DEVELOPMENT AND ASSESSMENT ISSUES IN THE DIAGNOSIS OF EARLY-ONSET BIPOLAR DISORDER

A Dissertation

by

CARRIE GEORGE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2004

Major Subject: School Psychology

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Approved as to style and content by:

Cynthia Riccio (Chair of Committee)	Michael Ash (Member)
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ABSTRACT

Development and Assessment Issues in the Diagnosis

of Early-Onset Bipolar Disorder. (August 2004)

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Psychologists face challenges on a daily basis. Among the challenges they face are making diagnostic decisions. Recently, bipolar disorder has shown an increase in diagnosis in children and adolescents. Once felt to be an adult disorder, journals are describing the use of the diagnosis with children and adolescents. While the diagnosis has been considered as relevant, no psychological measures have been developed to make an accurate diagnosis. Developing a new psychological measure for bipolar disorder in children is critical. Due to the lack of data on what constitutes normal behavior as well as the absence of an accurate measurement of early-onset bipolar disorder, it is necessary to develop such a measure. The purpose of this study was to evaluate a newly developed measure based on the literature on bipolar disorder in children. The measure was developed through a review of the current literature, DSM-IV-TR criteria for bipolar disorder, and ideas developed within a bipolar disorder research team at Texas A&M University. Because of the item content, the new measure is entitled the Mania Assessment Scale for Children (MASC). The first steps in understanding a new measure for early-onset bipolar disorder is to determine the factor

structure of the scale as well as the reliability and validity. Results indicated that the MASC is best understood as a measure with a single score, or factor. Once the underlying structure of the MASC was determined, the study evaluated which behaviors of typically developing children may be misconstrued as indicative of bipolar disorder. Group differences on the measure are also evaluated. Results from statistical analysis showed that there were significant group differences between age groups, but not gender and ethnic groups. In addition, there was a statistically significant difference between clinical and non-clinical groups. To conclude, a discussion of the findings and recommendations for future research is presented. Overall, it is hoped that the study will help psychologists better understand the complexity of behaviors associated with the diagnosis of bipolar disorder in children and adolescents.

This dissertation is dedicated to my grandmothers,

Laurine Julia Reed and Mildred Eileen George,

because of their eternal love and support.

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CHAPTER I

INTRODUCTION

A family presents their four year old son, Jake, for a psychological consult. The presenting problem is that Jake is exhibiting erratic behaviors. Parents indicate that Jake has mood swings, temper tantrums, oppositional behavior, aggression, and noncompliance. A psychologist operating within the medical model of assessment would look at Jake's presenting problems as useful information in making a diagnostic decision. Much like his/her medical colleagues, symptoms can be used by psychologists to make a diagnosis and then develop a treatment plan. Unfortunately, presenting problems rarely tell the whole story for child and adolescent clients. Further assessment may reveal many different diagnostic options. Jake may have a medical condition, a psychological condition, or no actual condition at all. For example, a medical condition such as deafness may cause their son to get frustrated at home and at school resulting in the aforementioned behaviors. Similarly, Jake may be experiencing Oppositional Defiant Disorder, Attention-Deficit/Hyperactivity Disorder or early-onset Bipolar Disorder. His parents even may be surprised to learn that Jake has no medical or psychological diagnosis. He may only be experiencing typical behaviors for a four year

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This dissertation follows the style and format of the *Journal of Clinical Child and Adolescent Psychology*.

old child. With proper guidance the parents and Jake may be able to get through this difficult time quickly.

Child psychologists face such challenging cases on a daily basis. One of the responsibilities of child psychologists is making accurate diagnostic decisions. Accurate diagnosis depends on a variety of factors, such as symptom presentation, developmental stage, psychological assessment, and background information. Any aspect of these factors that is found to be erroneous or unreliable can lead the psychologist in the wrong direction. Diagnostic decisions are directly related to treatment options, so care must be taken in making these decisions. The purpose of this study is to address some of the issues surrounding diagnostic decision making in children and adolescents.

