

A LONGITUDINAL STUDY OF CHILDHOOD RISK FACTORS FOR
HOSPITALIZATION UNDER A DEPRESSION RELATED DIAGNOSIS

by

MARCIA SUE HERINGA

(Under the Direction of Roy P. Martin)

ABSTRACT

A number of prenatal, early childhood, and middle childhood factors were studied to determine their utility for predicting hospitalization for depression. Data were acquired from the Helsinki Longitudinal Temperament Project, an ongoing longitudinal study of a Finnish birth cohort (N = 6401) that includes temperament, medical, and demographic data. The present study focuses on the 61 members of the birth cohort who were hospitalized under a depression related diagnosis (major depressive disorder, dysthymic disorder, bipolar disorder, or adjustment disorder/brief depressive reaction) prior to the age of 23. Specifically, prenatal smoking, fever, and nausea; infant and preschool temperament; age 12 behavior problems; maternal hospitalization history; and demographic data were analyzed. Temperament was assessed with Finnish versions of the Carey Infant Temperament Scale, the Thomas, Chess, and Korn Temperament Questionnaire (preschool), and behavior problems with the Lambert-Hartsough-Wrede Adjustment Difficulty Scale (Age 12 behavior problems). Chi-square analyses revealed gender, birth order, and maternal hospitalization for blood disorder, digestive problems, accidents, and psychosis to be significant predictors of hospitalization for depression. Temperament and behavior problems are discussed in terms of trends as data were available for an insufficient number of subjects to perform the analyses. More subjects than expected had deviations from average on one or more temperament scales. Independently, the Fussy/Demandingness infant scale and the preschool Negative Emotionality and Lack of Task Persistence scales appear to predict hospitalization for depression. Suggestions for further research involving larger sample sizes and formulating maternal hospitalization profiles of at-risk children are offered.

INDEX WORDS: Depression, Temperament, Prenatal Conditions, Longitudinal study, Children, Gender, Maternal hospitalization, Hospitalization

A LONGITUDINAL STUDY OF CHILDHOOD RISK FACTORS FOR
HOSPITALIZATION UNDER A DEPRESSION RELATED
DIAGNOSIS

by

MARCIA SUE HERINGA

B.A., The University of Michigan, 1996

M.Ed., The University of Georgia, 1998

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in
Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2002

© 2002

Marcia Sue Heringa

All Rights Reserved

A LONGITUDINAL STUDY OF CHILDHOOD RISK FACTORS FOR
HOSPITALIZATION UNDER A DEPRESSION RELATED DIAGNOSIS

by

MARCIA SUE HERINGA

Major Professor: Roy P. Martin

Committee: Linda Campbell
George Hynd
R.W. Kamphaus
Michelle Lease

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
December 2002

ACKNOWLEDGEMENTS

The chapters that follow bring an end to one of the most challenging, memorable, and enjoyable chapters of my life, the graduate school experience. I have many thanks to give. First I would like to thank Roy Martin for his guidance, expertise, moral support, and for helping me realize that I was capable of completing this task. I also wish to acknowledge the other members of my committee, Linda Campbell, George Hynd, Randy Kamphaus, and Michelle Lease for lending their expertise, support, and assistance. Also, a note of thanks to Demetrius Smith for helping to facilitate the paperwork during my year of exile in the desert (a.k.a, internship in Arizona) and to Joe Wisenbaker, for his assistance in solving statistical dilemmas.

I wish to acknowledge my friends and family for their support and love, for patiently listening, and helping me maintain my sanity. In particular, I wish to thank my dear friend Ara Schmitt, a veteran of this experience himself, for his advice, support, and reassurance. You endured numerous late night, anxiety-ridden phone calls and always helped put things back into perspective. I also wish to thank Mr. Fuzzles, my favorite canine, for his unconditional love and for sitting on my lap and keeping me company during hours of endless typing.

Finally, I especially wish to thank my recently deceased grandfather, Orvis Poorman, for his love, generosity, and for modeling strength of character. You were always there to help me “get through the rough spots”, both financially and spiritually. I miss you terribly and will be eternally grateful for your assistance.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES	viii
CHAPTER	
1 INTRODUCTION.....	1
Problem	1
Purpose	5
Hypotheses	5
Limitations	6
Definition of Terms	7
2 LITERATURE REVIEW	12
Family Factors.....	12
Cognitive Factors	20
Biological Factors.....	22
Organic Dysfunctions and Medications Related to Bipolar Disorder	24
Temperament.....	26
Relationship between Temperament and Psychopathology	28
Relationship between Anxiety and Depression.....	46
Gender Differences.....	48

3	METHOD.....	52
	Participants.....	52
	Hospitalization Data.....	53
	Diagnoses.....	53
	Instruments.....	56
	Procedures.....	59
4	RESULTS.....	61
	Comparison of Depressed and Control Groups on Prenatal Conditions.....	61
	Temperament and Behavior Ratings of Depressed Subjects.....	61
	Relationship of Infant Temperament, Preschool Temperament, and Age 12 Behavior Ratings.....	65
	Additional Analyses.....	67
	Diagnostic Group Analyses.....	70
5	DISCUSSION.....	76
	Hypothesis 1.....	76
	Hypothesis 2.....	77
	Hypothesis 3.....	79
	Additional Analyses.....	79
	Limitations.....	84
	Conclusion.....	87
	REFERENCES.....	89

LIST OF TABLES

	Page
TABLE	
1 Depression Related Diagnoses, Corresponding <i>ICD-9-CM</i> Codes, and Number of Subjects Assigned Each Diagnosis	54
2 Lambert-Hartsough Wrede Adjustment Difficulty Scale Items	60
3 Association of Hospitalization for Depression with Maternal Pregnancy Conditions	62
4 Infant and Preschool Temperament by Diagnostic Category	64
5 Age 12 Behavior Problem Ratings by Teacher	66
6 Associations of Hospitalization for Depression with Demographic Variables.....	68
7 Comparison of Depressed and Control Groups on Maternal Hospitalization.	71
8 Demographic and Prenatal Conditions by Diagnosis.....	73

CHAPTER 1

INTRODUCTION

Problem

Depression is a problem that affects a significant proportion of the population. The lifetime risk for major depressive disorder (MDD), recurrent, the diagnosis assigned when a person has experienced more than one major depressive episode, is 10 - 25% for women and 5 -12% for men (APA, 1994). At any given time, it is estimated that between 5% and 9% of women and between 2% and 3% of men meet criteria for MDD (APA, 1994). Dysthymic disorder (DD), a chronic pattern of depressed mood and associated symptoms, is estimated to affect 3% of the population (equally distributed across genders) at any given time. The lifetime risk for dysthymic disorder is estimated to be 6%, for both males and females (APA, 1994).

Bipolar disorders, disorders that involve manic or mixed episodes and sometimes major depressive episodes, are also common. The lifetime risk for bipolar I disorder, characterized by manic episodes or mixed episodes and major depressive disorders, is estimated to be between 0.4% and 1.6%. Similarly, the lifetime risk for bipolar II disorder, which is characterized by major depressive episodes and hypomanic episodes, is estimated to be about 0.5%.

According to Hall and Wise (1995), depressive disorders cost the United States economy approximately \$44 billion dollars in 1990. Hospitalization is one of the costliest factors associated with depression. Richman, Richman, and Richman (2000)

examined the cost of hospitalization for depression in various hospital settings throughout Nova Scotia, Canada. They tracked the hospitalizations for depression of 4,383 adults over a 3-6 year period. They found that the average per person cost for all of the individuals in the sample was \$21,800. For the 10% of the sample that accrued the highest expenses, the average cost was \$111,644 per person.

A second factor contributing to the high cost of depression is linked to reduced levels of employee productivity and greater rates of disability and absenteeism from work (Rupp, 1995). Depression can be even more costly to employers than physical illnesses. Druss, Rosenheck, and Sledge (2000) compared the disability and health costs (including mental health costs, medical costs, and cost of absenteeism) of depression, heart disease, diabetes, hypertension, and back problems among 15,153 employees of a major U.S. corporation. The annual per capita health cost of employees treated for depression (\$5,415) was approximately equal to the cost of heart disease, diabetes, and back problems and significantly greater than the cost of hypertension. In terms of absenteeism, depression was related to more sick days per year (an average of 9.86 sick days) than any of the other conditions.

However, the most devastating effect of depression is the human suffering it causes. It significantly interferes with the quality of life and level of functioning of affected individuals. It also has a significant impact on the friends, family, and co-workers of individuals with depression because individuals with depression behave differently than they do when they are not depressed. For instance, depressed individuals may isolate themselves from friends and family, be irritable, be angry, and induce a significant amount of stress on the family system. In fact, depression can even lead to

premature death if untreated (Rupp, 1995). Therefore, depression is a serious problem that needs fast, effective solutions and preventive measures.

New advances are continuously being made in the treatment of depressive disorders. For instance, cognitive-behavioral therapy techniques such as those described by Beck (1995) have been shown to be effective (Dobson, 1989). In addition, new psychotropic drugs have been discovered to effectively treat depression (e.g., Zoloft, Prozac, Serzone) (Medical Economics, 2002).

Despite gains in treatment effectiveness, much less is known about how to prevent depression. One of the first steps in preventing depression is identification of individuals who are likely to develop depression. If depression, and/or the potential for developing depression can be detected at early ages, intervention can occur at early ages, thus minimizing the amount of suffering affected individuals experience.

Several researchers have found temperament to be a useful predictor of depression. For example, Caspi, Henry, McGee, Moffitt, and Silva (1995) found level of approach (the willingness to participate in novel situations) as assessed in early childhood to be significantly negatively related to internalizing problems during late childhood/adolescence in males. In other words, males who exhibited the poorer adaptability to new situations as young children were the most likely to display symptoms of internalizing disorders as older children or adolescents.

Cole, Zahn-Waxler, Fox, Usher, and Welsh (1996) found a relationship between expressiveness of emotions at preschool age and number of symptoms of dysthymia and overanxious disorder at the end of the second half of the first grade (an average of 2.45 years later). Children in their inexpressive (low on emotional expressiveness) group self-

reported more symptoms of dysthymia and overanxious disorder than children in their moderately expressive and expressive groups. Similarly, mothers of children in the inexpressive group endorsed more items on mood screening questionnaires (the DICA-R) on their children than mothers of expressive children. In fact, based on the results of the mood screening questionnaires completed by the children's mothers, 66.7% of the inexpressive children as opposed to 25% of the expressive children met criteria for a mood disorder.

Clark, Watson, and Mineka (1994) found a negative relationship between positive emotionality and depression. Specifically, they identified a low score on a measure of positive emotionality as a risk factor for the development of depression, and as predictive of poor prognosis for depression. Their finding is logical given that positive emotionality refers to the expression of happiness, as through laughter and smiling. It is not surprising that the less children laugh and smile, the more likely they are to be depressed and vice versa.

In addition to temperament, several other factors have been linked to depression including cognitive factors, biological factors, and family of origin. However, temperament is of particular interest because it is observable and relatively easy to assess, even in very young children. In addition, there are a number of relatively simple environmental and behavioral modifications that can be made to accommodate temperament characteristics. For instance, a child who is highly active can be placed on a regular exercise program or participate in team sports as a way to exert some of their energy. Therefore, if temperament characteristics that predict depression can be identified in very young children, intervention methods (such as environmental and

behavioral change) can be created which have the potential to reduce the risk that the child will develop depression.

Purpose

The present study will examine the utility of temperament, teacher ratings of behavior problems at age 12, demographic characteristics, birth month, birth order, parental age at birth, prenatal complications (i.e., fever, nausea, and smoking), and maternal hospitalization history for predicting hospitalization for depression. Infant (n= 2018) and age five temperament characteristics (n = 1114, 54.2% boys and 45.8% girls) of children from the Helsinki region of Finland will be examined. Medical records will be examined, which include all hospitalizations until age 22 or 23 (depending on the individual 's date of birth). The infant (ages 6-8 months) and age five temperament characteristics of individuals in the sample who had been hospitalized for depression prior to the conclusion of the study (when the individuals were 22 and 23-years-old) were contrasted with individuals who had never been hospitalized for depression. Teacher behavior ratings at age 12 will also be analyzed. In addition, the two groups will be compared on gender distribution, socioeconomic status (SES), birth order, birth month, parental age at birth, prenatal factors (i.e., fever, nausea, and smoking) and maternal hospitalization history (both psychiatric and non-psychiatric).

Hypotheses

It is hypothesized that there will be several differences between the non-depressed and depressed subjects:

Hypothesis 1: Significant differences will exist between the non-depressed and depressed groups in maternal prenatal conditions (e.g., maternal nausea, smoking,

fever), such that mothers in the depressed group will have experienced more negative conditions.

Hypothesis 2: Significant differences in temperament characteristics between the two groups are hypothesized; in particular, the depressed group is expected to exhibit more negative emotionality.

Hypothesis 3: Age 12 teacher behavior ratings will differ significantly between the depressed and non-depressed subjects; the depressed group is expected to exhibit more behavior problems.

Limitations

One limitation of this study is that only depressed individuals who have been hospitalized are included in the sample. Therefore, there may be many others in the sample who met criteria for major depressive disorder (MDD) or dysthymia but were not hospitalized. There may be many factors that separate depressed individuals who are hospitalized for depression from depressed individuals who are not hospitalized for depression such as severity of depression, amount of anger, etc. In addition, many of the other individuals in the sample were hospitalized for mental health problems but diagnosed with disorders other than MDD and dysthymia such as schizophrenia, adjustment disorder, or an anxiety disorder. It is common for individuals with other mental disorders to have comorbid depression. Therefore, these individuals may have experienced significant levels of depression in addition to symptoms of the disorder with which they were diagnosed and they may have been hospitalized as a result of the depression and not the other disorder.

A second limitation is that the sample lacks diversity. The vast majority of the children are Caucasian and of Finnish descent and those in the minority were predominantly Caucasian and from other Scandinavian countries (i.e., Denmark, Norway, and Sweden). Therefore, results may not generalize to non-Caucasian, non-Scandinavian youth.

Definition of Terms

Activity Level: A temperament characteristic that refers to the individual's preference for engaging in and tendency to engage in gross motor activity as opposed to quiet, non-active behavior.

Behavioral Activation System (BAS): The neurological system in animals that responds to cues of reward and cues of punishment removal (Gray as cited in Martin & Bridger, 1999).

Behavioral Inhibition System (BIS): The neurological system in animals that responds to novelty, cues of reward removal, and cues of punishment. When the BIS is activated, the current behavior is discontinued and the animal experiences an increase in arousal (Gray as cited in Martin & Bridger, 1999).

Behavior Regulation: Behavior regulation is the ability to control how one's impulses and feelings are expressed behaviorally (Eisenberg, Fabes, Shepard, Murphy, Guthrie, Jones, Friedman, Poulin, & Maszk, 1997).

Bipolar Disorders: According to *DSM-IV*, bipolar disorder I, formally referred to as manic depressive disorder, is characterized by the experience of at least one manic episode or mixed episode and often one or more major depressive episodes. A manic episode is defined as a period of at least one week (or any duration if hospitalization is

required) characterized by unusually and persistently elevated or irritable mood. During this period, three or more (four or more if the mood is predominantly irritable) of the following symptoms are present: 1) inflated self-esteem or grandiosity, 2) decreased need for sleep, 3) more talkative than usual or pressure to keep talking, 4) flight of ideas or subjective experience that thoughts are racing, 5) distractibility, 6) increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation, 7) excessive involvement in pleasurable activities that have a high potential for painful consequences (APA, 1994). A mixed episode is an at least one week period during which criteria are met for both a manic episode and a major depressive episode (APA, 1994). Bipolar II disorder is characterized by at least one major depressive episode and at least one hypomanic episode. A hypomanic episode is identical to a manic episode except that it is less intense and may be shorter in duration (4 or more days instead of a week or more) (APA, 1994).

Diagnostic and Statistical Manual of Mental disorders (DSM): The *DSM* is a listing of research based diagnostic criteria for all disorders considered mental in nature. Each mental disorder is assigned a numeric code (e.g., major depressive disorder, single episode is assigned the numeric code 296.2x in *DSM-IV*).

Dysthymic Disorder: Dysthymic disorder (DD) is a chronic pattern of depressed mood and associated symptoms. More specifically, it is characterized by depressed mood most of the day, for more days than not for at least 2 years (in children and adolescents it can be irritable mood and the duration must be at least 1 year). While the individual is depressed at least 2 of the following symptoms are present: poor appetite or overeating; insomnia or hypersomnia; low energy or fatigue; low self-esteem; poor concentration or

difficulty making decisions; feelings of hopelessness. The symptoms must not be better accounted for by major depressive disorder and cannot be absent for more than 2 months. However, after the first 2 years of the presence of dysthymic disorder a person may experience a major depressive disorder and still be considered dysthymic. The combination of the two disorders is commonly referred to as double depression.

Impulsivity: Impulsivity is a temperament characteristic that refers to the tendency to act without first considering the possible detrimental consequences to that behavior.

Inhibition: Inhibition is a temperament characteristic that refers to the tendency to initially avoid, become upset by, or display downcast affect in response to unfamiliar people, situations, and objects (Kagan, 1998).

Internalizing Disorders: The category of mental syndromes (depressive and anxiety disorders) characterized by inner-directed symptomatology (Reynolds, 1990) such as worry, sadness, and the physiological correlates of heightened autonomic activity (e.g., high heart rate).

International Classification of Diseases (ICD): A listing of all medical conditions, including mental disorders, and their diagnostic criteria. Each condition is assigned a numeric code. For example, major depressive disorder is assigned the number 296.2 in *ICD-9*.

Major Depressive Disorder (MDD): There are two major categories of major depressive disorder: major depressive disorder, single episode and major depressive disorder, recurrent. Major depressive disorder, single episode is diagnosed when a single major depressive episode has occurred. Major depressive disorder, recurrent is diagnosed

when two or more major depressive episodes have been present. In order for the two episodes to be considered separate a two-month period in which criteria for major depressive episode were not met must have been present in between them. Exclusionary criteria for both include absence of a manic, mixed, or hypomanic episode and that the major depressive episodes are not secondary to schizophrenia, schizophreniform disorder, delusional disorder, or psychotic disorder not otherwise specified. *DSM-IV* criteria for a major depressive episode include: depressed mood most of the day, nearly every day (in children and adolescents, can be irritable mood); anhedonia; significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day (in children, consider failure to make expected weight gains); insomnia or hypersomnia nearly every day; fatigue or loss of energy nearly every day; feelings of worthlessness or inappropriate guilt; indecisiveness or difficulty concentrating; recurrent thoughts of death, recurrent suicidal ideation, or a suicide attempt, etc. Five or more symptoms must have been present during the same 2-week period and have been a departure from previous functioning. At least one of the symptoms must be either depressed mood or loss of interest or pleasure (APA, 1994).

