also found that emotional impact of bereavement was buffered by several components of social support.

This study revealed a number of interesting results that can prompt future research. Results of this study went beyond confirming that the mentally handicapped individuals
experienced greater emotional difficulties, lower social skills, and general psychopathology, as has been identified in prior studies. It was established that groups of subjects differed significantly between levels of intellectual functioning. There are specific self, and socio-environmental conditions that may predispose and or act as precipitants to greater or lesser degree of depressive symptoms. More interestingly there was a conditional relationship between intellectual functioning and depression depending on the level of adaptive behavior. Individuals with low adaptive behaviors may in fact resort to maladaptive strategies resulting in greater depressive symptoms. These results need further validation.

Future studies would well serve the knowledge base in explaining the relationship between intelligence and depression by using some of the potential variables that have been identified above. The results obtained in this study suggests the need for research aimed at examining the relationship of other variables in affecting the relationship of depression. The potential validity of adaptive behavior in moderating the level of depression especially among the mentally handicapped adolescents should not be dismissed. Identifying variables that buffer, mediate, and suppress other variables in relation to depression could lead to better prevention and treatment
options for especially with mentally handicapped adolescents who are at present underserved.

Several limitations of the present work should be mentioned. First, it was found that the majority of the moderately mentally handicapped subjects who participated in this study come from a special school environment where the social support, attitude, and daily activities are different from the children in a regular school campus. It is possible that a different result might have been obtained if moderately mentally handicapped individuals were recruited from regular campuses. Second, a larger subject pool might have provided more power to reveal greater strength and form of the moderator interaction between intelligence and adaptive behavior. Third, it should be noted that all of the measures utilized in the present study were self-report. As Doerfler (1981) has pointed out, this reliance may sometimes be problematic, due to cognitive distortions in depression. Thus, further work might attempt to overcome this possible difficulty by supplementing these self-report measures with direct observation, and/or report from others.
REFERENCES


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THIS SURVEY IS A MEASURE OF SOCIAL BEHAVIOR. THIS ASSESSMENT INVOLVES RATING HOW OFTEN YOU DO THE BEHAVIORS OR FEEL LIKE IT SAYS IN THE SURVEY. BE SURE TO RATE HOW OFTEN EACH BEHAVIOR IS DONE, NOT WHAT YOU THINK A GOOD ANSWER WOULD BE. NO ONE WILL BE TOLD HOW YOU ANSWER.

<table>
<thead>
<tr>
<th></th>
<th>Not at All</th>
<th>A Little</th>
<th>Some</th>
<th>Much of the time</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
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<td>1. I make other people laugh (tell jokes, funny stories, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I threaten people or act like a bully.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I become angry easily</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I am bossy (tell people what to do instead of asking).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I gripe or complain often.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I speak (break in) when someone else is speaking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I take or use things that are not mine without permission</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I brag about myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I look at people when I talk to them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I have many friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I slap or hit when I am angry.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I help a friend who is hurt.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I cheer up a friend who is sad.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
14. I give other children a dirty look.  1 2 3 4 5
15. I feel angry or jealous when someone does well.  1 2 3 4 5
16. I feel happy when someone else does well. 1 2 3 4 5
17. I pick out other children's faults/mistakes  1 2 3 4 5
18. I always want to be first  1 2 3 4 5
19. I break promises  1 2 3 4 5
20. I tell people they look nice  1 2 3 4 5
21. I lie to get something I want  1 2 3 4 5
22. I pick on people to make them angry  1 2 3 4 5
23. I walk up to people and start a conversation  1 2 3 4 5
24. I say "thank you" and am happy when someone does something for me  1 2 3 4 5
25. I like to be alone  1 2 3 4 5
26. I am afraid to speak to people  1 2 3 4 5
27. I keep secrets well  1 2 3 4 5
28. I know how to make friends  1 2 3 4 5
29. I hurt others' feelings on purpose (I try to make people sad)  1 2 3 4 5
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>30. I make fun of others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>31. I stick up for my friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>32. I look at people when they are speaking</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<tr>
<td>33. I think I know it all</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>34. I share what I have with others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>35. I am stubborn</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>36. I act like I am better than other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>37. I show my feelings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>38. I think people are picking on me when they are not</td>
<td>1</td>
<td>2</td>
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<td>4</td>
</tr>
<tr>
<td>39. I make sounds that bother others (burping, sniffing)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>40. I take care of others' property as if it were my own</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<tr>
<td>41. I speak too loudly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>42. I call people by their names</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>43. I ask if I can be of help</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>44. I feel good if I help someone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>45. I try to be better than everyone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>46. I ask questions when talking with others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>I see my friends often</td>
<td>I play alone</td>
<td>I feel lonely</td>
<td>I feel sorry when I hurt someone</td>
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</tbody>
</table>
| 47.