In Chapter I, an introduction to the current study is presented. A general overview of the study, the statement of the problem, a brief review of the literature, and the importance and purpose of the study are presented. Finally, research questions and corresponding hypotheses are discussed.

Chapter II provides an expanded review of the literature that was alluded to in Chapter I. The literature covers developmental perspectives, a history of the diagnosis of bipolar disorder, and current research findings from peer reviewed journals. Chapter III follows with an explanation of the study participants, the instruments utilized, the procedures, and the data analyses conducted. Sample demographics are provided. Chapter IV presents the results of the study in graphic and tabular format, while Chapter V provides a discussion of the findings explained in Chapter IV. The research questions

are reviewed and the findings are interpreted. Conclusions and future directions for research are identified.

Statement of the Problem

One factor that child psychologists need to take into consideration when making diagnostic decisions is developmental stage. For example, Jake's display of oppositional behavior, tantrums, assertiveness and mood swings are actually normal for his developmental stage. If a psychologist was not aware of the normal behaviors for Jake's developmental stage, then the psychologist might mistakenly diagnose Jake with a psychological disorder. In diagnosing children, the issues of developmental stage cannot be ignored. Children in the early childhood stage of development will display very different behaviors from children in middle childhood or adolescent stages of development. Therefore, psychologists need to interpret the child's behavior in terms of their development.

When do childhood behaviors become abnormal? Approximately 14-22% of children and adolescents experience psychological problems that are considered to be abnormal (Mash & Dozois, 1996**).** One important consideration is whether the behavior the child is displaying is causing significant distress to the child in more than one setting [American Psychiatric Association (APA), 2000]. For example, Attention-Deficit/Hyperactivity Disorder (ADHD) cannot be diagnosed unless the child is experiencing inattention and hyperactivity/impulsivity across at least two settings, and these behaviors negatively impact functioning (APA, 2000). Thus, if behaviors are only causing distress at school, then the diagnosis should not be made. In addition, if the

behaviors are noticeable**,** but not in excess, and are not causing significant impairment in functioning, the diagnosis should not be made. Therefore, while a child may be restless, inattentive, and impulsive, they may not have a disorder or be abnormal.

According to Cullinan, Epstein, and Lloyd (1983), in the late 1800s there had been relatively few studies of normal or abnormal child development. Children in the late 1800s were considered to be little adults and any disorders they experienced were just a "downward extension of adult disorders" (Cullinan et al., 1983, p. 19). However, once schooling became more available to the masses, children's behaviors became a larger focus. Now, in the twenty-first century, the study of child psychology is a highly researched area. Fields such as developmental psychology, school psychology, clinical child psychology, and pediatric psychology focus entirely on the special features of child psychopathology.

To understand abnormal mood in children, one must first establish "normal" behavior. The focus of this dissertation is to look at abnormal mood in children, specifically related to depression, mania, and bipolar disorder. Some argue that mood disorders, such as depression, do not exist in children, but literature suggests that depression does exist and it needs further study (Hammen & Rudolph, 1996). The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* [DSM-IV-TR; APA, 2000] supports the diagnosis of depression in children and provides specific criteria that are different from adults (e.g. irritable mood). A greater understanding of other mood disorders is needed. The following section briefly reviews current information on bipolar disorder in children.

Bipolar Disorder in Children

Psychologists now look at several disorders like ADHD and depression with regard to development, but bipolar disorder has not received the same treatment. While Anthony and Scott (1960), and Davis' (1979) work contributed to the field, the DSM-III (APA, 1980) and DSM-III-R (APA, 1987) did not establish specific criteria for bipolar disorder in children. Currently, the DSM-IV-TR states that the criteria for adult bipolar disorder also can be used to diagnose children (APA, 2000). Depression, a characteristic feature of bipolar disorder, has criteria for children, but bipolar disorder does not.