Negative Emotionality (Affectivity): Children who obtain high scores on measures of negative emotionality tend to be irritable, fussy, generally prone to distress, and emotionally reactive (Martin & Bridger, 1999). Negative Emotionality is a temperament characteristic that refers to an individual's tendency to become emotionally upset. It can be specifically related to the experience of and expression of frustration based emotion such as irritability, anger, sadness/crying when access to reward is

blocked. It can also refer to the level of intensity with which the negative emotions such as fear or distress are expressed (Eisenberg et al. 1997).

Overanxious disorder: Overanxious disorder is a diagnosis listed in the *DSM-III-R* (APA, 1987) that is characterized by excessive unrealistic anxiety and/or worry for a period of at least six months. It usually onsets during childhood.

Positive Emotionality (Affectivity): Positive emotionality is a temperament characteristic that is associated with the frequency of expression of happiness and joy, such as through smiling and laughing (Martin & Bridger, 1999).

Rhythmicity of Biological Functions (Biological Irregularity): Rhythmicity of biological functions refers to the extent of regularity of the child's natural biological functions (i.e., sleep, eating) (Thomas & Chess, 1977 as cited in Goldsmith, 1987).

Task Persistence: Task persistence is a temperament characteristic that includes ability to regulate attention and ability/willingness to continue a difficult task.

Temperament: Temperament is the biological basis for individual differences in behavioral tendencies (Martin, Wisenbaker, Baker, & Huttunen, 1997) such as response to reward and punishment, emotional intensity, sociability, and ability to regulate attention. Most researchers agree that it is observable at a very early age and is relatively stable throughout life (Martin & Bridger, 1999).

CHAPTER 2

LITERATURE REVIEW

Many factors have been found to relate to depression including family of origin factors, neuropsychological factors, genetics, cognitive factors, and temperament. A brief review of these classes of variables is provided and followed by a more detailed review of the temperament literature as it relates to depression.

Family Factors

Several specific factors related to family functioning have been associated with depression in children. For instance, Crook and Raskin (1975) found that marital problems and intentional parent/child separation are substantially correlated with severe depression. Witnessing domestic violence (Pfouts, Schopler, & Henley, 1982), and experiencing poor parenting, physical or sexual abuse (Blumberg, 1981) are also related to depression in children. In general, Birmaher (1996) described the families of depressed children as conflict-ridden and noted that one or more other family members also tend to meet criteria for a mood disorder.

The fact that family members of depressed individuals have higher rates of mood disorders themselves could support a genetic link or could be the result of a shared maladaptive environment. It is also possible that being raised by a depressed parent or raising a depressed child causes both parent and child to be depressed. However, Field (1995) concluded that infants of depressed mothers showed signs of depressive mood as early as eight months of age. She found that if the mother's depression remitted, so did

the infant's depression. In one study of 227 children from 29 families with a depressed parent and 41 families without a depressed parent eight were found to have a diagnosis of depression. All eight had at least one depressed parent (Welner, Welner, McCrary, & Leonard as cited in Billings & Moos, 1983). It is likely that there is a reciprocal relationship between the overall family environment and the behavior of individual family members (Billings & Moos, 1983). That is, parental depression may result from or be exacerbated by an unsupportive marriage or disturbed family relationships. On the other hand, parental depression has the potential to exacerbate marital or family problems.

A depressed child may have similar results on family functioning. For instance, it has been demonstrated that depressed children elicit more negativity from adults than non-depressed children (Mullins, Peterson, Wonderlich, & Reaven, 1986). Thus, depressed children indirectly make their environment worse (increasing the amount of parental negativity) through their behavior as a depressed individual. For example, depressed children may lack the energy necessary to complete homework and household chores. As a result, the parents reprimand the child for not completing the tasks required of him or her. Consequently, the child becomes more depressed as a result of the parental criticism and the cycle continues to escalate.

Studies of the families of origin of depressed adults have found them to be characterized by many of the same patterns described above (Arieti & Bemporand, 1980; Orvaschel, Welsh-Allis, & Ye, 1988). Orvaschel et. al. (1988) reported that the families of origin of depressed adults were more frequently characterized by parental rejection, abuse, lack of attention, conflict, and greater instance of parental psychopathology than

the families of origin of control subjects. Arieti and Bemporand (1980) obtained similar results. They describe the family structures as being highly stable, having one parent that was dominant over the other, and demanding strict adherence to expected ways of behaving. Misbehavior was punished by threats of abandonment or inducing guilt or shame.

Family of Origin Characteristics in Bipolar Disorder. Davenport, Adland, Gold, et al. (1979) completed a case study of the families of origin of 6 individuals who were hospitalized for mania. Several common characteristics were found among the families including; social isolation, tendency to avoid affect, and adherence to unrealistic standards of conformity. In contrast, Cooke, Trevor Young, Mohri, Blake, and Joffe (1999) found the families of origin of individuals with bipolar disorder were similar to those of mentally healthy controls.

Todd (1997) found higher rates of alcoholism in adult relatives of bipolar children (20.3%) than in adult relatives of children with unipolar depression (12.3%). Alcoholism has been found to correlate significantly with mood disorders (Tyndel, as cited in Weissman & Klerman, 1977) and Tyndel theorizes that it may explain the gender difference in rates of unipolar depression (i.e., women are more likely than men to have unipolar depression, men are more likely than women to have alcoholism). However, it may not be the case that having adult relatives with alcoholism increases a child's likelihood of developing bipolar disorder. It may be that raising a child with the disorder is significantly more stressful than raising a child with unipolar depression and that more adults with bipolar children turn to alcohol as a means of self-medication for stress.

Genetic Factors. It is difficult to partial out the genetic and family environment factors that correlate with depression since people who are genetically similar (i.e., families) often share the same family environment. As a result, most studies on the genetic basis of depression have not been designed in a way that allows the separation of genetics and environmental factors (Mash & Barkley, 1996). For instance, Sullivan, Neale, and Kendler (2000) conducted a meta-analysis of family and twin studies of the genetic and environmental influences on major depression. They found that first degree relatives of subjects with major depression were much more likely to also have major depression than first degree relatives of subjects who did not suffer from major depression. However, as the authors note, a study of familial aggregation of individuals with major depression cannot separate genetic and environment influences. The fact that a diagnosis of major depression in one family member is a useful predictor of whether or not any other family members meet criteria for major depression could result from shared environment, shared genetics, or a combination of the two.

Twin studies are useful for separating genetic and environmental factors. Most twin studies on affective disorders compare the concordance rates of affective disorders between monozygotic twins, dizygotic twins, and sometimes other family members. Because both monozygotic and dizygotic twins share more similar environments than other family members (as a result of being the same age, in the same grade at school, etc.) yet have different degrees of genetic similarity (monozygotic twins are nearly genetically identical and dizygotic twins share only some genetic characteristics), a comparison of concordance rates among them is useful for determining the separate influences of genetics and environment.

Rende, Plomin, Reiss, and Hetherington (1993) analyzed genetic and environmental factors of depressive symptomatology in adolescent monozygotic twins, dizygotic twins, full siblings, half siblings, and biologically unrelated (step) siblings. The individual heritability was found to be 34%. Similarly, Wierzbicki (1987) found a heritability of 35% for subclinical depressive symptoms.

Sullivan et al. (2000) also completed a meta-analysis of twin studies. Through statistical analysis, they were able to separate genetic and environmental factors. They found that shared environmental factors are unlikely to contribute significantly to concordance of depression in twins. However, they found that environmental factors specific to individuals were a significant predictor of major depression. Sullivan et al. (2000) determined the heritability of major depression to be in the range of 31% - 42%, which is consistent with the estimates of Rende et al. (1993) and Wierzbicki (1987) (34% and 35%, respectively).

There is also evidence for genetic influence on suicide attempt and/or completion (e.g., Roy, Segal, Centerwall, & Robinette, 1991; Roy, Segal, & Sarchiapone, 1995; Schulsinger, Kety, & Rosenthal, 1979). It must be noted that although a large percentage of persons who attempt and/or complete suicide suffer from a depressive disorder or at least some depressive symptoms, not all do. Other individuals, such as those who are impulsive, under the influence of alcohol or drugs, or meet criteria for schizophrenia or a personality disorder may also attempt and/or complete suicide.

Roy et al. (1991) studied monozygotic and dizygotic twin pairs in which at least one twin had committed suicide. In 9 of the 176 studied twin pairs, both twins had committed suicide. Seven of the 9 twin pairs in which both twins had committed suicide

were monozygotic, which is interesting given that there were almost twice as many dizygotic twin pairs as monozygotic twin pairs in the sample (114 and 62, respectively).

Roy et al. (1995) studied a sample of 35 living individuals whose twin (26 monozygotic, 9 dizygotic) had committed suicide. None of the 9 dizygotic twins had attempted suicide themselves but 10 of the 26 monozygotic twins had made such attempts, a difference the authors found to be statistically significant.

The results of Roy et al. (1991) and Roy et al. (1995) suggest that because monozygotic twins are more genetically similar than dizygotic twins and there are higher rates of concordant suicide attempts and/or completion in monozygotic twins than in dizygotic twins, there is evidence for a genetic factor in suicide and suicide attempts. However, it is possible that monozygotic twins share a closer emotional bond than dizygotic twins and that the higher rates of concordance are the result of monozygotic twins being more affected by the loss of their twin than dizygotic twins.

Furthermore, monozygotic twins are always of the same gender whereas dizygotic twins can be of different genders. Twins who are the same gender are likely to have more shared environmental characteristics than those of different genders because they are more likely to elicit similar expectations and treatment from parents, be exposed to some of the same social pressures (e.g., pressure for girls to be attractive, pressure for males to be physically and emotionally strong).

Adoption studies are particularly useful for ferreting out environmental and genetic contributors to the development of depression because adopted individuals share genetic factors with their biological relatives but not environmental factors. Schulsinger et al. (1979) found that a significantly ($p < .01$) larger portion of the biological relatives of

adopted suicide completers had committed suicide than the biological relatives of the adopted controls. The fact that there was a statistically significant difference between the two groups, with the group of suicide completers having a larger percentage of biological relatives who completed suicide than the control group suggests that there may be more of a genetic component than an environmental one in suicide completion. However, the number of biological relatives of suicide completers who had also completed suicide was low in both groups in comparison to the number of biological relatives who had not completed suicide. In the adopted group who had completed suicide, 12 of their 269 biological relatives had completed suicide compared with 2 of the 269 biological relatives of the adopted controls. Therefore, this difference may not be clinically meaningful.

Wender, Kety, Rosenthal, and Schulsinger (1986) compared the rates of mood disorders in biological relatives of adopted adults with a mood disorder and adopted adults without a mood disorder. Mood disorder rates were significantly higher in the biological relatives of the adopted individuals who met criteria for a mood disorder. In particular, higher rates of unipolar depression, alcoholism, and attempted/completed suicide were found in the biological relatives of adoptees with mood disorders.

Family Concordance Rates and Genetics in Bipolar Disorder. There is significant empirical evidence to support the role of genetics in bipolar disorder. According to the *DSM-IV*, first degree biological relatives of individuals with bipolar I disorder have elevated rates of bipolar I disorder (4-24%) and bipolar II disorder (1-5%) (APA, 1994). Based on literature review, Papolos and Papolos (1999) reported similar rates to those cited in the *DSM-IV*. Children of bipolar parents are more likely than those in the general population to develop bipolar disorder. If one parent is afflicted, the offspring have a 15-

30% chance of being afflicted. When both parents have bipolar disorder, their children have a 50-75% chance of also having bipolar disorder. The concordance rate for fraternal twins and other siblings is estimated to be between 15% and 25%. However, the identical twin of a bipolar individual has a 70% chance of having bipolar disorder (Papolos & Papolos, 1999).

Krauthammer and Klerman (1978) reported that up to 85% of bipolar patients have at least one family member with an affective disorder. A longitudinal study of an Amish family in Pennsylvania also demonstrated strong evidence for the role of genetics in bipolar disorder (Egeland & Hostletter, 1983; Egeland et. Al, 1987). Of 81 family members, 19 were afflicted with bipolar disorder.

It must be noted that concordance rates among family members may not solely be the result of genetics. Shared environment and shared stressors may also play a role. Although the rates of concordance increase as genetic similarity increases, the amount of shared environmental factors is also likely to increase with genetic similarity. The fact that having two bipolar parents versus one bipolar parent increases likelihood of developing the disorder is also not necessarily evidence for a genetic role in bipolar disorder. The environment experienced by children with two bipolar parents is likely to be more dysfunctional and chaotic than the environment experienced by children with one bipolar parent. Furthermore, the child with two bipolar parents is without a model of normal mental health functioning within the home whereas the child with one bipolar parent may have the other parent as a model of how to live a mentally healthy life.

Studies of twins who were adopted by different families are among the most useful means of helping to resolve the nature versus nurture issue in origins of bipolar

disorder. Papolos and Papolos (1999) reported that in a study of 12 pairs of identical twins who were separated at birth and adopted by different families, 8 of 12 (67%) of the pairs were concordant for bipolar disorder (i.e., in 8 of the 12 cases if one twin had bipolar disorder, the other had bipolar disorder).

Studies of identical twins who were raised together reveal concordance rates of approximately 75%. Although the rates of bipolar disorder do not differ drastically among identical twins raised apart and identical twins raised separately, the results do not exclude the possibility of environmental influences on the development of the disorder.

Many researchers have attempted to link bipolar disorder to specific chromosomes. Egeland et. al, (1987) initially found support for a link to chromosome 11. However, as time progressed and additional family members developed the disorder, the evidence for the relationship failed to remain significant. Three separate studies have found evidence for linkage of bipolar disorder to chromosome 18 (Papolos & Papolos, 1999, p. 160). However, the studies yielded drastically different results regarding the location on chromosome 18, which reduces the impact of these findings.

Cognitive Factors

A variety of cognitive factors have been associated with depression. One popular theory for explaining depression is the learned helplessness theory (Abramson, Seligman, & Teasdale, 1978). The learned helplessness theory states that depressed affect is the result of perceiving that one does not have control over what happens to them (Abramson, et al., 1978). The key element of the hypothesis is that learning that outcomes are not within one 's control leads to deficits in three areas: motivation; affect; and cognition. A cognitive deficit arises because learning that her/his actions have no

impact on outcomes impedes future learning that certain actions do lead to changes in outcome.

The reformulated learned helplessness model (Abramson et al., 1978) defines a person's attributions for outcomes as being global or specific, stable or unstable, and internal or external. Global factors affect a wide range of outcomes, whereas specific factors affect only one area. Stable factors remain constant over time, whereas unstable factors are temporary. Internal factors are within the person's control, while external factors are not. Therefore, there are eight kinds of attributions people can make for situations: global, stable, internal; specific, stable, internal; global, unstable, internal; specific, unstable, internal; global, stable, external; global, unstable, external; specific, unstable, external; and specific, stable, external.

In this reformulated learned helplessness model (Abramson et al., 1978), vulnerability to depression is thought to be a result of a pattern of attributing negative events to global, stable, and internal factors. This attribution pattern leads the individual to believe that future negative events are uncontrollable and renders the person feeling hopeless and helpless. Such hopeless and helpless thoughts are hypothesized to be core factors in depression (Hammen, 1990).

Abramson et al. (1978) found that symptoms of depression and attribution style were strongly correlated in children. Children who attributed negative events to stable, global, and internal factors were more likely to have symptoms of depression than those who made unstable, specific, external attributions for the negative events. Benfield, Palmer, Pfefferbaum, and Stowe (1988) noted that depressed children in their study attributed positive outcomes to unstable and specific factors. They also noted that the

more the children attributed negative events to stable factors and positive events to external factors the more depression they reported.

Some have argued that the depressive attribution style (attributing negative outcomes to global, stable, and internal factors) is not specific to depression but is associated with other types of psychopathology as well (i.e., Kaslow, Rehm, & Siegel, 1984). However, the results of many other studies indicate that the depressive attribution style is specific to depression (Kaslow et al., 1984; Kazdin, French, Unis, Esveldt-Dawson, & Sherick, 1983; Stark, Humphrey, Laurent, Livingston, & Christopher, 1993). Stark and colleagues (1993) compared the attribution styles of depressed children with the attribution styles of anxious children and found the depressed children to have more negative views of themselves, the world, and the future. Furthermore, depressive attribution style was linked with depressive symptoms six months following the study.

One of the most popular current theories of depression is Beck's information-processing model. His theory holds that depressed individuals make negative interpretations of neutral situations (dysfunctional automatic thoughts), have a negative 'filter' that filters out positive events and information and focuses on the negative. They tend to think of themselves as worthless or inadequate, the world as mean or unfair, and the future as hopeless (negative cognitive triad) (Beck, Rush, Shaw, & Emery, 1979). The negative cognitive triad is very similar to Abramson's depressive attribution style.

Biological Factors

From a biological perspective, neuroendocrines have also been associated with depression. For example, cortisol levels and growth hormone (GH) levels have been

studied. Cortisol levels have been measured with the dexamethasone suppression test (DST). In normal adults, the drug Dexamethasone suppresses cortisol secretion for twenty-four or more hours (Wenar, 1994). In depressed adults, the dexamethasone tends to be resisted and the cortisol level returns to high levels within twenty-four hours. However, non-suppression is not specific to individuals with depression. It has also been associated with schizophrenia, obsessive-compulsive disorder, and eating disorders (Wenar, 1994).

The association between depression and dexamethasone non-suppression has been less consistent and less pronounced in children. In compilation of inpatient and outpatient studies on the validity of the DST for children, Casat (1989) reported that 69.6% of children with MDD and 30.3% of children with other psychological diagnoses were non-suppressors. The overall sensitivity of the DST was 69.6% for inpatients and 69.7% for outpatients. However, the American Psychiatric Association (1987) reported that substantially more inpatient children diagnosed as MDD were non-suppressors (81.7%) than MDD outpatient children (31.6%).

Similar to the results of studies with children, most DST studies of adolescents do not support its ability to discriminate between depressed and non-depressed adolescents (Birmaher et al., 1992; Kutcher, Malkin, Silverberg, Marton, Williamson, Malkin, Szalai, & Katic, 1991). Kutcher et al. (1991) found a diagnostic sensitivity of 40% and a specificity of 69% for the DST in depressed adolescents. Kutcher et al.'s (1991) rates are consistent with other depressed adolescent DST studies that have found 30-70% of depressed adolescents to be non-suppressors (Crumley, Clevenger, & Steinfink, 1982; Exetein, Rosenberg, & Pottash, 1982; Ha, Molcan, & Cashman, 1984). Both of these

values are lower than what is typically deemed acceptable evidence of validity.

Therefore, the DST has not proven to be useful in discriminating between depressed and non-depressed adolescents.