I see my friends often

I play alone

I feel lonely

I feel sorry when I hurt someone

I like to be the leader

I join in games with other children

I get into fights a lot

I am jealous of other people

I do nice things for people who are nice to me

I ask others how they are, what they have been doing, etc.

I stay with others too long (wear out my welcome)

I explain things more than I need to

I laugh at other people's jokes and funny stories

I think that winning is everything

I hurt others when teasing them

I want to get even with someone who hurts me
SELF-REPORT INVENTORY OF GENERAL PSYCHOPATHOLOGY

Name: ____________________
Rater: ____________________
Date: ____________________

YES  NO

___ ___  1. Do you smile even when you are sad?
___ ___  2. Do you like to be alone most of the time?
___ ___  3. Do you worry about making friends?
___ ___  4. Do you enjoy things that are funny?
___ ___  5. Are you nervous most of the time?
___ ___  6. Do people know how you feel?
___ ___  7. Are you healthy?
___ ___  8. Do people have trouble understanding what you say?
___ ___  9. Do you keep all the rules where you live?
___ ___ 10. Have you ever tried to force someone else to take their clothes off?
___ ___ 11. Do you hear voices that upset you?
___ ___ 12. Do you care about what other people say to you?
___ ___ 13. Do you need a lot of help from other people?
___ ___ 14. Do you get a real excited feeling, when you see stocking or underwear?
___ ___ 15. Are you real happy some days, and real sad on other days?
___ ___ 16. Do you hate rules (such as don't do this and don't's do that)?
___ ___ 17. Do you like to dress like most men/women (same sex)?
___ ___ 18. Do you always try to make other people happy?
19. Do you get real upset when things get confusing?
20. Do you have a lot of pain?
21. Do you have lots of energy?
22. Is it bad to be sick?
23. Do people understand you? (check yes if noticeable speech disorder)?
24. Will you live a long time?
25. (to thin client) Have you lost a lot of weight? (to medium or heavy client) Have you gained a lot of weight?
26. Do you feel relaxed most of the time?
27. Are you happy that you are a man/woman? (same sex)
28. Do you think that other people try to take things from you?
29. Do you try real hard to act like a man/woman (same sex)?
30. Do you feel sad?
31. Have things been bad for you?
32. Do you get angry and fight with other people?
33. Do you worry a lot about your body?
34. Do you wish that you were a woman/man (opposite sex) instead of a man/woman (same sex)?
35. Do you think that things around you are safe?
36. Do people like to be with you?
37. When things go bad for you do you feel OK?
38. Do you like being with other people?
39. Are you a very nervous person?
40. Do you worry a lot?
41. Can you do most things on your own?
42. Do you get excited a lot?
43. Do you ever take all of your clothes off outside where other people can see you?
44. Do you complain about sickness or pain a lot?
45. Do you take things that only belong to you?
46. Do you like to talk with counselors when you feel sick?
47. Do you feel happy most of the time?
48. Do you get along well with people at home and at work?
49. Do you get along with lots of other people?
50. Do you like being with groups of people?
51. Do you breathe well?
52. Do you wish that you were a tree instead of a man/woman? (same sex)?
53. Do you like talking to new people?
54. Do you have trouble sleeping?
55. Do you think about one thing at a time?
56. Do you like collecting unusual things like old papers or garbage?
APPENDIX B
PARENT CONSENT FORM
(To be completed by primary care-taker)

I (Ramasamy Manikam) am inviting you and your child to participate in a study to find out how boys and girls feel, think, and act towards others.