Current research on bipolar disorder in children primarily appears in medical and psychiatric journals. Psychiatrists and physicians report that children with bipolar disorder may display unusual behavior from infancy. Some of the behaviors children may experience include night terrors, sleep disturbances, difficulties in being soothed and extreme reactions to sensory input **(**Papolos & Papolos, 1999). Manic features reported in children include increased disruptive behavior, hyperactivity, impulsivity, inattention, irritability, tantrums, and sleep disturbances (Weller, Weller, & Fristad, 1995). Several of the manic features believed to occur in children are similar to ADHD or normal development.

Other symptoms include increased speech and activity, delusions of grandeur, racing thoughts, anxiety, and unusual sexual behaviors (Child and Adolescent Bipolar Foundation, 2000). Children also are reported to experience mood swings that shift so rapidly that they are called ultra-rapid cycling (Papolos & Papolos, 1999). Symptoms and behaviors reported in the literature show a lot of variation. The variety of symptoms

can make diagnostic decisions difficult. Also making diagnosis difficult is the fact that psychologists are not studying this disorder. This highlights the need for research on early-onset bipolar disorder to be a focus for psychologists.

Diagnostic Issues

Before making any psychological diagnosis, it is important to rule out neurological disorders, drug use, and other metabolic conditions (Sanchez, Hagino, Weller, & Weller, 1999). These conditions can mimic psychological disorders. Many psychological disorders also have features similar to bipolar disorder; these disorders include ADHD, conduct disorder, and schizophrenia. Symptoms of these disorders are similar to bipolar disorder; this can make differential diagnosis difficult. When diagnosing any disorder, it is also important to rule out symptoms that may be culture bound (APA, 2000).

Because of symptom presentation, bipolar disorder can be difficult to assess in children. It can mimic other disorders like Attention-Deficit/Hyperactivity Disorder (ADHD), schizophrenia, and other externalizing disorders. Like many disorders in children, it also can be coexist (comorbidity) with other disorders (Mash & Dozois, 1996). It may be difficult for a child psychologist to parse out which symptoms go with which disorders.

Comorbidity is common; both ADHD and conduct disorder are felt to co-exist with bipolar disorder (Sanchez, et al., 1999). Several studies link these disorders together (Carlson, 1998; Giedd, 2000; Kovacs & Pollack, 1995; Sachs, Baldassano, Truman, & Guille, 2000). These will be discussed in more detail in Chapter II.

Assessment Issues

An appropriate evaluation may help make diagnostic decisions easier, but what makes an appropriate evaluation? A multi-method, multi-faceted assessment that includes family history, child history, checklists, observations, interviews, and other assessment measures is desirable.

Literature specific to bipolar disorder, from psychiatry journals, suggests using interviews with the parents, children and teachers. Teachers are valuable sources of information because they interact with a variety of children and can provide feedback on the abnormality of the behavior. Relying solely on others' reports should not be the only method chosen. Classroom and clinical observations are critical as well (Sanchez et al., 1999; Weller et al., 1995).

Other than interviews, behavioral checklists also can be used in the diagnosis of bipolar disorder. There are several available for assessing the adult symptoms of bipolar disorder. All of the adult scales have limited research data to support their use. No checklist is currently available that is specific to early-onset bipolar disorder.

Other behavioral checklists such as the Conners Parent Rating Scale (Conners, 1990), the Child Behavior Checklist (Achenbach & Edelbrock, 1983), and the Behavior Assessment System for Children (Reynolds & Kamphaus, 1992) can assist child psychologists in making diagnostic decisions. None of these scales are specific to bipolar disorder and most are omnibus measures of children's behavior (Sanchez et al., 1999; Weller et al., 1995). There is a practical need for an accurate measure of bipolar

disorder in children. The need for reliable and accurate assessment of bipolar disorder is necessary because treatment depends on it (Mash, 1998).