The relationship between growth hormone (GH) levels and depression has also received some empirical attention. Brambilla, Musetti, Tachchini, Fontanillas, and Guareschi-Cazullo (1989) found GH levels to be significantly higher in depressed adolescents than in non-depressed adolescents at three different times (12 a.m., 1 a.m., and 3 a.m.) and in total. When a cut-off secretion level (8 ug/L) was applied, all of the depressed subjects and 14 out of 15 control subjects were correctly identified as depressed or non-depressed.

If true differences exist between depressed and non-depressed individuals in levels of GH and response to the DST, they might be indicative of a biological basis for depression. However, such differences may also indicate that depression has the capacity to alter a person's biology. It could also be that the two conditions simply tend to coexist and no causal relationship is present (perhaps a third variable is present that causes both conditions).

Organic Dysfunctions and Medications Related to Bipolar Disorder

Several biological abnormalities, medical conditions, and medications have been associated with the onset of mania. Krauthammer and Klerman (1978) studied 21 cases of mania that were initiated by epilepsy, neoplasms, infections, CNS stimulants, bromide poisoning, and medical treatment with steroids. It must be noted that although these patients were manic, they were not likely to have bipolar disorder. First, there was a much lower rate of affective disorders in the family members of the individuals in the

study than for individuals with bipolar disorder (less than 50% and up to 85%, respectively). Second, the age of mania onset for the individuals in the study was much later than for bipolar patients (median ages 41 and 25, respectively). In addition, Lazare (1979) suggested that lack of prior history of mood disorders, lack of family history of mood disorders, and sudden onset may discriminate patients with organic/medical/medication related mania from individuals with bipolar disorder.

Other medical conditions that have been linked to mania include; isoniazid, influenza, encephalitis, multiple sclerosis, rheumatic chorea, and cerebral tumors (Hamilton, 1989). Mania may also result from medical treatment with amphetamines (Hamilton, 1989), use of hallucinogens, sympathomimetic amines, Antabuse, alcohol, barbiturates, anticholinergics, anticonvulsants, and benzodiazepines (Lazare, 1979). Potential neurological precursors to mania include general paresis, Huntington's disease, postcerebrovascular accidents, right temporal lobectomy, posttraumatic confusion, and postelectroconvulsive therapy. Lazare (1979) also found evidence for a relationship between certain metabolic conditions (postoperative states, hemodialysis, hyperthyroidism, Cushing's disease, and Addison's disease) and the onset of mania. Although the conditions listed above are linked specifically to mania and not necessarily to bipolar disorder, information regarding their relationship has the potential to provide valuable insight into the underlying factors involved in the development of bipolar disorder and factors that attribute for the difference between unipolar and bipolar depression.

Temperament

At a roundtable discussion convened by Goldsmith in 1985, he and other temperament researchers including Buss, Plomin, Rothbart, Thomas, and Chess discussed the definition of temperament. Although the researchers agree that temperament is relatively stable, at least somewhat biological, and reflects behavioral tendencies, there is some disagreement about how temperament should be defined. For instance, there is disagreement about which dimensions of behavioral tendencies are temperamental. All concur that activity level and emotionality are components of temperament, however, no other dimensions are agreed upon by all theorists. Definitions of temperament are provided below for Thomas and Chess, Goldsmith, Rothbart, Martin and Bridger, and Gray.

Thomas and Chess (Goldsmith, Buss, Plomin, Rothbart, Thomas, Chess, Hinde, & McCall, 1987) define the overall concept of temperament as the "stylistic component of behavior" (p. 508). In other words, they are interested in the how, what, and why of behavior. Thomas and Chess propose a total of nine dimensions including: rhythmicity of biological functions; approach to or withdrawal from new stimuli; adaptability; sensory threshold; predominant quality of mood; intensity of mood and expression; distractibility; and persistence/attention span. Rhythmicity of biological functions refers to the extent of regularity of the child's natural biological functions (i.e., sleep, eating). Sensory threshold refers to the amount of stimulation the child desires and can tolerate before experiencing distress.

Goldsmith places a heavier emphasis on emotionality than the other temperament researchers. Goldsmith defines temperament as "individual differences in the probability

of experiencing and expressing the primary emotions and arousal” (p. 510). Goldsmith includes anger, fear, joy and pleasure, and interest as primary emotions. The emphasis is on the behavioral tendencies that stem from the experience of those emotions.

Rothbart describes temperament as stable, biological based differences between people in reactivity and self-regulation. Like Goldsmith, Rothbart includes emotionality in her definition. However, Rothbart also includes non-emotional components such as orienting and motor activation. She identifies three temperament dimensions: negative reactivity; positive reactivity; and behavioral inhibition. Rothbart also identifies a potential fourth dimension, the ability to regulate attention. Negative reactivity is defined by Rothbart as amount of distress experienced and displayed, and behavioral and attentional aversion. Positive reactivity can be described as the opposite of negative reactivity. It is the amount of positive emotion experienced and displayed combined with behavioral and attentional approach. The third dimension is behavioral inhibition to intense or new situations. The potential fourth dimension, the ability to regulate attention, is self-explanatory.

Martin and Bridger (1999) define temperament as the biological basis for individual differences in behavioral, emotional, attentional, and motoric tendencies such as response to reward and punishment; emotional intensity; sociability; and ability to regulate attention. They emphasize the biological nature of temperament. Martin and Bridger (1999) describe four temperament characteristics: negative emotionality; task persistence; activity level; and inhibition. The first three are considered aspects of the temperament characteristic they labeled impulsivity.

From a biological perspective, Gray (as cited in Rothbart and Bates, 1998) proposes two regulatory systems called the Behavioral Activation System (BAS) and the Behavioral Inhibition System. Individuals with a stronger BIS than BAS will be more responsive to cues of punishment than cues of reward and will, therefore, be anxious and behaviorally inhibited. In contrast, individuals with a stronger BAS than BIS will be more responsive to cues of reward than to cues of punishment. As a result, such individuals are high in approach to situations that have the potential for reward and likely to withdraw from situations when doing so promises potential relief. In other words, persons with a stronger BIS than BAS are introverted and those with a stronger BAS than BIS are extroverted.

Relationship Between Temperament and Psychopathology

Temperament has been linked to a variety of behavior problems (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996; Eisenberg, Fabes, Shepard, Murphy, Guthrie, Jones, Friedman, Poulin, & Maszk, 1997; Kerr, Tremblay, Pagani, & Vitaro, 1997), general externalizing problems (Caspi, Henry, McGee, Moffitt, & Silva, 1995), general internalizing problems (Kochanska, 1995; Kochanska, Murray, Jacques, Koenig, & Vandergeest, 1996), anxiety (Hirschfeld, Klerman, Clayton, Keller, McDonald-Scott, & Larkin, 1983), depression (Kerr et. al., 1997; Hansenne, Reggers, Pinto, Kjiri, Ajamier, & Anseau, 1999; Ampollini, Marchesi, Signifredi, Ghinaglia, Scardovi, Codeluppi, & Maggini, 1999; Hirschfeld et. al, 1983), bipolar disorder (Osher, Lefkifker, & Kotler, 1999; Todd, Reich, & Reich, 1994; Akiskal, Hirshfeld, & Yerevanian, 1983) and suicidality (Mehrabian & Weinstein, 1985; Engstrom, Alling, Gustavsson, Orelund, & Traskman-Bendz, 1997). This section begins with a discussion of hypotheses for the

relationship between temperament and depression and is followed by a brief literature review of a number of temperament characteristics and their relationships with depression and other forms of psychopathology.

Cloninger, Svrakic, and Przybeck (1993) propose a biosocial model of temperament/personality. They found three fundamental, seemingly inheritable temperament qualities (novelty seeking, harm avoidance, and reward dependence). Each quality was found to be associated with a particular neurotransmitter. Novelty seeking was associated with dopamine, harm avoidance was associated with serotonin, and reward dependence was associated with norepinephrine. All three of these neurotransmitters also play a role in determining an individual's mood (in fact, most antidepressants target some or all of the three neurotransmitters). Therefore, a relationship between levels of novelty seeking, harm avoidance, reward dependence and depression would not be surprising. Harm avoidance has been found to have the strongest association with depression (e.g., Hansenne et al., 1999). This is also not a surprising finding given that serotonin is the neurotransmitter that seems to have the strongest relationship to depression. Many antidepressant medications (e.g., Prozac, Serzone, Zoloft) are designed to increase levels of serotonin in the brain of depressed individuals.

Clark, Watson, and Mineka (1994) reviewed the literature on the proposed hypotheses for the relationship between temperament/personality and the mood and anxiety disorders. They outlined four possible explanations for a relationship: the pathoplasty model; the complication or scar hypothesis; the spectrum/continuum model; and the predisposition model. One hypothesis, labeled the pathoplasty model, is that one's personality/temperament impacts the expression of the disorder in terms of

severity, what symptoms are present, etc. (Wachtel, 1994). In other words, different people with the same disorder experience different symptoms and different levels of severity because of the differences in their temperament and personality characteristics.

The complication or scar hypothesis states that the personalities/temperaments of individuals with anxiety or mood disorders are altered as a result of the disorder (Akiskal, Hirschfield, & Yerevanian, 1983). For instance, a person with depression that is introverted and tends to avoid social interaction may have been extroverted prior to the onset of the depressive disorder.

The third hypothesis for the relationship between temperament/personality and mood and anxiety disorders is the spectrum/continuum model. The spectrum/continuum model holds that disorders are patterns of exacerbated normal personality traits (Hirschfield & Klerman, 1979). For instance, one of the core symptoms of depression is melancholy mood, yet all human beings experience sadness from time to time. The difference is in the severity and duration of sadness and the other symptoms associated with it (e.g., loss of appetite, difficulty sleeping).

The fourth hypothesis (labeled the predisposition model) holds that the possession of certain personality/temperament characteristics predisposes an individual to some disorders (e.g., Blatt as cited in Clark et al., 1994; Martin, Bridger, & Huttunen, 2000). The predisposition model is difficult to test since it requires an extensive longitudinal study of a large sample to examine the temperament/personality of a large group of people prior to the development of any disorders and following them for many years to allow comparison of temperament/personality characteristics in those who developed mood or anxiety disorders and those who did not.

Clark and Watson (1991) propose a tripartite model of anxiety and depression. The tripartite model offers an explanation for the comorbidity between anxiety and depression through identification of variations and similarities in temperamental characteristics of persons who are anxious, depressed, or both anxious and depressed. Clark and Watson derived their tripartite model from a meta-analysis of data from many studies that examined temperamental characteristics of persons diagnosed with anxiety, depression, or both anxiety and depression. Based on the results of their analysis, they hypothesize a three factor structure; an overarching general distress factor that is related to both anxiety and depression and the presence of two specific factors, one for anxiety and one for depression.

The general distress factor is defined by elevated levels of the temperament characteristic negative affectivity, which Clark and Watson found to be present in persons with both anxiety and depression, persons with anxiety but not depression, and persons with depression but not anxiety. The factor specific to anxiety is defined by high scores on measures of the temperament characteristic physiological arousal and the factor specific to depression is defined by low scores on measures of the temperament characteristic positive affectivity. Therefore, according to the tripartite theory, persons with anxiety will have elevated general distress factor scores, elevated physiological arousal scores and normal scores on scales of positive affectivity. Persons suffering from depression will also have elevated general distress scores but will have normal levels of physiological arousal and lower than average scores on scales of positive affectivity. A third group of people, those with mixed anxiety and depression, will have elevated levels

of general distress and physiological arousal and lower than average scores on measures of positive affectivity.

Activity Level. Watson and Kucala (1978) administered their Anhedonia scale to patients who later committed suicide. The individuals tended to be active and energetic. High levels of energy and activity may seem to be surprising characteristics of suicide attempters given that people tend to think of suicidal individuals as depressed and hopeless. However, the planning and implementation of a suicide attempt require a certain amount of energy. Therefore, it follows that individuals who have at least that amount of energy are more likely to attempt suicide than those who have less than that amount of energy. In addition, many suicide attempts are made by non-depressed individuals such as individuals with borderline personality disorder, an anxiety disorder, or schizophrenia (APA, 1994). Based on the results of their study, Watson and Kucala (1978) suggested that suicides occur when a person is highly emotional and undergoing a high level of situational stress.

Attention Regulation. The ability to regulate attention appears to have a relationship with depression that is mediated by ability to manage stress. Increased ability to regulate attention is associated with an increased ability to cope with stress (Miller & Green, 1985). Perhaps being able to regulate attention is important for stress management because it allows the individual to focus on one problem at a time. Distractible individuals are likely to continuously worry about several tasks or issues at once instead of focusing only on the current task, a problem that can lead to greater levels of stress. Greater levels of stress can lead to increased levels of depression and anxiety. Benfield et al. (1988) found that distractibility was negatively correlated with mood at

($r = .60$) and correlated positively with internalizing symptoms at ($r = .83$). In turn, increased levels of depression and anxiety can result in difficulty concentrating. In fact, difficulty concentrating is a symptom of several internalizing disorders including dysthymia, MDD, and generalized anxiety disorder (APA, 1994).

Difficulty concentrating is also a symptom of bipolar disorder (APA, 1994). However, it may be that difficulty maintaining attention is a temperament characteristic of many individuals with bipolar disorder that precedes the development of psychopathology. In a case study of children thought to be at risk for bipolar disorder, Kestenbaum (1979) found distractibility to be a unifying characteristic of the sample. However, other unifying characteristics included disturbances in affect, impulsivity, rage outbursts, and academic difficulties despite strong verbal cognitive abilities, suggesting that bipolar disorder may have already been present at the time of study.

Strober and Carlson (1982) followed a sample of adolescents who were hospitalized for a major depressive episode; they were 3-4 years after their hospitalization. The individuals who had a subsequent manic episode during the follow-up period scored higher on measures of distractibility than the adolescents who did not experience a manic episode during follow-up.

Impulsivity. Hansenne et al. (1999) compared the level of impulsivity (i.e., novelty seeking, reward dependence) in individuals currently hospitalized for a major depressive disorder and a healthy control group. Hansenne et. al (1999) define novelty seeking as the "tendency to respond actively to novel stimuli leading to pursuit of rewards and escape from punishment" (p.31). They describe reward dependence as the "tendency for a positive response to signals of reward to maintain or resist behavioral

extinction" (p. 31). Although no significant relationship was found between either novelty seeking and depression or reward dependence and depression, both relationships were negative. However, Caspi et al. (1995) found approach, the willingness to participate in novel situations, as assessed in early childhood to have a significant negative relationship with internalizing problems during late childhood or adolescence in males.

Hansenne et. al (1999) and Caspi et. al's (1995) results are congruent with the BIS and BAS theory proposed by Gray (as cited in Rothbart & Bates, 1998). All suggest that depressed individuals are more motivated to avoid punishment than to receive reward. It may also be the case that persons with depression are depressed because they do not tend to seek rewards. If all of one's energy is expended to avoid pain and none is expended to seek pleasure, one is not likely to be very happy. The individual is also likely to avoid any situation involving risk of punishment, even if likelihood of reward is far greater than likelihood of punishment. It is similar to the athletic team that has a great defense but a poor offense. They may avoid letting the other team score, but they won't score any points themselves.

In contrast, Ampollini et al. (1999) found a positive relationship between reward dependence and depression, as well as anxiety and mixed anxiety and depression. Ampollini et. al's (1999) results lead to another hypothesis for the relationship between temperament and depression. Perhaps reward dependent individuals experience anxiety (learned helplessness) when access to reward is blocked for a significant period of time and, after a prolonged period of learned helplessness, they experience depression. This hypothesis is consistent with Barlow's (1991) theory of a temporal continuum between

anxiety and depression. Barlow (1991) proposes that anxiety and depression are inherently the same disorder but are different points on a continuum. His theory holds that a person experiences anxiety first and when they are unable to continuously manage the anxiety and stressful situations they encounter they become depressed as a result of learned helplessness.

Kestenbaum's (1979) case study of children at risk for bipolar disorder revealed that impulsivity might also be linked to bipolar disorder. This finding is not surprising given that individuals are often excessively impulsive during manic episodes (APA, 1994). However, the possibility remains that impulsivity precedes the development of bipolar disorder and that individuals who are temperamentally impulsive are at an increased risk for bipolar disorder.

Many studies have shown suicide attempters to be more impulsive than others (i.e., Pendse et. al, 1999; Corbitt, Malone, Haas, & Mann, 1996). In fact, many suicide attempters meet criteria for cluster B personality disorders (which are characterized by impulsivity, aggression, hostility, excessive emotionality, etc.) or display some of the characteristics of personality disorders (APA, 1994). Corbitt et al., (1996) found persons with depression and comorbid cluster B personality disorders (as defined by *DSM-III-R*) that are characterized by dramatic/erratic traits including impulsivity, aggression, and hostility are likely to exhibit more suicidal behavior and to display it earlier than persons who have had one or more major depressive episodes but did not have a comorbid personality disorder. Of the 102 psychiatric inpatients who had either major depressive disorder (60%) or were currently experiencing their first major depressive episode, 60% had attempted suicide at least once. Individuals with traits of borderline personality

disorder (impulsivity, aggression, and hostility) were more likely to have attempted suicide in the past. The number of borderline type traits was also significant and was a better predictor than depressive symptoms.

Because this study looked at personality traits after suicide attempts it is possible that the suicide attempt preceded development of the personality characteristics. An action as drastic as a suicide attempt is likely to dramatically alter the manner in which a person is treated by individuals in his or her environment. For instance, an individual who attempted suicide might be treated with extra caution to the point where they are given no privacy whatsoever (because others are afraid of a repeated attempt) and display hostility about their lack of privacy. Or, perhaps others begin to distance themselves from the individual who attempted suicide and the individual becomes hostile or depressed because he or she feels betrayed.

It must also be noted that individuals with major depressive disorder (MDD) and comorbid personality disorders (or characteristics of personality disorders) have greater levels of symptomatology than those with MDD and no comorbid personality disorder. Greater levels of symptomatology are often directly correlated with severity of pathology (as seen also in research regarding anxiety, depression, and comorbid anxiety and depression such as Carey, Finch, & Imm, as cited in Brady & Kendall, 1992). In other words, they exhibit more symptoms but they may not necessarily have more severe symptoms. Therefore, it is conceivable that it is not the specific symptoms of borderline personality disorder that are related to increased likelihood of past suicide attempt and that it is the greater number of symptoms present in individuals with comorbid MDD and BPD.

Not all findings indicate a difference in impulsivity level between suicide attempters and non-attempters. Apter, van Praag, Plutcik, Sevy, Korn, and Brown (1990) found that the difference in impulsivity levels lies between violent and non-violent attempters, not between those who are suicidal and those who are not. Vinoda (1996) found suicide attempters to be more rigid than controls.