Your consent to allow your child to participate is important to the success of this study. I feel that knowing how children feel, and think and act can give me information to help them and other children I work with in the school system.

If you agree to allow your child to participate in this study, your child will be asked to complete several questionnaires at school.

You may withdraw your consent to participate at any time during the study. You or your child's names will not be used in any way. Information from this study will not be made available to anyone else without your written permission. The information I obtain is purely for research and will not be put in your child's file at school or used for any other purpose.

If you have any questions about your participation in this study, now or after you have agreed to participate, please call me at 346-8581, or Dr. Johnny Matson my supervisor on this project (Professor and Director of Clinical Training and Graduate Studies, Psychology Department, Louisiana State University), at 388-8745.

I have read/ this has been explained to me, I understand my privileges and rights in agreeing to participate in this study.

I AGREE ___________ I DO NOT AGREE ___________

signed:__________________________ Date:______________
CONSENT FORM
(to be completed by child)

I (Ramasamy Manikam) am inviting you to participate in a study to find out how boys and girls feel, think, and act towards others.

Your consent to participate is important to the success of this study. I feel that knowing how children feel and think can give me information to help you and others I work with in the school system.

If you and your parents agree to participate in this study, you will be asked to complete several questionnaires. You will complete the questionnaire in the school.

You may withdraw your consent to participate at any time during the study. You or your parents names will not be used in anyway. Information from this study will not be made available to anyone else without your written permission. The information I obtain is purely for research and will not be put in your file at school or used for any other purpose.

If you have any questions about your participation in this study, now or after you have agreed to participate, please call me at 346-8581, or Dr. Johnny Matson my supervisor on this project (Professor and Director of Clinical Training and Graduate Studies. Psychology Department, Louisiana State University), at 388-8745.

Thank You

I have read/ this has been explained to me, and I understand my rights and privileges in agreeing to participate in this study.

I AGREE _______ I DO NOT AGREE _______

signed: ___________________________ Date: ___________
APPENDIX C

BEHAVIOR CHARACTERISTICS IDENTIFIED AS
SYMPTOMS OF DEPRESSION IN JOURNALS

Withdrawn (Morse, 1975)
Cries often (Stumphauzer, 1977)
Talks about Suicide (Stumphauzer, 1977)
Frequent temper tantrums (Gordon, 1981)
Disobedient (Gordon, 1981)
Truant (Gordon, 1981)
Runs away from house (Gordon, 1981)
Inhibited (Gordon, 1981)
Lacks interest in activities (Gordon, 1981)
Listless or bored (Gordon, 1981)
Aggressive behavior (Gordon, 1981)
Changes in school performance (Gordon, 1981)
Diminished socialization (Gordon, 1981)
Regression from social contact (Gordon, 1981)
Hypoactive (Kashani & Ray, 1983)
Excessive activity to mask depression (Derdeyn, 1983)
Hyperactive (Kashani & Ray, 1983)
Socially isolated (Kashani & Ray, 1983)
Frequent physical Complaints (Gordon, 1981)
Sleep disturbances (Gordon, 1983)
Loss of usual energy (Gordon, 1983)
Unusual changes in appetite or weight (Gordon, 1983)
Fatigue (Kashani & Ray, 1983)
Low Self-esteem (Morse, 1975; Ornstein, 1975)
Drifts into a world of fantasy (Morse, 1975)
Feels demoralized (Ornstein, 1975)
Low and unrealistic aspiration levels (Ornstein, 1975)
Generally sad, depressed, and unhappy (Gordon, 1981)
Angry (Derdeyn, 1983; Brendt & Kaiser, 1983)
Irritable (Kashani & Ray, 1983)
Apathetic (Kashani & Ray, 1983)
Feelings of hopelessness (Butler & Whipple, 1983)
Negative attitudes (Butler & Whipple, 1983)
Extremely shy (Callahons, 1979)
Psychoneurotic (Callahons, 1979)
Extremely fearful (Callahons, 1979)
Irrational beliefs (Kelly & Lahey, 1983)
Lonely (Berndt & Kaiser, 1983)
Feeling very stressed (Berndt & Kaiser, 1983)
Believes he has little control over what happens to him
(Banks & Goggin, 1983)
### APPENDIX D