In order to learn more about bipolar disorder in children (early-onset bipolar disorder), more accurate assessment is needed. As described earlier, there are no reliable or accurate measures available to assess this disorder in children. In addition, symptom overlap and developmental stage have not been adequately addressed. There is still of lot to be determined about this controversial diagnosis. Even though research in the area is sparse, bipolar disorder is becoming an increasingly common diagnosis in children (Rice, Reich, & Andreasen, 1987). More information is needed on these issues. It is time to look more carefully at the diagnosis of bipolar disorder as it relates to children.

Importance and Purpose of the Study

Developing a new psychological measure for bipolar disorder in children is critical. Due to the lack of data on what constitutes normal behavior as well as the absence of an accurate measurement of early-onset bipolar disorder, it is necessary to develop such a measure. Overall, the use of the new measure would add to the comprehensive assessment of children being evaluated by persons in the mental health field by adding to the knowledge base of what constitutes normative behavior.

The purpose of this study was to evaluate a newly developed measure based on the literature on bipolar disorder in children (see Chapter II-Literature Review). The measure was developed through a review of the current literature, DSM-IV-TR criteria for bipolar disorder, and ideas developed within a bipolar disorder research team at Texas A&M University; however, a new measure should not be used without

investigating its reliability and validity. Therefore, the dissertation evaluated the new measure. Because of the item content, the new measure is entitled the Mania Assessment Scale for Children (MASC).

Once having determined the reliability and validity of the MASC, the purpose of the study was to evaluate which behaviors of typically developing children may be misconstrued as indicative of bipolar disorder. Children are expected to be sad, agitated, or overactive at times, but data are needed to determine how much mood fluctuation is normal. Then, and only then, can we determine at what point mood fluctuation is abnormal.

Research Questions and Hypotheses

The present study examined the reliability and validity of results from a new measure for bipolar disorder in children. In conjunction with this, the MASC was evaluated to determine if there are any underlying latent factors. Further, an attempt was made to determine whether the MASC is sensitive to differences between clinical and non-clinical groups. The present study addressed the following questions:

1. What is the underlying latent factor structure of the results obtained from the MASC? Are results better understood/interpreted as a single score or factors? If more than one factor exists, then what is the internal consistency of the factors? It is expected that there will be at least two factors obtained from the MASC. The factors are expected to represent manic and depressive symptoms.
2. How do the results of the MASC relate to the *Behavior Assessment Scale for Children* (BASC) scales? It is expected that the factors obtained from the first

analysis will have comparable scores to the BASC. That is, if factor/total scores are elevated on the MASC, then similar factor/total scores should be elevated on the BASC (e.g. Depression scale on BASC similar to depression factor on MASC; Behavior Symptom Index of the BASC and the total MASC score).

3. To what extent do behaviors associated with bipolar disorder occur at differing developmental levels across groups of children and adolescents? Do behavioral levels change depending on the *age* of the child? Do behavioral levels change depending on the *gender* of the child? Do behavioral levels change depending on the *ethnicity* of the child? It is expected that behavioral levels will vary across age and gender, but not ethnicity based on the literature in the field.
4. Do children in a clinical group differ from a matched non-clinical group on the MASC? It is expected that scores on the MASC and the BASC will be significantly higher for clinical groups.

Implications for Practice

The results of the study will be beneficial for the field of psychology. Practitioners and researchers can utilize the instrument in making reliable diagnoses. For example, they can better understand the behaviors associated with different developmental levels, gender, and ethnicities. Practitioners also can utilize the results to determine what behaviors are normal and what are not. Finally, practitioners can begin to identify the key behaviors that differentiate early-onset bipolar disorder from similar disorders.

Additional details about the implications of the study will be examined in Chapter V. In the next section, Chapter II, an extensive review of literature occurs. Relevant studies and current findings are discussed as relevant to the dissertation. Chapters III, IV, and V address the method, results, and a discussion of the findings of the study.