Inhibition. Inhibition is a broad temperament characteristic that refers to the tendency to initially avoid, become upset by, or display downcast affect in response to unfamiliar people, situations, and objects (Kagan, 1998). It includes many subcharacteristics such as: behavior regulation; behavioral inhibition; and harm avoidance. Kerr et al. (1997) found a relationship between behavioral inhibition and later delinquency. They studied 10-12 year-old boys who were classified as disruptive or non-disruptive and assessed their levels of behavioral inhibition (tendency to react with fear to threats of punishment and unfamiliar people, situations, and objects). They found that disruptiveness paired with a lack of behavioral inhibition predicted delinquency at ages 13-15. Inhibition seemed to serve as a protective factor against the development of disruptiveness into delinquency.

Eisenberg et al. (1997) also found evidence of a relationship between behavior regulation (ability to control how one's impulses and feelings are expressed behaviorally) and behavior problems. Although behavior regulation and inhibition differ in that inhibition refers to a tendency to respond to cues of punishment and behavior regulation refers to the ability to control one's behavior, the two concepts are similar in that children who are inhibited tend to regulate their behavior too rigidly due to excessive fear of punishment. Children who regulate their behavior well are neither impulsive nor

inhibited. They neither under nor overcontrol their behavior. They behaviorally express their feelings when appropriate, whereas inhibited children may never express them and impulsive children might express them in all situations. Eisenberg et al. (1997) completed a longitudinal study of temperament characteristics at ages 4-6 and social functioning at ages 6-8 and 8-10. Parents and teachers provided reports of children's social behavior, emotionality (intensity of negative emotion and emotion in general), regulation (attentional and inhibition control and impulsivity levels), and children participated in fictitious peer conflict puppet scenarios. Mother's report of behavioral regulation was significantly negatively related to mother's report of problem behavior for both boys and girls (children who were reported as good regulators of their behavior were less likely to exhibit problem behavior than children who were rated as poor regulators of their behavior). Similarly, fathers who rated their children as high in behavioral regulation were likely to label them as displaying low levels of problem behavior. However, the relationship was only significant for boys (Eisenberg et al., 1997).

Eisenberg et al.'s (1997) findings are not surprising since the concept of behavior regulation refers to the ability to make good choices about how one should behave and to act according to those good choices. A parent who believes that their child makes good choices about how to behave is unlikely to regard the child's general behavior patterns as problematic.

Despite its relationship with low levels of problem behavior, high levels of behavioral inhibition may be a risk factor for internalizing problems. Kochanska et al. (1996) studied behavioral inhibition and internalization in children at 26-41 months of age and again at 43-56 months of age. Behavioral inhibition was measured by mother

report and placing the child in situations in which they were asked to inhibit behavior (e.g., leaving each child alone in a room with objects that the researchers had said were forbidden and observing whether or not the child played with the forbidden object).

Behavioral inhibition was related to internalization at both times. In addition, behavioral inhibition at ages 26-41 months was a significant predictor of internalization at ages 43-56 months.

Hansenne et al. (1999) compared the level of inhibition (harm avoidance) in individuals currently hospitalized for a major depressive disorder and a healthy control group. Harm avoidance, as defined by Hansenne et. al. (1999), is the tendency toward an inhibitory response to signals of aversive stimuli that lead to avoidance of punishment and non-reward' (p. 31). They found that depressed individuals exhibit higher levels of harm avoidance than healthy controls. Brown, Svrakic, Przybeck, and Cloninger (1992), Joffe, Bagby, Levitt, Regan, and Parker (1993), Joyce, Mulder, and Cloninger (1994), and Ampollini, Marchesi, Signifredi, Ghinaglia, Scardovi, Codeluppi, and Maggini (1999) also found harm avoidance to be characteristic of depressed individuals more so than non-depressed individuals.

Sonneck, Grunberger, and Ringel (as cited in Mehrabian & Weinstein, 1985) found that those who were suicidally depressed were also more inhibited and more depressed than those who were not suicidal. Although suicide may at first appear as a punishment and, therefore, something inhibited individuals would typically work to avoid, suicidally depressed individuals may instead view it as avoidance of punishment since it ends their suffering. In other words, they may view it as a way to prevent experiencing any further punishment (e.g., feeling depressed).

Once again, Gray's (as cited in Rothbart & Bates, 1998) BIS and BAS theory provides the basis for a potential explanation of the relationship between high levels of inhibition, depression, and other internalizing problems. Gray states that individuals with a stronger BIS than BAS are more sensitive to cues of punishment than they are to cues of reward. Therefore, such a person is likely to scan the environment for cues of punishment and ignore cues of reward. As a result, the person may come to view the world as comprised of more punishing cues than rewarding ones. In addition, those reward cues that are observed by the individual are unlikely to be viewed as meaningful since the person's motivation is derived from the desire to avoid punishment, not to seek rewards.

Negative Emotionality (Negative Affectivity). Eisenberg et al. (1997) found high levels of negative emotionality (they define negative emotionality as the intensity with which negative emotions such as anger and sadness are felt and expressed) and destructive coping (tendency to respond to upsetting social situations with aggression or venting negative emotions by crying or yelling) to be positively related to problem behavior. Similarly, they found that low levels of negative emotionality, general emotional intensity, and destructive coping were associated with high quality social functioning. A relationship between negative emotionality and behavioral/social functioning seem logical. Children who tantrum, display anger, and/or cry often are more likely to be labeled a behavior problem by adults because they require more attention (comforting, etc.), and less likely to be sought as a companion by other children because they are not as pleasant to be with as children whose negative emotions are less intense.

A second potential reason for the relationship between negative emotionality and depression lies in the relationship between the definitions of the two variables. Negative emotionality pertains to the intensity with which negative emotions such as sadness are expressed (Eisenberg et al., 1997). By the definition of depression (APA, 1994), individuals who are depressed are likely to currently be experiencing greater amounts and intensities of sadness and anger than individuals who are not currently depressed. Therefore, they may also be more likely to express those feelings in an intense manner than those who are not currently depressed.

Although there is evidence that negative affectivity is related to depression (e.g., Triebwasser, Phillips, & Begin in press as cited in Clark et al., 1994), the relationship may be dependent upon whether or not the disorder is currently present or in remission (Clark et al., 1994) and on the age of the subjects (Wretmark, Astrom, & Eriksson as cited in Clark et al., 1994). Triebwasser et. al, (as cited in Clark et al, 1994) reviewed five studies of depressed individuals and the personality traits they displayed prior to becoming depressed. In all five studies negative affectivity was related to depression. However, Clark et al (1994) found that level of negative affectivity was related to whether or not the disorder was currently present or if it was in remission. Subjects currently affected by depression had higher negative affectivity scores than they had when their disorder was in remission or than other subjects whose disorders were currently in remission. Therefore, negative affectivity may be a symptom of depression and not a predictor of it.

Negative affectivity as a symptom of depression is consistent with the observation that the expression of unpleasant emotions such as anger and sadness is often part of

depression. Although negative affectivity scores on measures of temperament are often elevated in young children, diagnosable depression is rare in young children. However, it may be that children who display high levels of negative emotionality are more likely to experience diagnosable depression at some time (predictive validity instead of concurrent) than those children who display low levels of negative emotionality.

Wretmark, Astrom, and Eriksson (1970) provide evidence for an alternative explanation. They found a negative relationship between age and negative affectivity (NA) and neuroticism (N) scores, meaning that the younger a subject is the more likely he or she is to have high NA/N scores. This relationship could exist because a large percentage of young children have difficulty regulating the intensity of their negative emotions; as they mature, many of them learn to manage the intensity more effectively. Therefore, since younger subjects are more likely than older subjects to have high NA/N scores simply based on age, it seems logical that negative affectivity and neuroticism scores are more predictive of the development of depression for older subjects than for younger ones (Hirschfeld, Klerman, Lavori, Keller, Griffith, & Coryell, 1989).

Negative emotionality also appears to be linked to bipolar disorder (Kestenbaum, 1979), perhaps even to a greater extent than to unipolar depression (Mundt, Kronmuller, & Backenstrais, 2000). On a self-report measure, individuals with bipolar disorder rated themselves higher on scales of negative emotionality than individuals with unipolar depression (Mundt, Kronmuller, & Backenstrais, 2000). However, this study was conducted after the onset of illness. Therefore, it is difficult to discern whether negative emotionality preceded the onset of disorder or vice versa.

Mehrabian and Weinstein (1985) studied the temperament characteristics of suicide attempters and found them to be unpleasant, arousable, and submissive. Their study consisted of 45 individuals who had previously attempted suicide. Each subject was interviewed and completed a temperament assessment that consisted of three dimensions, pleasant/unpleasant, arousable/unarousable, and submissive/dominant. Scores were compared to those of the average standardized scores of the general population. As a group (mean scores were calculated for each dimension), subjects were found to be unpleasant, arousable, and submissive, the cluster which the authors label anxious or neurotic.

Arousability was the most significant discriminator between subjects in Mehrabian and Weinstein's (1985) study (suicide attempters) and the general population (primarily non-attempters) which is interesting given that arousability is the only characteristic that separates Mehrabian's (as cited in Mehrabian & Weinstein, 1985) anxious and depressive (unpleasant, unarousable, and submissive) clusters. Mehrabian and Weinstein define arousability as a "larger arousal response and slower habituation of arousal to unusual, complex, or changing stimuli" (p. 544). Based upon other definitions of anxiety and depression and research regarding the relationship between the two (Barlow, 1991), one would not expect that suicide attempters are better characterized as anxious/neurotic than depressed. However, given Mehrabian and Weinstein's definition of arousability and the temperament characteristics that comprise the anxious and depressive clusters it is logical that individuals who are arousable are more likely to attempt suicide because they are, by definition, more affected by external stimuli and may have more energy to plan and attempt suicide than those in the depressed cluster.

Several other researchers have found arousability to discriminate between suicide attempters and non-attempters. Sonneck et al. (as cited in Mehrabian & Weinstein, 1985) found that arousability (excitability) discriminated between depressed persons who were suicidal and those who were not suicidal. Perhaps depressed persons who are arousable are more likely to be suicidal because they are more likely to be upset by external events and experience more emotion in relation to those events than those who are not as arousable. However, they also found that those who were suicidally depressed were also more inhibited and more depressed than those who were not suicidal.

Positive Affectivity (Positive Emotionality). Level of positive affectivity appears to predict depression but not anxiety. Clark et al. (1994) found a negative relationship between positive affectivity and depression (low positive affectivity was related to depression). Specifically, Clark et. al (1994) identified low positive affectivity as a risk factor for the development of depression, and as predictive of poor prognosis for depression. Similar to negative affectivity, level of positive affectivity is also likely to be affected by the presence or absence of the disorder. Individuals who are currently depressed are likely to score lower on measures of positive affectivity than those who are not currently depressed (Clark et al, 1994).

Given that many of the characteristics associated with positive affectivity, such as extroversion (Clark et al., 1994) and frequent expression of happiness and joy (Martin & Bridger, 1999) are in direct contrast with the *DSM-IV* criteria for major depressive episodes and dysthymia (e.g., loss of interest or pleasure in most activities, fatigue or loss of energy) (APA, 1994), it is logical that there would be a negative relationship between the two.

Individuals with bipolar disorder may be more extroverted than those with unipolar depression. In a self-report based comparison study of the temperaments of individuals with bipolar disorder and unipolar depression, Mundt, Kronmuller, and Backenstrais (2000) found that individuals with bipolar disorder rated themselves higher on an extroversion scale than individuals with unipolar depression. It is possible that both groups display similar amounts of extroversion during depressive episodes and normal periods of functioning and that the difference occurs during the manic episodes experienced by bipolar individuals. According to the *DSM-IV*, individuals experiencing manic episodes are often highly sociable and active (APA, 1994). As a result, level of extroversion in bipolar individuals may be better described as an aspect of current functioning (i.e., whether they are experiencing a depressive episode, a manic episode, or are functioning normally) than a temperament characteristic. However, in a review of the literature on premorbid temperament and affective disorders, Akiskal et al. (1983) found that extroversion was often related to bipolar disorder.

Task Persistence. Nolen- Heksema, Seligman, and Girgus (1992) found a positive relationship between poor task persistence and depression in a five year longitudinal study. They propose the learned helplessness theory (Abramson, et. al, 1978) as a potential explanation. According to the learned helplessness theory, children who are depressed have learned and adopted the belief that persisting at tasks will not lead to reward. That is, they believe that they will not be able to complete the task even if they persist at it. However, it is also possible that children who are poor task persisters and have difficulty regulating their attention become depressed because of their inability to persist and successfully complete difficult tasks.

Studies of the relationship between task persistence and bipolar disorder have yielded inconsistent results. Osher, Cloninger and Belmaker (1996) and Osher, Lefkiker, and Kotler (1999) found that euthymic manic-depressive patients tended to score lower on measures of task persistence than control subjects. In contrast, Akiskal et al. (1983) describe bipolar individuals as driven, work-oriented, and obsessoid prior to the onset of bipolar disorder. Either relationship is logical. Given that there appears to be a relationship between distractibility and bipolar disorder (Kestenbaum, 1979; Strober & Carlson, 1982), it is logical that individuals with bipolar disorder might have difficulty persisting at tasks. It is possible that individuals experiencing mania find it difficult to channel their high levels of energy into persisting at one task. In contrast, some individuals may be able to channel the high levels of energy they experience during manic episodes into persisting at tasks for long periods of time. In fact, an increase in goal-directed activity is a criterion for a manic episode in the *DSM-IV* (APA, 1994). However, distractibility is also a criterion (APA, 1994). Although the two criteria are not necessarily incompatible, it may be that the contrasting results reported in the literature on the direction of the relationship between task persistence and bipolar disorder reflects individual differences in the ability to channel the excessive energy typically experienced during a manic episode.

Relationship Between Anxiety and Depression

Depression and anxiety are comorbid disorders (APA, 1994). Much of the research reviewed thus far on the relationship between temperament and depression has actually been about the relationship between temperament and internalizing disorders, which include anxiety. Therefore, an exploration of similarities and differences between

the two categories is necessary. One way anxious and depressed individuals have been found to differ is in the types of dysfunctional (automatic) thoughts they commonly have. According to Beck (1995), automatic thoughts are the immediate thoughts a person has in response to a situation or event. Depressed and anxious individuals tend to have dysfunctional automatic thoughts, meaning that they tend to interpret situations as worse or more threatening than they really are. Beck, Brown, Steer, Eidelson, and Riskind (1987) administered the Cognition Checklist (CCL) to 408 outpatients at the Center for Cognitive Therapy in Philadelphia who were diagnosed with an anxiety disorder, a depressive disorder, or neither according to *DSM-III* criteria. The CCL is comprised of a variety of automatic thoughts typical of persons with depression or anxiety. Beck et al.'s (1987) study found that the CCL discriminated between depressed and anxious individuals. Individuals who met *DSM-III* criteria for an anxiety disorder endorsed items that suggested their automatic thoughts revolved around the theme of danger, either physical or psychosocial threat. In contrast, individuals who met *DSM-III* criteria for a depressive disorder endorsed items on the CCL that suggested their automatic thoughts revolved around a sense of loss and hopelessness. Therefore, Beck et al.'s (1987) study suggests that anxious individuals tend to fear loss or danger and depressed individuals feel they have already experienced loss or danger. This result supports Barlow's (1991) theory of a temporal continuum of anxiety and depression.

Clark et al. (1994) found a negative relationship between positive affectivity and depression but not between positive affectivity and anxiety. One possible reason for this difference could be that, as stated above, some of the criteria for depression are in direct contrast with extroversion. However, the criteria for anxiety disorders (with the

exception of social phobias, agoraphobia, etc.) are generally not incompatible with being extroverted.

Gender Differences

DSM-IV (APA, 1994) reports that twice as many women as men meet criteria for depressive disorders. The lifetime risk for major depressive episode, is 10 - 25% for women and 5 -12% for men. At any given time, it is estimated that between 5% and 9% of women and between 2% and 3% of men meet criteria for MDD (APA, 1994). Several hypotheses have been generated in an attempt to explain the rate discrepancy between genders. Differences in socialization, rates of alcoholism, rates of involvement in the law enforcement system, self-esteem, and willingness to present for treatment are each discussed in the following section as possible explanations for this gender discrepancy.

Socialization is one possible reason that more women than men are depressed. Society dictates that it is unacceptable for women to express anger. As a result, women are taught to internalize their feelings and feel sad when something upsets them. On the other hand, society trains men to externalize their feelings and feel angry when something upsets them. There are significantly more men than women in the law enforcement system (Weissman & Klerman, 1977). Weissman and Klerman (1977) explore the possibility that depressed men may present in the law enforcement system as a result of externalizing their depressive feelings. They suggest that some depressed men may become violent towards others and end up in the law enforcement system instead of mental health clinics and psychologists' offices.

According to *DSM-IV* (APA, 1994), alcoholism is much more prevalent in males. It is thought that many alcoholics are actually depressed and that their alcoholism is a

symptom of and an attempt to escape from depression. Tyndel (as cited in Weissman & Klerman, 1977) found that approximately 35% of alcoholics in a study of 1000 alcoholics presently had serious symptoms of depression or had experienced them in the past.

However, since alcohol is a depressant drug, it may be the case that large quantities of alcohol masks depression in some individuals, causes it in others, and works to maintain already present depression in others. Therefore, if this hypothesis is correct it may explain much of the “discrepancy” between the amount of men and women who are depressed.

A third alternative lies in the notion that women are more concerned with their relationships with others than men. Because depression can lead to isolation from and rejection by ones friends and family (because of the difficulty of coping with the depressed individual 's negativity and not wanting to be “brought down”) (Stark et al., 1993), individuals who are highly concerned with their relationships with others may become increasingly depressed as they become isolated.

Another possibility for the reported discrepancy between levels of depression in men and women is that women may be more willing to seek treatment than men (Weissman & Klerman, 1977). Women utilize health services more often than men in general (Weissman & Klerman, 1977) and, therefore, are also probably more likely to present themselves for mental health services than men. This difference may be due in part to social pressure for men to “tough it out” and take care of things themselves and not rely upon others to solve their problems. In contrast, women are often socialized to seek help from others. Therefore, it may be that equal numbers of men and women are depressed or that more men than women are depressed but it appears that more women

than men are depressed because more women than men report symptoms and present for treatment.

Low self-esteem is a symptom of both dysthymic disorder and major depressive disorder in *DSM-IV* (APA, 1994). Pre-adolescent males and females have similar levels of self-esteem (American Association of University Women, as cited in Woolfolk, 1998) and are equally likely to be depressed (APA, 1994). However, there is a reduction in females' self-esteem (American Association of University Women, as cited in Woolfolk, 1998) and an increase in female rates of depression (APA, 1994) during adolescence. Similar changes are not found for boys. Not surprisingly, Altman and Wittenborn (1980) found that women with low self-esteem are more prone to depression than those with high self-esteem. Therefore, it may be the case that a lower level of self-esteem causes some girls to become depressed. On the other hand, it could be that depression decreases self-esteem. A third possibility is that depression and self-esteem are not directly related and are related to each other through an additional variable, such as eating disorders. Eating disorders are much more common in females than in males, typically onset in adolescence or young adulthood, and are often accompanied by low self-esteem and depression (APA, 1994). Therefore, it is possible that depression and low self-esteem are related because they are both symptoms of eating disorders, which are more likely to be present in women than in men.