**ALTERNATIVE SYMPTOM PRESENTATION OF DEPRESSION IN THE MENTALLY RETARDED PERSONS**

<table>
<thead>
<tr>
<th>SYMPTOM AREA</th>
<th>POSSIBLE PRESENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mood dysphoria</strong>&lt;br&gt;(sadness, feeling blue, hopelessness, anxiety, irritability)</td>
<td>withdrawal, somatic-complaints, aggression behavior regression sad facial expression</td>
</tr>
<tr>
<td><strong>Appetite disturbance</strong>&lt;br&gt;decreased appetite change</td>
<td>(assess by weight&lt;br&gt;weight loss&lt;br&gt;increased appetite&lt;br&gt;weight gain</td>
</tr>
<tr>
<td><strong>Sleep disturbance</strong>&lt;br&gt;difficulty falling asleep&lt;br&gt;awakening at night&lt;br&gt;fitful sleep&lt;br&gt;awakening too early in the morning&lt;br&gt;increased sleep</td>
<td>disruptive behavior at bedtime or during the night</td>
</tr>
<tr>
<td><strong>Psychomotor disturbance</strong>&lt;br&gt;lack of facial expression&lt;br&gt;appearing slowed up&lt;br&gt;agitation</td>
<td>behavior disorder of recent onset</td>
</tr>
<tr>
<td><strong>Motivation disturbance</strong>&lt;br&gt;loss of interest in usual activities&lt;br&gt;loss of sexual interest</td>
<td>apathy</td>
</tr>
<tr>
<td><strong>Activation disturbance</strong>&lt;br&gt;fatigue&lt;br&gt;loss of energy</td>
<td>change in productivity monitoring performance</td>
</tr>
</tbody>
</table>
| **Self-assessment disturbance**<br>feelings of worthlessness<br>excess/inappropriate guilt<br>feeling/self-recrimination | statements such as: "I'm dumb...stupid. no ones like me"
| **Cognitive disturbance**<br>poor concentration<br>indecisiveness | decrease in IQ on retesting |

* adapted from Sovner, and Hurley (1982). *Newsletter*, 1(1)
VITA

Ramasamy Manikam is a Malaysian Citizen of Indian origin. Born in Malaysia in 1946, he obtained his basic education in Malaysia. He obtained his Bachelor's and Master's degrees at Northern Illinois University in Dekalb, Illinois. He interned at Johns Hopkins Hospital and The Kennedy Institute, in Baltimore, Maryland. He is serving as a School Psychologist with the East Baton Rouge Parish School system, in Louisiana. His major areas of interest include research, teaching, and practice in Autism, Tourette Syndrome, Lesch-Nyhan Syndrome, Mental Retardation, Developmental Disabilities, and Behavioral Medicine.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Ramasamy Manikam

Major Field: Psychology

Title of Dissertation: Assessment of Depression in Adolescents: Relationship between IQ, Depression and Adaptive Behavior

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

October 29, 1991