CHAPTER II

REVIEW OF THE LITERATURE

After an introduction to the current study in the previous chapter, a review of the literature is necessary. In the current chapter, the literature regarding the assessment and diagnosis of bipolar disorder in children and adolescents is given. Specifically, the chapter covers social/emotional development and the history of diagnosing bipolar disorder. As bipolar disorder often is confused with similar disorders, information on comorbidity and differential diagnosis will be reviewed. In addition, the ramifications of diagnosing children and adolescents with bipolar disorder are considered. The following section, Chapter III, examines the method and procedure of the current study, including the participants, measures, and the details of the data analysis. In Chapter IV, the results are presented. Chapter V, Discussion, discusses the meaning behind the results of the study.

Developmental Issues

Development is an important factor for psychologists to consider when making diagnostic decisions. Development is central to understanding behavioral difficulties in children. There are several behaviors that are common to one age group that are uncommon to another age group (Kamphaus & Frick, 1996). Historically, development has been looked at in terms of the stage the child was in. A developmental stage is defined as "a distinct phase within a larger sequence of development; a period

characterized by a particular set of abilities, motives, behaviors, or emotions, that occur together and form a coherent pattern" (Shaffer, 1989, p. 41). Freud, Erickson, and Piaget each formulated different developmental stages to help psychologists understand personality. Sigmund Freud (1856-1939) saw development in terms of the individual satisfying instincts, urges, and motives, also known as the psychosexual stages of development (Cole & Cole, 2001). In each stage the child has an internal battle between the id, ego, and superego. His stages were comprised of the oral stage (birth to 1 year), the anal stage (1 to 3 years), the phallic stage (3 to 6 years), the latency period (6 to 12 years), and the genital stage (12 years onward). Freud's stages of development have been noted to be controversial because of the focus on early sexual desires and incestuous attractions to parents of the opposite sex (Shaffer, 1989).

Erik Erickson (1902-1994) had similar views about development (regarding instincts and personality components), but he differed from Freud in many ways. For example, he saw the child as an active agent in their environment, while Freud saw the child as passive. In addition, Freud's theory stressed the conflict between the id and superego in forming the adult personality. Erickson felt the ego was key to understanding development. Erickson's psychosocial stages of development involved eight stages as compared to the five stages in Freud's theory. His stages included Trust versus Mistrust (birth to 1 year), Autonomy versus Shame and Doubt (1 to 2 years), Initiative versus Guilt (3 to 6 years), Industry versus Inferiority (7 to puberty), Identity versus Role Confusion (adolescence), Intimacy versus Isolation (early adulthood), Generativity versus Stagnation (middle age), and Integrity versus Despair (old age).

Erickson's stages extend past young adulthood, revealing how development can change across the lifespan (Shaffer, 1989).

Jean Piaget (1896-1980), a Swiss scholar, created a theory of human development that centered on cognitive development. His view was that development was divided into four periods: the Sensorimotor Stage (birth to 2 years), the Preoperational Stage (2 to 7 years), the Concrete-Operational Stage (7 to 11 years), and the Formal-Operational Stage (11 to adulthood). Piaget felt that as children grow they learn to adapt to the environment by assimilating and accommodating successfully to new experiences (McDevitt & Ormond, 2002; Shaffer, 1989). Piaget's theory was similar to Erickson's theory in that he envisioned the child taking an active role in their own life.

Critical to all the aforementioned theories is that children are expected to progress in a sequence. Consistent with this, psychologists look at developmental milestones as a sign of making progress. Developmental milestones are behaviors that a parent can expect from a child at a particular age. For instance, an infant is expected to sit up around six months of age, and say their first word around 12 months of age. Developmental milestones are also important in psychological development. Separation anxiety is an example of a disorder that is typical for one stage development, but abnormal for other stages of development (Kamphaus & Frick, 1996). Bedwetting also is typical for a young child, but atypical for an older child. Intellectual skills play a role as well. If a child has cognitive delays, they may not acquire the psychological skills of a child the same age until a later date.