It is unlikely that a relationship exists between depression and self-esteem only because both are characteristic of eating disorders. In fact, Beck and many other depression researchers have identified low self-esteem as one of the main characteristics of depressives and included it as a main target in the treatment of depression. For

instance, Beck (1995) identifies a sense of worthlessness and unloveability (both of which imply low self-esteem) as the most common core beliefs of those with depression. In order to remediate those core beliefs, Beck (1995) encourages cognitive therapists to teach positive self-talk to their patients and challenge their poor self-esteems by asking them to weigh the evidence for and against their insecure beliefs.

Lewinsohn, Roberts, Seeley, Rohde, Gotlib, and Hops (1994) found that controlling for psychosocial variables such as current other disorders, past suicide attempt, past depressive disorders, internalizing problem behaviors and lifetime number of physical symptoms eliminated gender differences in rates of depression for a sample of adolescents. This finding further supports the idea that there may be no true difference between rate of depression in men and rate of depression in women. The real difference between the two rates may lie in the manner in which depression manifests itself and the manner in which the individual attempts to cope with it.

Because gender differences in depression rates begin to appear in adolescence concurrent with the onset of puberty, hormonal activity has also been studied in relation to depression. However, little evidence exists for this hypothesis as most researchers (e.g., Angold & Rutter, 1992; Susman, Inoff-Germain, Nottelmann, Loriaux, Cutler, & Chrousos, 1987) have found that pubertal status did not correlate with depression when age was controlled.

CHAPTER 3

METHOD

Participants

The participants consisted of those subjects from the Helsinki Longitudinal Temperament Project (Martin, Bridger, & Huttunen, 2000) who were admitted to the hospital with the diagnosis of a depressive disorder during the study. The Helsinki Longitudinal Temperament Project is an on-going study of 6401 individuals born in the Helsinki region of Finland between July 1, 1975 and June 30, 1976. During infancy, 2018 participants (50.2% boys, 49.8% girls) were given a temperament assessment at a wellbaby clinic between the ages of 6 and 8 months. During the preschool years, the temperament of 1114 participants (54.2% boys, 45.8% girls) was assessed while at a government sponsored health checkup for children age 5. Subjects' hospitalization data were collected for admissions up to December 1998 (subjects were 22 or 23 years old, depending on birth date). Both infant and preschool assessed participants were determined to be representative of the overall birth cohort (the 6401 individuals born in the Helsinki region of Finland between July 1, 1975 and June 30, 1976), except that they had a lower death rate during childhood and approximately 1.4% more males were in the sample than in the cohort. In addition, the infant sample was born about one month earlier than the remainder of the cohort and contained approximately 9% more first-born children.

At age 12, teacher ratings of behavior problems were completed for 1289 participants (51.8% boys, 48.2% girls). These children were representative of the overall cohort except that there were 1% more only children, lower death rates for the immediate family, and parents and siblings were slightly older for the age 12 sample.

Hospitalization Data

In the current research, hospitalization data was attained on each subject from 1980 (at age 6, one year after the temperament assessment) until December 1998 (when the subjects were 22 to 23 years of age). Hospitalization data was obtained from the Hospitalization Registry of Finland, a record of all admissions to every hospital in Finland. Information obtained from this registry included length of hospital stay and up to four *International Classification of Diseases (ICD-9-CM or ICD-10)* diagnoses given at time of admission.

The *International Classification of Diseases* is a numeric code of all medical conditions, including mental disorders. For instance, major depressive disorder is assigned the numeric code 296.2 in *ICD-9-CM*. The *ICD* is similar to the *DSM*, but it is more comprehensive in that it includes all medical conditions. In the present study, the emphasis will be on individuals who received *ICD* codes that refer to depressive disorders at the time they were hospitalized. Table 1 lists the *ICD* numeric codes which apply to depressive disorders.

Diagnoses

Table 1 provides a listing of depression related diagnoses assigned to subjects upon hospital admission between 1992 and 1998, the *ICD-9-CM* numeric codes that correspond with each diagnosis, and the number of individuals who received that

Table 1

Depression Related Diagnoses, Corresponding ICD-9-CM Codes, and Number of Subjects Assigned Each Diagnosis

Diagnosis	ICD-9-CM Code	# of
manic depressive psychosis, depressed type	296.1	30
major depressive disorder, single episode	296.2	4
manic depressive psychosis, other and unspecified	296.8	7
neurotic depression	300.4	4
adjustment disorder/brief depressive reaction	309.0	16
Total		61

Note: Five subjects had more than one depression related diagnosis. Three subjects included in the manic- depressive psychosis, depressed type group had other depression diagnoses (one had a major depression diagnosis, two had a manic depressive psychosis, other and unspecified diagnosis) as well but were only included in the manic-depressive psychosis, depressed type group. One subject had a neurotic depression diagnosis and a manic-depressive psychosis, other and unspecified diagnosis and was only included in the latter group. The fifth subject had an adjustment reaction or brief depressive reaction diagnosis and a neurotic depression diagnosis and was only included in the latter group.

diagnosis. The vast majority of diagnoses were assigned based on the *ICD-9-CM*, however some individuals may have received diagnoses based on the *ICD-10*. The vast majority of individuals were included under their primary diagnoses, however a small minority were included under their secondary diagnosis to a non-depression related diagnoses. Many of the individuals were hospitalized multiple times under the same diagnosis but each individual is counted only once.

Major Depressive Disorder, Single Episode. Major depressive disorder, single episode is characterized by the experience of one major depressive episode. A major depressive episode is a period of at least two weeks in which the individual is depressed or has lost interest or pleasure in activities he or she would normally be interested in or enjoy. Other symptoms include: fatigue or loss of energy, feelings of worthlessness or excessive guilt, changes in sleeping and/or eating patterns, difficulty concentrating, and indecisiveness.

Manic-Depressive Psychosis, Other and Unspecified. Manic-depressive psychosis, other and unspecified is a subcategory of disorders under affective psychosis. It includes diagnoses that are given when the clinician determines that an affective psychotic disorder is present but none of the major diagnoses in the category fit the individual's symptoms. The diagnoses in this subcategory are: manic-depressive psychosis, unspecified, atypical manic disorder, atypical depressive disorder, and manic-depressive psychosis, other. Diagnoses in this subcategory were included because all of them (with the exception of atypical manic disorder) include depressive symptoms. Manic-depressive psychosis, unspecified and other are characterized by a history of manic and depressive episodes that do not meet criteria for bipolar disorder. Atypical

depressive disorder is characterized by depressive symptoms that do not meet criteria for major depressive disorder.

Neurotic Depression (Dysthymia). Neurotic depression (dysthymia) is a depressive disorder characterized by depressed mood or irritability most of the day, more days than not, for a period of at least 2 years in adults and one year in children and adolescents. Other symptoms include difficulty concentrating, poor self-esteem, hopelessness, low energy, overeating or poor appetite, and hypersomnia or insomnia.

Adjustment Disorder/Brief Depressive Reaction. Adjustment disorder or brief depressive reaction refers to an adjustment disorder that is predominantly characterized by depressed mood, hopelessness and tearfulness. An adjustment disorder (reaction) is an excessive, maladaptive reaction to a stressor that has occurred within three months prior to the onset of the symptoms. The reaction leads to impairment in daily functioning (occupation, relationships, social activities, etc.) and lasts less than 6 months.

Instruments

In infancy, temperament was assessed with a 71-item, Finnish version of the Carey Infant Temperament Questionnaire (Carey, 1970). Exploratory factor analysis was performed on the 71 items and resulted in four factors: Biological Irregularity, Threshold, Distress to Novelty, and Activity/Intensity. The four factors were utilized to create scales and a fifth scale was generated by identifying a principal component of all items, isolating all items that loaded $r = .30$ or greater on the principal component, and eliminating the isolated items that strongly loaded on one of the other four scales. The uneliminated items were grouped to combine the Fussy/Demanding scale. At age five, temperament was assessed with a Finnish version of the Thomas, Chess, and Korn Temperament

Questionnaire (Thomas & Chess, as cited in Martin, Wisenbaker, Baker, & Huttunen, 1997). The questionnaire contains 82 items in a seven-step likert response format and is designed to assess temperament based on parent ratings. A total of 8 scales were derived: Activity Level; Biological Irregularity; Emotional Intensity; Inhibition; Lack of Task Persistence; Negative Emotionality; Nonadaptability/Unhappy; and Stimulation Threshold. All scales were obtained through factor analysis, with the exception of Nonadaptability/ Unhappy (Martin et al, 1997). Before factor analysis was conducted, all items were correlated with a general difficulties factor. Only items that correlated $r = .30$ or greater with the general difficulties factor were included in the factor analysis. A group of items that did not align with any of the 7 factors obtained through factor analysis, but were related to nonadaptability or unhappiness, were combined to form the Nonadaptability/Unhappy scale (Martin et. al, 1997).

Description of Infant Temperament Characteristics. (Activity/Intensity) refers to the level of gross motor activity the infant engages in and the intensity of their emotional reactions. The Distress to Novelty scale consists of items relating to initial reactions of infants to novel stimuli. A high score on the Distress to Novelty scale indicates that the infant tends to express negative emotion in response to new situations. Threshold refers to the infant's sensitivity to wet/soiled diapers. Infants with a high score on the Threshold scale (indicating that they had a low threshold) were highly sensitive to wet/soiled diapers and infants with low scores were not as sensitive (high threshold). The items on the Fussy/Demandingness scale assessed the infant's tendency to cry, fuss, and demand attention due to inability to entertain him/herself. Biological Irregularity is a category of items that refer to irregularity in sleep, eating, and bowel movement patterns.

Description of Preschool Temperament Characteristics. Activity Level refers to the frequency of gross motor activity that the child exhibits. Items on the Emotional Intensity scale address the level of arousal the child exhibits when upset. Does the child merely frown when unhappy or does the child cry hysterically? Inhibition refers to the tendency to initially avoid, become upset by, or display downcast affect in response to unfamiliar people, situations, and objects (Kagan, 1998). Children who receive high ratings on the Lack of Task Persistence scale (meaning that they are low in task persistence) are unable and unwilling to maintain their attention and persist at completing difficult tasks. The Negative Emotionality scale measures the child's expression of and experience of frustration based emotion such as irritability, anger, and sadness/crying when access to reward is blocked. As explained above, the Nonadaptability/Unhappy scale is comprised of items that did not fit into the other factors yet were significantly (.30 or greater) correlated with a general distress factor. The items tended to assess adaptability to change and unhappiness. Stimulation Threshold items address the level of external stimulation the child can tolerate before becoming irritable or frustrated. The Biological Irregularity scale assesses the diurnal (day/night) regularity of biological functions such as sleep, eliminating, and eating.

Description of Age 12 Behavior Ratings. Behavior at age twelve was assessed by teacher completion of the Lambert-Hartsough-Wrede Adjustment Difficulty Scale, a Finnish adaptation of the Lambert-Hartsough adjustment Difficulty Scale (1973). It consists of 11 items (Table 2) that pertain to learning problems, immaturity, and social and emotional problems. Each item was answered on a continuous 3-point scale that

allowed for non-whole number responses (e.g., 2.1, 1.4). Each child's rating on each item was then converted to a t-score to ease comparison of subjects.

Procedures

Data analysis. The primary focus of this study will be to identify common, early onset characteristics of individuals who are at risk for depressive disorders and related hospitalizations. It was determined that 15 of the cohort children for whom temperament data were available from infancy were later hospitalized for depression; 9 of the children for whom preschool temperament data were available had hospitalization records for depression. Due to the relatively small sample size, a purely statistical analysis would not be practical. Therefore, the statistics generated will be utilized as one of several information sources for a large case study of the subjects hospitalized for depression. The emphasis of the case study will be on generating a profile of characteristics common among children who are later hospitalized for a depression related diagnosis.

Table 2

Lambert-Hartsough-Wrede Adjustment Difficulty Scale Items

Items
1. Lack of interest in learning
2. Learning difficulties
3. Doesn't follow directions
4. Distractible
5. Immaturity of reaction
6. Dependent on the teacher
7. Overreacts to difficult situations
8. Depressed
9. Socially withdrawn
10. Quarrels with peers
11. Dangerous to self and/or others

CHAPTER 4

RESULTS

Comparison of Depressed and Control Groups on Prenatal Conditions

The first set of analyses were designed to determine if there were differences between children hospitalized for depression and controls who were never hospitalized for depression on maternal prenatal nausea, fever, and smoking (see Table 3). Chi-square analyses of 2 x 2 contingency tables were performed.

Over half (55.74%) of the mothers of the non-depressed sample experienced nausea during their first trimester as opposed to only one-third (33.33%) of the depressed sample. However, this difference was non-significant. Thirty percent of the mothers of non-depressed subjects experienced nausea during the 2nd trimester as compared to 18.18% of the mothers of depressed subjects. This also was non-significant. The analysis of smoking and fever data revealed very small differences between the depressed and non-depressed groups. In summary, with regard to prenatal conditions, lower levels of maternal nausea were observed, but this difference was not significant.

Temperament and Behavior Ratings of Depressed Subjects

The analysis of temperament characteristics and behavior ratings was limited as preschool data was only available for nine subjects and infant data was available for fifteen subjects from the depressed group. Therefore, trends in the available data will be discussed in lieu of statistical analyses. Given that temperament and behavior rating

Table 3

Association of Hospitalization for Depression with Maternal Pregnancy Conditions

Variables	Not Depressed		Depressed		Chi-sq.	p-value
	Frequency	Percent	Frequency	Percent		
1 st trimester fever	Yes (673) No (957)	Yes (41.29) No (58.71)	Yes (4) No (6)	Yes (40.00) No (60.00)	0.01	Ns
2nd trimester fever	Yes (568) No (2387)	Yes (19.22) No (80.78)	Yes (4) No (18)	Yes (18.18) No (81.82)	0.02	Ns
3rd trimester fever	Yes (343) No (2459)	Yes (12.24) No (87.76)	Yes (3) No (16)	Yes (15.79) No (84.21)	0.22	Ns
1 st trimester nausea	Yes (796) No (632)	Yes (55.74) No (44.26)	Yes (3) No (6)	Yes (33.33) No (66.67)	1.82	Ns
2nd trimester nausea	Yes (923) No (2113)	Yes (30.40) No (69.60)	Yes (4) No (18)	Yes (18.18) No (81.82)	1.54	Ns
3rd trimester nausea	Yes (517) No (2328)	Yes (18.17) No (81.83)	Yes (3) No (16)	Yes (15.79) No (84.21)	0.07	Ns
Smoking during preg.	Yes (0) No (3490)	Yes (0.00) No (100.00)	Yes (0) No (25)	Yes (0.00) No (100.00)	—	—

Notes: Number subjects differed by variable because not all data was available for every subject.

P-values are considered significant if below .05

scores for the non-depressed population were normally distributed, approximately 67% of their scores fell within one standard deviation of the mean (the average range) and approximately 33% of their scores fell one or more standard deviations from the mean for each temperament characteristic. Apparent deviations from normal distribution among depressed subjects are discussed below.

Infant Temperament Characteristics of Hospitalized Subjects. Infant temperament data is presented in Table 4. The score distributions of the Distress to Novelty, Threshold, Activity/Intensity, and Biological Irregularity scales are relatively consistent with expectations for normal distribution. Scores tended to fall within the average range and an approximately equal number of subjects scored more than one standard deviation above and below the mean. In contrast, seven (46.67%) of the fifteen depressed subjects had scores more than one standard deviation from the mean on the infant Fussy/Demanding scale. Four of the subjects had scores more than one standard deviation above the mean (*t-scores* = 67, 74, 63, and 74) and three had scores more than one standard deviation below the mean (*T-scores* = 36, 33, and 37). Thus, the sample of depressed subjects had typical score distributions on infant temperament, but on the Fussy/Demanding scale they tended to have more extreme scores, both low and high.

Preschool Temperament Ratings. Preschool temperament data is presented in Table 4. Scores on the Activity Level, Threshold, Emotional Intensity, Inhibition, and Biological Irregularity scales appear to be normally distributed. Most scores fell within the average range and an approximately equal number of subjects had scores more than one standard deviation above and below the mean. With regard to Negative

Table 4

Infant and Preschool Temperament by Diagnostic Category for Each Subject

Diag.	ID#	Infant Scales						Preschool Scales						
		DN	BR	TH	AI	FD	NE	IH	AC	LP	IR	EI	TH	NA
Man- Depr., depr. type	4	-	-	-	-	-	42	47	48	40	44	52	55	36
	8	-	-	-	-	-	40	57	50	51	57	45	51	38
	11	-	-	-	-	-	70	44	63	64	64	58	54	51
	12	-	-	-	-	-	64	49	55	60	57	53	51	69
	13	46	49	56	59	63	-	-	-	-	-	-	-	-
	14	77	37	71	51	36	74	66	40	56	45	62	54	56
	15	32	41	45	36	44	-	-	-	-	-	-	-	-
	16	37	45	45	48	52	-	-	-	-	-	-	-	-
	18	37	65	45	55	44	-	-	-	-	-	-	-	-
	20	55	49	41	48	44	-	-	-	-	-	-	-	-
	25	50	49	45	55	74	-	-	-	-	-	-	-	-
27	41	53	56	49	33	-	-	-	-	-	-	-	-	
Man.- Depr., o/u	31	-	-	-	-	-	-	-	-	-	-	-	-	-
	33	50	49	38	36	48	78	54	55	49	55	61	36	67
	34	-	-	-	-	-	34	50	45	34	47	28	39	31
Neur. Depr.	38	50	61	56	67	67	-	-	-	-	-	-	-	-
	39	73	49	52	44	74	-	-	-	-	-	-	-	-
Adj. d/o- BDR	50	-	-	-	-	-	54	70	34	56	45	49	47	50
	51	-	-	-	-	-	32	45	58	38	51	34	54	51
	53	48	45	71	55	52	-	-	-	-	-	-	-	-
	55	68	45	64	55	52	-	-	-	-	-	-	-	-
	60	46	61	49	32	50	-	-	-	-	-	-	-	-
	61	43	45	52	51	37	-	-	-	-	-	-	-	-

All scores are t-scores and have been rounded to the nearest whole number

DN= Distress to Novelty NE = Negative Emotionality EI = Emotional Intensity
 BI = Biological Irregularity IH = Inhibition NA = Nonadaptability
 TH = Threshold AC = Activity Level
 AI = Activity/Intensity LP = Lack of Task Persistence
 FD = Fussy/Demandingness IR = Irregularity

Emotionality, t-scores of the depressed sample were highly variable. Two of the nine subjects had scores one or more standard deviations below average (t-scores = 32 and 34), four had scores one or more standard deviations above average (t-scores = 70, 64, 74, and 78), and the remainder had scores within one standard deviation of average. Lack of Task Persistence ratings also varied considerably among the nine subjects. Three had scores more than one standard deviation below the mean (t-scores = 38, 34, and 40) and two had scores more than one standard deviation above the mean (t-scores = 64 and 60). Two subjects had Adaptability scores above the average range (t-scores = 69 and 67), indicating difficulty adapting to changes, and three had scores below the average range (t-scores = 31, 36, and 38).