In children, some behaviors remain consistent across all stages of development, such as feeding and sleeping problems (Jenkins, Owen, Bax, & Hart, 1984). In fact, what many consider as problem behaviors are actually part of normal development. Bragging, reckless behavior, overactivity, temper tantrums, motor restlessness, imaginative thinking, grandiosity, and impaired judgment are typical for children as they develop into adulthood (Sanchez et al., 1999; Weckerly, 2002). Other behaviors are specific to a certain age group. Tantrums in the early childhood years and rebellion in the adolescent years are felt to be normal for their developmental stage (Kamphaus & Frick, 1996).

A psychologist unaware of typical development may misdiagnosis a child with a psychological disorder. If observed in isolation, one might think that childhood/adolescence is a disorder. In fact, Anna Freud described the period of adolescence as a time of "developmental disturbance" (Lerner, 1986, p. 301). Neither childhood nor adolescence is a time of disturbance for most, however. It is a time of changing emotions, cognitions, and physical ability. Children are not little adults; they are developing into adults. Therefore, psychologists need to interpret the child's behavior in terms of their development. Several questions arise when considering development. The aforementioned behaviors are noted to be typical for children, but to what extent? In addition, when does normal behavior become abnormal?

Historically, there have been relatively few studies of normal and abnormal child development. In the late 1800s, children were considered to be little adults and the disorders they experienced were just a "downward extension of adult disorders"

(Cullinan et al., 1983, p. 19). Once mandatory schooling came into existence, children's behaviors became more important to research and understand. Currently, in the 21st century, child psychology is an area of much research. Now, fields such as school psychology, clinical child psychology, developmental psychology, and pediatric psychology focus entirely on the unique features of children.

Much progress has been made since the late 1800s. In 1896, Lightner Witmer opened the first child psychological clinic in the United States (Cullinan et al., 1983). Clifton Beers and Adolph Meyer created the National Committee for Mental Hygiene in 1909 that conducted multiple surveys on children's mental health and developed child guidance centers. In 1924, the American Orthopsychiatric Association was created specifically to look at preventative methods for correcting children's behavioral problems. Around this same time, universities began offering courses on children with handicapping conditions (Cullinan et al., 1983). After World War II, children's educational opportunities became a focus of the nation and they were seen as important to our society. Other contributions made by Piaget, Binet, and Gesell, led to a greater understanding of normal and abnormal childhood development.

In spite of the advances that were made, there is still a lack of studies on normal developmental processes. According to Mash and Dozois (1996), "far greater attention has been devoted to the description and classification of psychopathology in children than to healthy child functioning" (p. 16). The following paragraphs review some of the behaviors known to be present during childhood.

In each stage of development, children exhibit a variety of behaviors, some of which are typical and some of which are atypical. In early childhood (3-5 years old), children may display dependence, independence, affection, oppositional behaviors, noncompliance, tantrums, physical and verbal aggression, moodiness, jealousy, excessive happiness, bossiness, helpfulness, loudness, impulsivity, anxiety, and carelessness (Bowler & Linke, 1989; Helms & Turner, 1978; Jenkins et al., 1984; Puckett & Black, 2001; Smart & Smart, 1978). These behaviors, considered typical in the early childhood stage of development, can be very different from the typical behaviors in the middle childhood or adolescent stages of development.

In middle childhood (6-11 years old), the typical behaviors children may show include anxiety, social withdrawal, assertiveness, politeness, physical and verbal aggression, critical behaviors, hyperactivity, impulsivity, talkativeness, purposeful behaviors, shyness, pickiness, self-confidence, and mood swings (Bowler & Linke, 1989; Helms & Turner, 1978).