Age 12 Behavior Problem Ratings by Teacher. The items that comprised the behavior rating scale are listed in Table 2. Age 12 behavior problem ratings are presented in Table 5 by diagnostic category. In general, most scores are in the normal range. However, all subjects who received a diagnosis of manic-depressive disorder, depressed type received elevated ratings on at least two items. Subject 13 was elevated on items 1-6, 8, 10, and 11. Subject 16 was elevated on items 9 and 10, and subject 19 was elevated on items 1-4, 6, and 9. In contrast, none of the subjects from the other diagnostic categories received any elevated ratings.

Relationship of Infant Temperament, Preschool Temperament, and Age 12 Behavior Ratings

Four subjects had data available for more than one time period. Based on the available data, no relationships appear to exist between the temperament ratings at different ages for those individuals.

Table 5

Age 12 Behavior Problem Ratings by Teacher

ID #	Diag-nosis	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11
13	man-dep. dep. type	71	71	71	67	62	62	58	69	43	60	60
16	man-dep. dep. type	54	51	49	51	56	48	54	59	63	60	53
19	man-dep. dep. type	60	67	73	67	58	65	54	50	75	53	42
31	man-dep. o/u	49	43	49	51	50	55	54	50	57	55	53
35	man-dep. o/u	35	36	36	35	36	36	35	40	55	37	53
39	neurotic dep.	46	50	51	50	50	48	46	50	57	39	42
44	mdd, s.e.	56	57	52	51	58	59	54	58	57	57	53
48	adj./ b.d.r	52	50	49	51	50	55	54	50	57	55	53
59	adj./ b.d.r	35	36	35	37	35	35	50	43	56	46	45

Notes: All scores are t-scores (M = 50, SD = 10)

adj./ b.d.r = adjustment disorder/brief depressive reaction

man-dep. dep. type = manic-depressive disorder, depressed type

man-dep. o/u = manic-depressive disorder, other and unspecified

mdd, s.e. = major depressive disorder, single episode

neurotic dep. = neurotic depression

Item 1 = Lack of interest in learning

Item 2 = Learning difficulties

Item 3 = Doesn't follow directions

Item 4 = Distractible

Item 5 = Immaturity of reaction

Item 6 = Dependent on the teacher

Item 7 = Overreacts to difficult situations

Item 8 = Depressed

Item 9 = Socially withdrawn

Item 10 = Quarrels with peers

Item 11 = Dangerous to self and/or others

Additional Analyses

Comparison of the Depressed and Control Groups on Demographic

Characteristics. A variety of demographic characteristics were analyzed (see Table 6). These analyses revealed that there were gender differences between the depressed group and controls. The depressed group was approximately two-thirds male (67.21%) and one-third female (32.79%), although the non-depressed group was comprised of an approximately equal number of males (52.54%) and females (47.46%). The difference in gender distribution between the two groups was significantly greater than would be predicted by chance ($X = 5.22, p < .05$).

There was also evidence of a birth order effect. When first-borns and only children (which were combined to form one group) were compared to later born children, first-borns and only children were underrepresented in the depression group. Although 54.59% of the non-depressed sample ($n = 6827$) were either first-borns or only children, only 44.26% of the depressed sample ($n = 61$) were first-borns or only children. However, these differences were not statistically significant.

Paternal age at the time of birth was analyzed by dividing the sample of fathers into three age groups: less than 21, 21 to 26, and older than 26. The depressed sample had a higher frequency of older fathers (greater than 26 years old when they were born) (27.66% of the depressed sample, 16.58% of the non-depressed sample) than controls. They had a smaller percent of fathers who were between the ages of 21 and 26 (36.17% of the depressed sample, 46.51% of the non-depressed sample) than controls. Approximately the same percentage of the groups had fathers who were younger than 21

Table 6

Associations of Hospitalization for Depression with Demographic Variables

Variables	Not Depressed		Depressed		Chi-sq.	p
	Frequency	Percent	Frequency	Percent		
Gender	M (3594) F (3247)	M (52.54) F (47.46)	M (41) F (20)	M (67.21) F (32.79)	5.22	.02
SES	L (2743) M (2157) H (715)	L (48.85) M (38.41) H (12.73)	L (22) M (21) H (12)	L (40.00) M (38.18) H (21.82)	4.51	Ns
Maternal age at birth	<21 or >35 (2208) 21-26 (1939) 26-35 (1459)	<21 or >35 (39.39) 21-26 (34.59) 26-35 (26.03)	<21 or >35 (17) 21-26 (18) 26-35 (14)	<21 or >35 (34.69) 21-26 (36.73) 26-35 (28.57)	0.46	Ns
Paternal age at birth	< 21 (1953) 21-26 (2641) > 26 (877)	< 21 (36.91) 21-26 (46.51) > 26 (16.58)	< 21 (17) 21-26 (17) > 26 (13)	< 21 (36.17) 21-26 (36.17) > 26 (27.66)	4.51	Ns
Birth order	1 st born (3727) 2 nd (2157) 3 rd (679) 4+ (264)	1 st born(54.59) 2 nd (31.60) 3 rd (9.95) 4+ (3.85)	1 st born(27) 2 nd (22) 3 rd (8) 4+ (4)	1 st born(44.26) 2 nd (36.07) 3 rd (13.11) 4+ (6.56)	4.18	Ns
Only child vs. not Only child	Only (1105) Not (5722)	Only (16.19) Not (83.81)	Only (6) Not (55)	Only (9.84) Not (90.16)	1.80	Ns
Maternal Expectancy	1 st child (3727) 2 nd + (3100)	1 st child (54.59) 2 nd + (45.41)	1 st child (27) 2 nd + (34)	1 st child (44.26) 2 nd + (55.74)	2.60	Ns

Note: Number of older siblings and number of younger siblings percents refer to % of those who have older or younger siblings who fall into each category, not percent of total sample who have that number of younger or older siblings. Also, some individuals may be included in both categories.

years old at their time of birth (36.17% of the depressed sample, 36.91% of the non-depressed sample). These differences, however, were not statistically significant.

Maternal age at the time of birth was analyzed by dividing the sample of mothers into three age groups: less than 21 or older than 35, 21 to 26, and 26 to 35. The distribution of mothers in each group was similar for depressed subjects and controls. The results were not statistically significant.

Socioeconomic status (SES) based on occupation of the father was analyzed by dividing the six category ratings of hospital officials into three groups: high, middle, and low. The high SES group appeared to be overrepresented in the depressed group. Only 12.73% of the non-depressed group was classified as high SES but 21.82% of the depressed group was classified as high SES. Similar percentages were classified as middle SES (depressed group = 38.18%, non-depressed group = 38.41%) and a smaller percentage of depressed than non-depressed individuals fell within the low SES category (40.00% and 48.85%, respectively). These differences were not statistically significant.

Comparison of Depressed and Control Groups on Maternal Hospitalization. The complete hospitalization records of the mothers of depressed and control children were available to this researcher. Hospitalization diagnoses for the purpose of this analysis were categorized by major systems affected as indicated by the major categories of the *ICD-9*. Table 7 indicates the categories of maternal disease that were analyzed. Large differences between the depressed and control groups occurred for four categories of maternal illness. In all cases mothers of depressed children had higher rates of illness. Maternal hospitalization for the following conditions were significantly more prevalent among depressed subjects (n = 61) than among non-depressed subjects (n = 6832); blood

disorder ($X = 10.72, p < .01$), psychosis ($X = 4.03, p < .05$), digestive problems ($X = 4.79, p < .05$), and accidents ($X = 4.15, p < .05$). Maternal hospitalization for all other conditions did not reach significance.

Diagnostic Group Analyses

A quasi-case study design was employed to examine characteristics of individuals in each depression group. Gender, parent ages at birth, socioeconomic status, and maternal prenatal conditions by diagnostic category are presented in Table 8. Because of the small sample sizes in some of the individual diagnostic categories, trends in the available data will be discussed in lieu of statistical analyses. Because not all data was available for all subjects, percentages do not add up to 100% in many categories. The potential impact of the missing data will be examined in the Discussion section. The following description is limited to the largest differences.

Prenatal Conditions, Temperament, and Behavior Ratings. Maternal nausea, fever, and smoking during pregnancy, temperament, and behavior ratings will not be discussed individually by category as the response rates were too small to provide useful information.

Gender, Parent Ages at Birth, Birth Month, and Birth Order. Consistent with the comparison of the combined depressed group and the control group, males were overrepresented in all diagnostic categories except major depressive disorder, which contained an equal number of males and females. Similarly, the distribution of paternal age at birth in each diagnostic category was similar to the pattern in the general depressed group; that is, older fathers were overrepresented and fathers between the ages of 21 and 26 were underrepresented. With regard to maternal age at birth, the 26-35 category was

Table 7

Comparison of Depressed and Control Groups on Maternal Hospitalization

Reason for Maternal Hospitalization	Non-Depressed subjects		Depressed subjects		Chi-square	p-value
	Frequency	Percent	Frequency	Percent		
Infection	No (6426) Yes (409)	No (94.06) Yes (5.94)	No (56) Yes (5)	No (91.80) Yes (8.20)	0.55	Ns
Neoplasms	No (5399) Yes (1433)	No (79.03) Yes (20.97)	No (50) Yes (11)	No (81.97) Yes (18.03)	0.32	Ns
Endocrine	No (6444) Yes (388)	No (94.32) Yes (5.68)	No (55) Yes (6)	No (90.16) Yes (9.84)	1.94	Ns
Blood	No (6689) Yes (143)	No (97.91) Yes (2.09)	No (56) Yes (5)	No (91.80) Yes (8.20)	10.72	0.00
Psychoses	No (6596) Yes (236)	No (96.55) Yes (3.45)	No (56) Yes (5)	No (91.80) Yes (8.20)	4.03	0.04
Neuroses	No (6468) Yes (364)	No (94.67) Yes (5.33)	No (55) Yes (6)	No (90.16) Yes (9.84)	2.42	Ns
Neurological	No (6248) Yes (584)	No (91.45) Yes (8.55)	No (60) Yes (1)	No (98.36) Yes (1.64)	3.72	Ns
Circulatory	No (5524) Yes (1308)	No (80.85) Yes (19.15)	No (52) Yes (9)	No (85.25) Yes (14.75)	0.75	Ns
Respiratory	No (5296) Yes (906)	No (86.74) Yes (13.26)	No (55) Yes (6)	No (90.16) Yes (9.84)	0.62	Ns
Digestive	No (5745) Yes (1087)	No (84.09) Yes (15.91)	No (45) Yes (16)	No (73.77) Yes (26.23)	4.79	0.03
Urine/genital	No (4573) Yes (2259)	No (66.94) Yes (33.06)	No (39) Yes (22)	No (63.93) Yes (36.07)	0.25	Ns
Birth	No (3828) Yes (3004)	No (56.03) Yes (43.97)	No (28) Yes (33)	No (45.90) Yes (54.10)	2.52	Ns
Skin	No (6577) Yes (255)	No (96.27) Yes (3.73)	No (58) Yes (3)	No (95.08) Yes (4.92)	0.24	Ns
Skeletal	No (5752) Yes (1080)	No (84.19) Yes (15.81)	No (47) Yes (14)	No (77.05) Yes (22.95)	2.31	Ns
Anamolies	No (6714) Yes (118)	No (98.27) Yes (1.73)	No (60) Yes (1)	No (98.36) Yes (1.64)	0.00	Ns

Natality	No (6808) Yes (24)	No (99.65) Yes (0.35)	No (60) Yes (1)	No (98.36) Yes (1.64)	2.78	Ns
Symptomatology	No (6025) Yes (807)	No (88.19) Yes (11.81)	No (49) Yes (12)	No (80.33) Yes (19.67)	3.57	Ns
Accidents	No (5884) Yes (948)	No (86.12) Yes (13.88)	No (47) Yes (14)	No (77.05) Yes (22.95)	4.15	0.04

Table 8

Demographic and Prenatal Conditions by Diagnosis

Diagnosis	ID#	Sex	SES	B	B	D	M	Prenatal Nausea			Prenatal Fever			P S
				M	O	A	A	1 st	2 nd	3 rd	1 st	2 nd	3 rd	
man.-dep., dep	1	M	2	10	3	1	1	-	n	n	y	-	y	n
	2	M	1	7	1	1	1	-	-	-	-	-	-	-
	3	M	3	12	1	-	-	-	-	-	-	-	-	-
	4	M	2	3	2	1	1	n	n	n	n	n	n	n
	5	M	1	5	1	1	1	-	-	-	-	-	-	-
	6	F	2	1	1	2	2	-	-	-	-	-	-	-
	7	F	2	1	2	1	1	-	-	-	-	-	-	-
	8	F	1	6	3	1	1	-	y	y	-	n	y	n
	9	M	1	11	4	1	1	-	-	-	-	-	-	-
	10	M	2	2	1	2	3	-	n	n	-	y	n	n
	11	M	1	1	2	1	1	-	-	-	-	-	-	-
	12	M	2	4	2	1	1	n	n	n	n	n	n	n
	13	M	1	1	2	1	1	-	n	n	-	n	n	n
	14	M	1	5	2	1	3	-	n	n	-	n	n	n
	15	M	1	5	1	2	3	-	-	-	-	-	-	-
	16	M	3	7	1	2	3	-	n	n	-	n	n	n
	17	F	1	9	1	2	3	-	-	-	-	-	-	-
	18	F	3	8	1	1	1	-	n	-	-	y	-	n
	19	M	1	2	2	1	1	-	-	-	-	-	-	-
	20	F	1	8	1	1	1	-	n	n	-	n	n	n
	21	M	1	8	1	2	2	-	-	-	-	-	-	-
	22	M	1	6	2	1	1	-	-	-	-	-	-	-
	23	M	3	11	1	1	3	-	-	-	-	-	-	-
	24	M	2	2	1	2	2	-	-	-	-	-	-	-
	25	F	2	8	1	2	2	y	y	-	y	n	-	n
	26	F	1	9	1	-	1	-	-	-	-	-	-	-
	27	M	-	4	4	1	3	-	-	-	-	-	-	-
	28	M	-	4	2	1	1	-	-	-	-	-	-	-
	29	F	-	6	2	1	1	-	-	-	-	-	-	-
	30	F	-	7	3	2	2	-	-	-	-	-	-	-
man.- dep., o & u	31	M	3	7	2	1	1	-	-	-	-	-	-	-
	32	M	2	1	1	1	1	-	-	-	-	-	-	-
	33	M	2	3	3	1	1	y	n	n	n	n	n	n
	34	F	2	8	2	2	1	-	-	-	-	-	-	-

	35	F	2	6	1	2	1	-	-	-	-	-	-	-
	36	M	1	9	3	1	1	-	n	n	-	n	n	n
	37	M	-	8	1	1	3	n	n	n	n	n	n	n
nd														
	38	M	2	12	1	1	-	y	n	y	y	n	n	n
	39	M	1	12	2	1	1	-	y	y	-	n	n	n
	40	M	1	10	2	1	2	-	-	-	-	-	-	-
	41	F	2	5	1	1	3	-	y	n	-	n	n	n
mdd														
	42	M	2	8	1	1	1	-	n	n	-	y	n	n
	43	F	2	8	2	2	1	-	-	-	-	-	-	-
	44	F	2	1	2	1	2	-	-	-	-	-	-	-
	45	M	2	9	2	1	1	-	-	-	-	-	-	n
adj./bdr														
	46	M	3	1	2	1	1	n	-	-	y	y	-	n
	47	M	1	7	2	1	1	-	-	-	-	-	-	-
	48	M	2	2	1	-	-	-	n	n	-	n	n	n
	49	M	1	7	1	2	3	-	-	-	-	-	-	-
	50	F	2	11	1	1	1	n	n	-	n	n	-	n
	51	M	3	1	4	1	1	-	n	n	-	n	n	n
	52	F	3	6	1	2	2	-	-	-	-	-	-	-
	53	F	1	11	3	1	1	-	-	-	-	-	-	-
	54	M	2	4	2	1	2	-	-	-	-	-	-	-
	55	F	2	3	1	2	-	-	-	-	-	-	-	-
	56	F	3	7	3	1	1	-	-	-	-	-	-	-
	57	M	1	3	2	1	2	-	-	-	-	-	-	-
	58	F	3	9	2	1	1	-	-	-	-	-	-	-
	59	M	1	11	1	2	2	n	n	-	n	n	-	n
	60	M	2	5	4	1	2	-	-	-	-	-	-	-
	61	M	-	8	3	1	1	-	-	-	-	-	-	-

SES: 1 = Low

2 = Middle

3 = High

BO= Birth Order: 1 = only or 1st2 = 2nd3 = 3rd4 = 4th or later

BM= Birth Month

MA= Mom Age (at birth): 1 = 26-35

2 = 21-26

3 = < 21 or > 35

DA= Dad Age (at birth): 1 = > 26

2 = 21-26

3 = < 21

PS = Prenatal Smoking

man-dep, dep = manic-depressive disorder, depressed type

man-dep, o & u = manic depressive disorder, other and unspecified

nd = neurotic depression (dysthymia, dysthymic disorder)

mdd = major depressive disorder, single episode

adj/bdr = adjustment disorder/brief depressive reaction

overrepresented in all of the individual diagnostic categories except neurotic depression. Month of birth and birth order did not appear to differ across diagnostic category.

SES. The SES distribution of the adjustment disorder-brief depressive reaction category (31.3% low SES, 31.3% middle SES, and 31.3% high SES) was similar to that of the depressed group as a whole in comparison to the control group (low SES underrepresented, middle SES consistent with control subjects, and high SES overrepresented). However, the other individual diagnostic categories followed different trends. In the manic-depression, depressed type group, representation of the low SES (46.7%, $n = 14$) and high SES (13.3%, $n = 4$) groups were consistent with the distribution in the control group and the middle SES (26.7%, $n = 8$) group was underrepresented. The low SES (14.3%, $n = 1$) group was underrepresented in the manic depressive disorder, other and unspecified category. In the neurotic depression group, the middle SES (50.0%, $n = 2$) group was overrepresented, the high SES group was not represented, and the percentage in the low SES (50.0%, $n = 2$) group was consistent with the percentage in the control group. All ($n = 4$) of the subjects in the major depressive disorder group were from middle socioeconomic status (SES) families.

CHAPTER 5

DISCUSSION

The purpose of the present study was to examine characteristics of children who are later hospitalized under depression related diagnoses. A large sample of Finnish subjects was followed from infancy until ages 22-23. Subjects were divided into two groups, those who were hospitalized for a depression related diagnosis (manic-depressive disorder, other and unspecified, manic-depressive disorder, depressed type, adjustment disorder/brief depressive reaction, dysthymic disorder, and major depressive disorder, single episode) and those who were not hospitalized for a depression related diagnosis. The two groups were compared on a variety of characteristics including demographics, prenatal conditions, maternal hospitalizations, infant and preschool temperament, and behavior problems at age 12.

Hypothesis 1

Hypothesis 1 stated that there would be significant differences between the depressed and non-depressed groups on prenatal conditions. Although chi-square analysis did not reveal statistically significant differences, the results are of interest. Contrary to expectations, maternal nausea during pregnancy may serve as a protective factor against later hospitalization for depression. It is possible that a certain amount of nausea during pregnancy indicates appropriate hormone levels and that absence of nausea indicates irregular hormone levels that may be related to mental health problems in the child's future. Although no research could be found on the relationship of maternal prenatal

nausea to depression, Martin, Wisenbaker, and Huttunen (1999)'s analysis of a larger sample of the present study (including non-depressed subjects) revealed that maternal nausea during the 2nd and 3rd trimesters was related to behavior difficulties at age 12. Some depressed children exhibit behavior problems while others are highly inhibited and withdrawn. As noted in the results section, nausea data was available for too few subjects to compare by diagnostic category in this study. However, age 12 behavior problems do not appear to be related to maternal nausea or hospitalization for depression in the present study.

Hypothesis 2

Hypothesis 2 proposed that significant differences in temperament characteristics would exist between the two groups. The hypothesis appears to be supported for both infant and preschool temperament. It appears that deviations from average infant temperament scores may be predictive of later hospitalization for depression, regardless of specific temperament characteristic or direction of deviation. Consistently, the only scale that independently appeared to predict later hospitalization for depression was the most general infant temperament scale, Fussy/Demandingness. The predictive utility of the Fussy/Demandingness scale was also found in a different subsample of the same cohort analyzed in the present study. Teerikangas, Aronen, Martin, and Huttunen (1998) found it to predict psychiatric symptoms in adolescence. Because the small sample size prevents any conclusions from being made on the predictability of infant temperament, further research is needed.

Consistent with past research indicating a relationship between negative emotionality and bipolar (Kestenbaum, 1979) and unipolar depressive disorders

(Triebwasser, Phillips, & Begin, as cited in Clark et al., 1994), more subjects than expected had preschool negative emotionality scores above the average range in the present study. This finding is not surprising given that the construct of negative emotionality includes many of the symptoms associated with bipolar disorder and depression (e.g. frequent display of sadness, anger, intense negative reactions).

Hypothesis 2 was also supported for preschool Lack of Task Persistence. More subjects than expected had scores outside the average range, although some were higher than average and some were lower than average. Therefore, it may be that deviant Lack of Task Persistence scores, independent of direction of deviance, predict hospitalization for depression. Past research on task persistence is consistent with the results of this study. Nolen-Heksema, Seligman, and Girgus (1992) found a positive relationship between poor task persistence and unipolar depression. Both positive (Osher, Cloninger, & Belmaker, 1996) and negative (Akiskal et. al, 1983) relationships have been found between task persistence and bipolar disorders. The *DSM-IV* (APA, 1994) criteria for bipolar disorder may lend explanation for the results of this study and previous studies. Both distractibility and increased goal-directed activity are among the seven criteria for a diagnosis of a manic episode (three are needed for a diagnosis), indicating that persons experiencing a manic episode may be either hyperfocused or hypofocused. However, the results of the present study do not indicate temperament differences between bipolar and unipolar depression categories.

Almost all subjects with available temperament data had at least one preschool temperament score outside the average range and the majority had one elevated score. Therefore, it may be that preschool temperament scores outside the average range are

predictive of later hospitalization, independent of the specific scale or direction of deviation. An easy temperament has been described as a protective factor against development of psychiatric conditions, despite presence of multiple risk factors such as parental psychopathology and severe marital discord (Rutter, 1975). Conversely, any type of temperamental difficulty may lead to an increased risk for depression development.

Similar to the findings in this study, Rutter (1975) found that later psychopathology was best predicted by a culmination of factors as opposed to any single risk factor. However, an alternative explanation must be considered. By chance, one deviant score could occur in most individuals. Therefore, this deviation finding should be interpreted with caution.

Hypothesis 3

Hypothesis 3 stated that age 12 teacher behavior ratings would differ significantly between the depressed and non-depressed subjects. It was unsupported. Although a few subjects had deviant scores across behavior ratings, most subjects had scores that fell within the average range and there were an approximately equal number of subjects with scores above and below average. Based upon the results of this study, age 12 behavior problems do not appear to predict hospitalization for depression. Again, further research with larger sample sizes are needed to determine presence or absence of a relationship.

Additional Analyses

Comparison of demographic characteristics yielded significant results for gender. Significantly more males than females were hospitalized for depression related diagnoses prior to age 23. Although a difference in gender distribution was expected to exist between the depressed and non-depressed groups, it was expected that females, not males,

would be overrepresented in the depressed group. According to the *DSM-IV* (APA, 1994), major depressive disorder is twice as common in women as in men (10-25% lifetime incidence rate for women, 5-12% for men). Incidence rates for other depressive disorders included in this study, dysthymia, bipolar disorders, and adjustment disorder-depressed type/brief depressive reaction, are consistent across gender. The depressed sample in this study consisted of 37 individuals with a bipolar disorder, 4 individuals with major depressive disorder, single episode, 16 individuals with adjustment disorder/brief depressive reaction, and 4 individuals with dysthymia. Therefore, one would expect an equal or greater percentage of females in the depressed sample than non-depressed sample. The disparity may be explained by the exclusion of depressed subjects who were never hospitalized for their condition. As noted by Weissman and Klerman (1977), women are more likely to utilize health services in general. Therefore, they may be more likely to seek treatment before their depression escalates to a level requiring hospitalization.

In addition, because the majority of subjects were under parental care throughout much of the study, social factors such as ‘men should be able to tough it out on their own but women can’t be expected to’ may have played a role in the discrepancy. Parents may have been more likely to take their daughters than their sons for treatment prior to hospitalization.

Furthermore, as Weissman and Klerman (1977) note, depressed men may be more likely than women to externalize their depressed feelings by becoming aggressive towards themselves or others. Hospitalization for depression is most likely to occur when an individual is a physical threat to themselves or others as opposed to crying or

withdrawing, the internalizing methods of expressing emotion that are thought to be more typical of women.

The fact that the study included prepubescent males and females may have also contributed to the unexpected overrepresentation of males in the depressed group. Studies of preadolescent children have found equal (e.g., Angold & Rutter, 1992) or higher (e.g., Costello, Costello, Edelbrock, Burns, Dulcan, Brent, & Janiszewski, 1988) rates of depression in boys than in girls. Further research comparing the treatment seeking trends of depressed men and women who have never been hospitalized would be beneficial. If it is found that men are less likely to seek treatment than women, reasons for the discrepancy could be studied and community based interventions could be developed and implemented to encourage men to seek treatment in the earlier stages of their illness. Hospitalization rates for depressive disorders across gender would also be of interest to study and compare to overall rates of depressive disorders across gender.

Although results of chi-square analyses of other demographic variables were insignificant, when the variables are more closely examined, differences appear to exist in birth order, father's age at birth, and SES. It was interesting that the depressed group had older fathers than the non-depressed group.

Although no data could be found on the relationship of birth order to depression, birth order has been studied in relation to other psychiatric conditions. For example, there is some evidence that birth order may be related to schizophrenia, with later-borns being at a higher risk (Hare & Price, 1970).

It was expected that if differences in father's age at birth existed, the depressed sample would have younger fathers than the non-depressed sample because children of

very young fathers are less likely to be planned and young fathers are less likely to be financially established, which could result in harsher life conditions and lower SES. No studies were found on the relationship between paternal age at birth and risk for depression during childhood and early adulthood. In a study of elderly individuals with depression and control subjects, Ptok, Maier, Heun, and Papassotiropoulos (2000) found no mean differences in the parental ages of the two groups. However, advanced paternal age has been linked to disorders such as down's syndrome (Stene, Stene, Stengel - Rutkowski, & Murken, 1981), alzheimer's with dementia (Urakami, A dachi, & Takahashi, 1989), and psychiatric conditions, particularly schizophrenia (Hare & Moran, 1979), even when mother's age was controlled.

Maternal advanced age was also a predictive factor in all of the above studies, although not in the present one. One potential explanation is that the mother's in the present study were relatively young. Only one mother was over 36 years of age, as opposed to ten of the fathers.

The impact of paternal age may be the result of the aging process on reproductive function at the genetic level. However, it is also feasible that the older fathers married later in life due to traits that were predictive of psychological difficulties in their offspring, such as psychological difficulties of their own. Birth order effects may also contribute to parental age effects as later-borns are more likely to have older parents than first-borns and only children.

Results of the SES analysis were also surprising. In contrast with previous research that has shown low SES to be a risk factor for psychopathology (Rutter, 1975), the depressed group had a higher rate of high SES and a lower rate of low SES than the

control group. It is possible that the difference was a reflection of factors other than actual incidence rates of depression. Again, the fact that the study only included individuals who were hospitalized may impact the results. Perhaps individuals from high SES families are more likely than those from low SES families to hospitalize their children when depressive symptomatology is exhibited. In the United States this argument would be highly plausible, given the fact that wealthier individuals are more likely than less wealthy individuals to have adequate health insurance to pay for hospital care. However, this study occurred in Finland where health care is government funded and the cost of hospitalization would not be a deterrent to hospitalization. Yet, differences may exist in the attitude towards hospitalization between the low and high SES groups in Finland. Further research involving a larger sample of depressed individuals would be necessary to determine if birth order, father's age at birth and SES are useful predictors of later hospitalization for depression.

The next analysis compared the depressed and non-depressed groups on the number and types of maternal hospitalization (e.g., digestive problems, neurosis, neurological problems). Significant differences were found for maternal blood disorder, psychosis, digestive problems, and accidents. A difference in the percentage of mothers hospitalized for psychosis is not surprising given the abundance of research demonstrating genetic and family links to mental disorders (Papolos & Papolos, 1999; Krauthammer & Klerman, 1978; Sullivan, Neale, & Kendler, 2000). Differences were also expected to exist between the depressed and non-depressed groups in maternal hospitalization for neurosis but were not found.

A multitude of speculations can be proposed for the difference in rate of maternal hospitalization for digestive problems. Perhaps digestive problems were somatic symptoms of anxiety and depression, perhaps a history of digestive problems created a pre-natal environment that put the child at risk for depression, or perhaps the stress of having a child with depression resulted in maternal stress and subsequent digestive problems. It is also possible that children who will later be hospitalized for a depression related diagnosis impact their mother's body in an unknown manner that results in digestive problems. No prior research was available on this topic. It is suggested that it be explored further with a larger sample size while controlling for maternal anxiety and depression.

The relationship between maternal hospitalization for accidents and child hospitalization for depression may be related to impulsivity if it is assumed that, as a whole, accident prone mothers are more impulsive than mothers who are not accident prone and that children of impulsive mothers are more likely to be impulsive than children of non-impulsive mothers. Although impulsivity is not directly related to depression (Hansenne et. al, 1999), it has been linked to suicidality (Pende et al., 1999; Corbitt, Malone, Haas, & Mann, 1996), one of the most common reasons an individual would be hospitalized under a depression related diagnosis.

Limitations

One limitation of this study is that only depressed individuals who have been hospitalized are included in the sample. Therefore, there may be many others in the sample who met criteria for depressive disorders but were not hospitalized. There may be many factors that separate depressed individuals who are hospitalized for depression from

depressed individuals who are not hospitalized for depression such as severity of depression, display of aggression, etc.

Furthermore, many of the subjects in the present study were hospitalized on other occasions for other psychiatric diagnoses such as anxiety disorders, alcohol/drug abuse, schizophrenia, or a personality disorder. Therefore, they may have been misdiagnosed with depression, or depression may have been secondary to another condition. Even if all individuals were appropriately diagnosed with depression, the presence of other conditions adds variability to the sample that may alter the results. The variability impedes the ability to conclude that the analyzed variables are specifically linked to depression instead of general psychopathology.

Similarly, the diversity of the diagnoses included in the study poses a potential problem. Although no differences appeared between the diagnostic categories for most variables, the sample sizes of some categories were too small to provide sufficient information. The possibility remains that the relationships between some of the variables and depression are not applicable to all depression related disorders, particularly given the inclusion of bipolar disorders. However, if all individuals had the same diagnosis, the possibility would remain that the true relationship was between the variable and a characteristic other than depression, such as poor social skills, but the likelihood is reduced.

In addition, no information was available about the treatments received by either the depressed or non-depressed samples. It is possible that a significant portion of the ‘non -depressed’ sample was actually depressed but received treatment in the form of medication and/or psychotherapy that prevented hospitalization. It would be of interest to

compare the percentages of each group receiving each type of treatment for depression (i.e., medications, psychotherapy) as well as the effects of each treatment.

The sample also lacks diversity. The vast majority of the children are Caucasian and of Finnish descent and those in the minority were predominantly Caucasian and from other Scandinavian countries (i.e., Denmark, Norway, and Sweden). Therefore, results may not generalize to non-Caucasian, non-Scandinavian youth.

In regard to prenatal conditions, temperament, and behavior problems, non-response bias may have been an additional limiting factor in this study. Preschool temperament data was available for only 1114 (17.4%) of the 6401 subjects and infant temperament data was available for only 2019 (31.5%) of the 6401 subjects in the Helsinki Longitudinal Temperament Project. Of the 61 subjects in the depressed sample, only 9 (14.8%) had preschool temperament data and 15 (24.6%) had infant temperament data. Although a proportional amount of depressed and non-depressed subjects had temperament data, those subjects whose mothers agreed to complete temperament data may have differed from the remainder of the sample. For instance, they may have had fewer or more temperamental eccentricities or their parents may have been more educated and, therefore, more appreciative of research and more willing to acquiesce to the researchers' requests to complete temperament scales.

Because preschool temperament data was collected at a routine age 5 medical check-up, the individuals whose mothers provided preschool temperament ratings may have been more physically ill than the other children. Although the check-up was free to all families (as is all health care in Finland) and recommended by physicians, it is

possible that mothers of healthy children would be less inclined to take their child for the check-up than mothers of children who had chronic or frequent health problems.

Ideally, this study would have been conducted with a much larger depressed sample, all subjects would have had a major depressive disorder diagnosis, and the study would have included subjects who were depressed but never hospitalized for their condition. It also would have been preferable to have temperament data for all individuals, instead of a small percentage of them. Under such conditions, more statistical analyses could be performed and the results would have increased validity.

Conclusion

Perhaps the most important finding in this study was that of a relationship between maternal hospitalizations and hospitalization for depression. As little or no research has previously been conducted in this area, this finding provides a potential new direction for exploring the risk of developing depression. Further study could reveal a medical profile of women at high-risk for having children needing mental health hospitalization. A critical factor would be to understand why these patterns of hospitalization occurred for these mothers. Genetics, environment, and mother-child relationships would all be pertinent factors to consider.

In conclusion, if large numbers of depressed and non-depressed individuals can be compared on temperament characteristics, demographic variables, parental data, pre-natal conditions, birth order, and birth month, characteristics of those who become depressed may be able to be identified at early ages. Characteristics found to predict later hospitalization for depression should not be viewed in isolation. In contrast, it would be beneficial to identify groups of characteristics that describe children at risk for

depression. Results of independent studies should be meta-analyzed to create such descriptions to aid in early identification. If early identification occurs, early intervention techniques can be constructed and implemented to prevent development of depression. Possible intervention techniques include cognitive therapy (i.e., reduction of cognitive distortions), behavioral therapy (e.g., increased activity), and coping skills training.

REFERENCES

- Abramson, L., Seligman, M., & Teasdale, J. (1978). Learned helplessness in humans; Critique reformulation. *Journal of Abnormal Psychology, 87*, 49-74.
- Akiskal, H.S., Hirschfield, R.M.A., & Yerevanian, B.I. (1983). The relationship of personality to affective disorders. *Archives of General Psychiatry, 40*, 801-810.
- Altman, J.H., & Wittenborn, J.R. (1980). Depression-prone personality in women. *Journal of Abnormal Psychology, 89*(3), 303-308.
- American Psychiatric Association. (1987). *The diagnostic and statistical manual of mental disorders* (3rd ed., revised). Washington, DC: Author.
- American Psychiatric Association. (1994). *The diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Ampollini, P., Marchesi, C., Signifredi, R., Ghinaglia, E., Scardovi, F., Codeluppi, S., Maggini, C. (1999). Temperament and personality features in patients with major depression, panic disorder and mixed conditions. *Journal of Affective disorders, 52*, 203-207.
- Angold, A. & Rutter, M. (1992). Effects of age and pubertal status on depression in a large clinical sample. *Development and Psychopathology, 4*, 5-28.
- Apter, A., van Praag, H.M., Plutchik, R., Sevy, S., Korn, & Brown, (1990). Interrelationships among anxiety, aggression, impulsivity, and mood: A serotonergically linked cluster?, *Psychiatry Research, 32*(2), 191-199.

- Arieti, S., & Bemporand, J. (1980). The psychological organization of depression. *American Journal of Psychiatry*, *136*, 1360-1365.
- Barlow, D.H. (1991). Disorders of emotion. *Psychological Inquiry*, *2*, 58-71.
- Beck, A.T., Brown, G., Steer, R. A., Eidelson, J.I., & Riskind, J.H. (1987). Differentiating anxiety and depression: A test of the cognitive content-specificity hypothesis. *Journal of Abnormal Psychology*, *96*(3), 179-183.
- Beck, A.T., Rush, A., Shaw, B.F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Beck, J. (1995). *Cognitive therapy: Basics and beyond*. New York: The Guilford Press.
- Benfield, C.Y., Palmer, D.J., Pfefferbaum, B., & Stowe, M.L. (1988). Comparison of depressed and non-depressed disturbed children on measures of attributional style, hopelessness, life stress, and temperament. *Journal of Abnormal Child Psychology*, *16*(4), 397-410.
- Billings, A.G., & Moos, R.H. (1983). Comparisons of children of depressed and nondepressed parents: A social-environmental perspective. *Journal of Abnormal Child Psychology*, *11*(4), 463-486.
- Birmaher, B., Ryan, N.D., Dahl, R., Rabinovich, H., Ambrosini, P., Williamson, D.E., Novacenko, H., Nelson, B., Lo, E.E.S., & Puig-Antich, J. (1992). Dexamethosone suppression test in children with major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *31*, 291-297.

- Birmaher, B., Ryan, N.D., Williamson, D.E., Brent, D.A., Kaufman, J., Dahl, R.E., Perel, J., & Nelson, B. (1996). Childhood and adolescent depression: A review of the past 10 years. Part I. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(11), 1427-1439.
- Blumberg, M.L. (1981). Depression in abused and neglected children. *American Journal of Psychotherapy*, 35, 1981.
- Brady, E.U., & Kendall, P.C. (1992). Comorbidity of anxiety and depression in children and adolescents. *Psychological Bulletin*, 111(2), 244-255.
- Brambilla, F., Musetti, C., Tachchini, C., Fontanillas, J. & Guareschi-Cazullo, (1989). Neuroendocrine investigation in children and adolescents with dysthymic disorders: The DST, TRH, and clonidine tests. *Journal of Affective Disorders*, 17(3), 279-284.
- Brown, S.L., Svrakic, D.M., Przybeck, T.R., & Cloninger, C.R. (1992). The relationship of personality to mood and anxiety states: A dimensional approach. *Journal of Psychiatric Research*, 26, 197-211.
- Carey, W.B. (1970). A simplified method of measuring infant temperament. *Journal of Pediatrics*, 77, 168-174.
- Casat, C.D., Arana, G. D. & Powel, K. (1989). The DST in children and adolescents with major depressive disorder. *American Journal of Psychiatry*, 146, 503-507.
- Caspi, A., Henry, B., McGee, R.O., Moffitt, T.E., & Silva, P.A. (1995). Temperamental origins of child and adolescent behavior problems: From age three to age fifteen. *Child Development*, 66, 55-68.

- Clark, L., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology, 103*(1), 103-116.
- Cloninger, C.R., Svrakic, D.M., & Przybeck, T.R. (1993). A psychobiological model of temperament and character. *Archives of General Psychiatry, 50*(12), 975-990.
- Cole, P.M., Zahn-Waxler, C., Fox, N., Usher, B.A., & Welsh, J.D. (1996). Individual differences in emotion regulation and behavior problems in preschool children. *Journal of Abnormal Psychology, 105*(4), 518-529.
- Cooke, R.G., Trevor Young, L., Mohri, L., Blake, P., & Joffe, R.T. (1999). Family-of-origin characteristics in bipolar disorder: a controlled study. *Canadian Journal of Psychiatry, 44*(4), 379.
- Corbitt, E.M., Malone, K.M., Haas, G.L., & Mann, J.J. (1996). Suicidal behavior in patients with major depression and comorbid personality disorders. *Journal of Affective Disorders, 39*, 61-72.
- Costello, E.J., Costello, A. J., Edelbrock, C., Burns, B.J., Dulcan, M.K., Brent, D., & Janiszewski, S. (1988). Psychiatric disorders in pediatric primary care. *Archives of General Psychiatry, 45*, 1107-1116.
- Crook, T. & Raskin, A. (1975). Association of childhood parental loss with attempted suicide and depression. *Journal of Counseling and Clinical Psychology, 43*, 277-282.
- Crumley, F.E., Clevenger, J., & Steinfink, D (1982). Preliminary report on the dexamethasone suppression test for psychiatrically disturbed adolescents. *The American Journal of Psychiatry, 139*(8), 1062-1064.

- Davenport, Y., Adland, M., Gold, P. (1979). Manic depressive illness: Psychodynamic features of multigenerational families. *American Journal of Orthopsychiatry*, 49, 24-35.
- Dobson, K.S. (1989). A meta-analysis of the efficacy of cognitive therapy for depression. *Journal of Consulting and Clinical Psychology*, 57, 414-419.
- Druss, B.G., Rosenheck, R.A., & Sledge, W.H. (2000). Health and disability costs of depressive illness in a major U.S. corporation. *American Journal of Psychiatry*, 157(8), 1274-1278.
- Egeland, J.A., Gerhard, D.S., Pauls, D.L., Sussex, J.N., Kidd, K.K., Allen, C.R., Hostletter, A.M., & Housman, D.E. (1987). Bipolar affective disorders linked to DNA markers on chromosome 11. *Nature*, 325, 783-787.
- Egeland, J.A. & Hostetter, A.M. (1983). Amish Study, 1: Affective disorders among the Amish, 1976-1980. *American Journal of Psychiatry*, 140, 56-61.
- Eisenberg, N., Fabes, R., Shepard, S., Murphy, B., Guthrie, I., Jones, S., Friedman, J., Poulin, R., & Maszk, P. (1997). Contemporaneous and longitudinal prediction of children's social functioning from regulation and emotionality. *Child Development*, 68(4), 642-664.
- Eisenberg, N., Guthrie, I.K., Fabes, R., Reiser, M., Murphy, B.C., Holgreen, R., Maszk, P., & Losoya, S. (1997). The relations of regulation and emotionality to resiliency and competent social functioning in elementary school children. *Child Development*, 68(2), 295-311.

Engstrom, G., Alling, C., Gustavsson, P., Oreland, L., & Traskman-Bendz, L. (1997).

Clinical characteristics and biological parameters in temperamental clusters of suicide attempters. *Journal of Affective disorders*, *44*, 45-55.

Exetein, I., Rosenberg, G., & Pottash, A. (1982). The dexamethasone suppression test in depressed adolescents. *American Journal of Psychiatry*, *139*, 1617-1619.

Field, T. (1995). Infants of depressed mothers. *Infant Behavior and Development*, *18*, 1-13.

Goldsmith, H.H., Buss, A.H., Plomin, R., Rothbart, M.K., Thomas, A., Chess, S., Hinde, R., & McCall, R.B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, *58*, 505-529.

Ha, L., Molcan, K., & Cashman, N. (1984). The dexamethasone suppression test in adolescent depression. *American Journal of Psychiatry*, *141*: 421-423.

Hall, R.C.W., & Wise, M.G. (1995). The clinical and financial burden of mood disorders: Cost and outcome. *Psychosomatics*, *36*(2), s11-s18.

Hamilton, M. (1989). Mood disorders: Clinical features. In H.I. Kaplan & B.J. Sadock (Eds.), *Comprehensive textbook of psychiatry/V* (5th ca, Vol. I, pp. 892-913). Baltimore: Williams & Wilkins.

Hammen, C. (1990). Cognitive approaches to depression in children: Current findings and new directions. In B. Lahey & A.E. Kazdin (Eds.), *Advances in clinical child psychology* (Vol 13, pp. 139-173). New York: Plenum Press.

Hansenne, M., Reggers, J., Pinto, E., Kjiri, K., Ajamier, A., & Ansseau, M. (1999).

Temperament and character inventory (TCI) and depression. *Journal of Psychiatric Research*, *33*, 31-36.

- Hare, E.H., & Moran, P.A. (1979). Raised parental age in psychiatric patients: Evidence for the constitutional hypothesis. *British Journal of Psychiatry*, *134*, 169-177.
- Hare, E.H. & Price, J.S. (1970). Birth rank in schizophrenia: With a consideration of the bias due to changes in birth rate. *British Journal of Psychiatry*, *116*, 409-420.
- Hirschfeld, R.M.A., & Klerman, G.L. (1979). Personality attributes and affective disorders. *American Journal of Psychiatry*, *136*, 67-70.
- Hirschfeld, R.M.A., Klerman, G.L., Clayton, P.J., Keller, M.B., McDonald-Scott, P., Larkin, B.H., (1983). Assessing personality: Effects of the depressive state on trait measurement. *American Journal of Psychiatry*, *140*, 695-699.
- Hirschfeld, R.M.A., Klerman, G.L., Lavori, P., Keller, M., Griffith, P., & Coryell, W. (1989). Premorbid personality assessments of first onset of major depression. *Archives of General Psychiatry*, *46*, 345-350.
- Joffe, R.T., Bagby, R.M., Levitt, A.J., Regan, J.J., & Parker, D.A. (1993). The Tridimensional Personality Questionnaire in major depression. *American Journal of Psychiatry*, *150*, 959-960.
- Joyce, P.R., Mulder, R.T., Cloninger, C.R. (1994). Temperament predicts clomipramine and desipramine response in major depression. *Journal of Affective disorders*, *30*, 35-46.
- Kagan, J. (1998). Biology and the child. In W. Damon and N. Eisenberg (Eds.), *Handbook of child psychology. Volume 3: Social, emotional, and personality development*. (pp. 105-176). New York: J. Wiley.

- Kaslow, N.J., Rehm, L.P., & Siegel, A.W. (1984). Social-cognitive and cognitive correlates of depression in children. *Journal of Abnormal Child Psychology*, *12*, 605-620.
- Kazdin, A.E., French, N.H., Unis, A.S., Esveldt-Dawson, K., & Sherick, R.B. (1983). Hopelessness, depression, and suicidal intent among psychiatrically disturbed inpatient children. *Journal of Consulting and Clinical Psychology*, *51*, 504-510.
- Kerr, M., Tremblay, R.E., Pagani, L., & Vitaro, F. (1997). Boys' behavioral inhibition and the risk of later delinquency. *Archives of General Psychiatry*, *54*, 809-816.
- Knesevich, J.W., LaBarge, E., Martin, R.L., Danziger, W.L., & Berg, L. (1982). Birth order and maternal age effect in dementia of the Alzheimer type. *Psychiatric Research*, *7*, 345-350.
- Kochanska, G., Murray, K., Jacques, T.Y., Koenig, A.L., and Vandegeest, K.A. (1996). Inhibitory control in young children and its role in emerging internalization. *Child Development*, *67*, 490-507.
- Krauthammer, C., & Klerman, G.L. (1978). Secondary mania: manic syndromes associated with antecedent physical illness or drugs. *Archives of General Psychiatry*, *35*, 1333-1339.
- Kutcher, S., Malkin, D., Silverberg, J., Marton, P., Williamson, P., Malkin, A., Szalai, J., & Katic, M. (1991). Nocturnal cortisol, thyroid stimulating hormone, and growth hormone secretory profiles in depressed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *30*, 407-414.
- Lazare, A. (1979). Manic behavior. In A. Lazare (Ed.), *Outpatient psychiatry: Diagnosis and treatment* (pp. 261-264). Baltimore: Williams & Wilkins.

- Lewinsohn, P.M., Roberts, R.E., Seeley, J.R., Rohde, P., Gotlib, I.H., & Hops, H. (1994). Adolescent psychopathology: II. Psychosocial risk factors for depression. *Journal of Abnormal Psychology, 103*(2), 302-315.
- Martin, R.P., (1999). The temperamental foundation of developmental psychopathology: Toward a theory of temperamental types. Paper presented at the biannual meeting of the Society for Research in Child Development, Albuquerque, New Mexico, April, 1999.
- Martin, R.P. & Bridger, R.C. (1999). *Temperament Assessment Battery for Children-Revised: A Tool for the Assessment of Temperamental Traits and Types of Young Children*. School Psychology Clinic of the University of Georgia: Athens, GA U.S.A.
- Martin, R.P., Bridger, R., Huttunen, M. (2000). Prediction of mental health and somatic health hospital admissions from early childhood temperament types. Paper presented at the International Congress of Psychology, Stockholm, Sweden, July, 2000.
- Martin, R.P., Wisenbaker, J., Baker, J., & Huttunen, M.O. (1997). Gender differences in temperament at six months and five years. *Infant Behavior and Development, 20*(3),339-347.
- Martin, R.P., Wisenbaker, J., & Huttunen, M.O. (1999). Nausea during pregnancy: Relation to early childhood temperament and behavior problems at twelve years. *Journal of Abnormal Child Psychology, 27*(4), 323-329.

- Mash, E.J. & Barkley, R.A. (1996). *Child Psychopathology*. New York: The Guilford Press. Medical Economics. (2002). *The physician's desk reference (56th ed.)*. Montvale, NJ: Author
- Mehrabian, A. & Weinstein, L. (1985). Temperament characteristics of suicide attempters. *Journal of Consulting and Clinical Psychology, 53*, 544-546.
- Miller, S.M. & Green, M.L. (1985). Coping with stress and frustration: Origins, nature and development. In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 263-314). New York: Plenum.
- Mullins, L.L., Peterson, L., Wonderlich, S.A., & Reaven, N.M. (1986). The influence of depressive symptomatology in children on the social responses and perceptions of adults. *Journal of Clinical Child Psychology, 15*(3), 233-240.
- Mundt, C., Kronmuller, K.T., & Backenstrais, M. (2000). In A. Marneros & J. Angst (Eds.), *Bipolar disorders: 100 years after manic-depressive insanity* (pp. 201-213). Great Britain: Kluwer Academic Publishers.
- Nolen-Heksema, S., Seligman, M.E.P., & Girgus, J.S. (1992). Predictors and consequences of childhood depressive symptoms: A 5-year longitudinal study. *Journal of Abnormal Psychology, 101*(3), 405-422.
- Orvaschel, H., Welsh-Allis, G., & Ye, W. (1988). Psychopathology in children of parents with recurrent depression. *Journal of Abnormal Child Psychology, 16*, 17-28.
- Osher, Y., Lefkifker, E., & Kotler, M. (1999). Low persistence in euthymic manic-depressive patients: A replication. *Journal of Affective Disorders, 53*(1), 87-90.
- Papoulos, D. & Papoulos, J. (1999). *The bipolar child: The definitive and reassuring guide to childhood's most misunderstood disorder*. New York: Broadway Books.

- Pende, B., Westrin, A., Engstrom, G. (1999). Temperament traits in seasonal affective disorder, suicide attempters with non-seasonal major depression and healthy controls. *Journal of Affective disorders, 54*, 55-65.
- Pfouts, J.H., Schopler, J.H., & Henley, H.C. (1982). Forgotten victims of family violence. *Social Work, 27*(4), 367-368.
- Ptok, U., Maier, W., Heun, R., & Papassotiropoulos, A. (2000). Advanced parental age: A risk factor for Alzheimer's disease or depression in the elderly? *International Psychogeriatrics, 12*(24), 445-451.
- Rende, R.D., Plomin, R., Reiss, D., & Hetherington, E.M. (1993). Genetic and environmental influences on depressive symptomatology in adolescence: Individual differences and extreme scores. *Journal of Child Psychology and Psychiatry, 8*, 1387-1398.
- Reynolds, W.M. (1990). Introduction to the nature and study of internalizing disorders in children and adolescents. *School Psychology Review, 19*(2), 137-141.
- Richman, V.V., Richman, E.M., & Richman, A. (2000). Patterns of hospital costs for depression in general hospital wards and specialized psychiatric settings. *Psychiatric Services, 51*(2), 179-181.
- Rothbart, M.K., & Bates, J.E., (1998). Temperament. In W. Damon and N. Eisenberg (Eds.), *Handbook of child psychology. Volume 3: Social, emotional, and personality development.* (pp. 105-176). New York: J. Wiley.
- Roy, A., Segal, N.L., Centerwall, B.S., & Robinette, C.D. (1991). Suicide in twins. *Archives of General Psychiatry, 48*(1), 29-32.

- Roy, A., Segal, N.L., & Sarchiapone, M. (1995). Attempted suicide among living co-twins of twin suicide victims. *American Journal of Psychiatry*, *152*(7), 1075-1076.
- Rupp, A. (1995). The economic consequences of not treating depression. *British Journal of Psychiatry*, *166*, 29-33.
- Rutter, M. et. al (1975). Attainment and adjustment in two geographical areas: III. Some factors accounting for area differences. *British Journal of Psychiatry*, *126*, 520-533.
- Schulsinger, R., Kety, S., Rosenthal, D. (1979). A family study of suicide. In M. Schou & E. Stromgren (Eds.) *Origins, Prevention, and Treatment of Affective disorders*. (pp. 277-287). New York: Academic Press.
- Stark, K.D., Humphrey, L.L., Laurent, J., Livingston, R., & Christopher, J. (1993). Cognitive, behavioral, and family factors in the differentiation of depressive and anxiety disorders during childhood. *Journal of Consulting and Clinical Psychology*, *61*(5), 878-886.
- Stene, J., Stene, F., Stengel-Rutkowski, S., & Murken, J.D. (1981). Paternal age and Down's Syndrome: Data from prenatal diagnoses (DFG). *Human Genetics*, *59*, 119-124.
- Sullivan, P.F., Neale, M.C., & Kendler, K.S. (2000). Genetic epidemiology of major depression: Review and meta-analysis. *American Journal of Psychiatry*, *157*(10), 1552-1562.

- Susman, E.J., Inoff-Germain, G., Nottelmann, E.D., Loriaux, D.L., Cutler, G.B., and Chrousos, G.P. (1987). Hormones, emotional dispositions, and aggressive attributes in young adolescents. *Child Development*, 58, 1114-1134.
- Teerikangas, O.M., Martin, R.P., Huttunen, M.O., & Aronen, E.T. (1998). Effects of infant temperament and early intervention on the psychiatric symptoms of adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 37(10), 1070-1076.
- Todd, R. (1997). The link between parental alcoholism and childhood mood disorders: A family/genetic perspective. *Medscape Mental Health*, 2(4).
- Todd, R., Reich, W., & Reich, T. (1999). Prevalence of affective disorder in the child and adolescent offspring of a single kindred: A pilot-study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 33(2), 198-208.
- Urakami, K., Adachi, Y., & Takahashi, K. (1989). A community based study of parental age at the birth of patients with dementia of the Alzheimer type, *Archives of Neurology*, 46, 38-39.
- Vinoda, K.S. (1966). Personality characteristics of attempted suicides. *British Journal of Psychiatry*, 112, 1143-1150.
- Wachtel, P.L. (1994). Cyclical processes in psychopathology. *Journal of Abnormal Psychology*, 103, 51-54.
- Watson, C.G. & Kucala, T. (1978). Anhedonia and death. *Psychological Reports*, 34, 1120-1122.
- Weissman, M.M. & Klerman, G.L. (1977). Sex differences and the epidemiology of depression. *Archives of General Psychiatry*, 34, 98-111.

- Wenar, C. (1994). *Developmental Psychopathology: From Infancy to Adolescence/ Third Edition*. New York: McGraw-Hill, Inc.
- Wender, P.H., Kety, S.S., Rosenthal, D., & Schulsinger, F. (1986). Psychiatric disorders in the biological and adoptive families of adopted individuals with affective disorders. *Archives of General Psychiatry*, 43(10),923-929.
- Wierzbicki, M. (1987). Similarity of monozygotic and dizygotic child twins in level and lability of subclinically depressed mood. *American Journal of Orthopsychiatry*, 57, 33-40.
- Woolfolk, A.E. (1998). *Educational Psychology: Seventh Edition*. Needham Heights, MA: Allyn and Bacon.
- Wretmark, G., Astrom, J., & Eriksson, M. (1970). The Maudsley Personality Inventory as a prognostic instrument. *British Journal of Psychiatry*, 116, 21-26.