In adolescence (12-18 years old), children may exhibit unpredictable moods, rebelliousness, independence, happiness, sexual desire, delinquency, and anxiety (Knopf, 1984; Lerner, 1986). Adolescence also is characterized by "heightened instability and emotional conflict" brought on by the biological changes of puberty (Cole & Cole, 2001, p. 606). Each stage has behaviors that are specific to it, but also behaviors that span development.

According to Mash and Dozois (1996), approximately 14-22% of children experience behaviors that can be classified as abnormal. Behavior is abnormal when it

is, "1) unusual or statistically infrequent, 2) socially unacceptable or in violation of social norms, 3) fraught with misperceptions of reality, 4) associated with states of severe emotional distress, 5) maladaptive or self-defeating, or 6) dangerous" (Rathus & Nevid, 1991). In addition, abnormal behavior impairs the child and causes significant distress in more than one setting (APA, 2000). Attention-Deficit/Hyperactivity Disorder (ADHD), for example, can only be diagnosed if a child experiences the symptoms (inattention, hyperactivity, and impulsivity) in at least two settings and the symptoms negatively impact functioning. If the behaviors are noticeable**,** but are not causing significant impairment in functioning, the diagnosis should not be made. Additionally, if the impulsivity, hyperactivity or impulsivity were only occurring at school, then the diagnosis should not be made. So, even if a child is displaying behaviors consistent with ADHD, they may not be given a diagnosis. For most disorders, the same reasoning is applied.

Bipolar Disorder in Children

In the present day, psychologists look at disorders like ADHD and depression with regard to development, but development is not considered for many other disorders. Of the disorders that children and adolescents may experience, the focus of this study will be on mood disorders in children, specifically depression, mania, and bipolar disorder. Depression can be viewed as a symptom or a syndrome. As a symptom, it is a general feeling of unhappiness. As a syndrome, depression is a psychiatric disorder characterized by a general feeling of sadness, insomnia, loss of appetite, anhedonia, inability to concentrate, feelings of guilt, helplessness and hopelessness, and thoughts of

death. Mania is a symptom of bipolar disorder that involves rapidly changing ideas, exaggerated sexuality, feelings of grandiosity, irritability, and decreased need for sleep. Bipolar disorder is a combination of depressive and manic symptoms that impair the person's functioning.

Bipolar disorder has recently become the focus of study in pediatric literature. For many years, its incidence in child populations was questioned. As far back as the mid-19th century, mania has been reported in preschool children (Weller et al., 1995). In 1921, Kraeplin described the appearance of childhood mania; Barratt also found that manic behaviors existed in children. Kraeplin found that 0.04% of his patients with mania could be diagnosed prior to age 10 (Weller et al., 1995). In 1960, Anthony and Scott created diagnostic criteria for childhood mania based on a study of 60 children with manic symptoms. In their study, 5% of the children met criteria for mania (Weller et al., 1995). Table 1 provides further information on Anthony and Scott's diagnostic criteria.

Table 1

Childhood Bipolar Criteria

Bipolar Criteria	Anthony & Scott	Davis	Current Research
Abnormal Personality (extroverted)	✓		
Abnormal Psychiatric State	✓	✓	✓
Absence of Other Psychological Problems	✓		
Affective Storms/Tantrums		✓	✓
Anxiety			✓
Current Problems	✓	✓	✓
Enuresis		✓	
Evidence of Recurrent Problems	✓		
Family History of Bipolar Disorder	✓	✓	✓
Hyperactivity/Disruptive Behavior		✓	✓
Impairment (work/relationships)	✓	✓	✓
Impulsivity			✓
Improvement with Lithium		✓	
Inattention			✓
Internal Problems/Issues	✓		
Inflated Self-Esteem			✓
Irritability			✓
Mood Swings (Depressed and Manic)	✓		✓
Neurological Problems		✓	
Racing Thoughts/Flight of Ideas			✓
Sleeping Problems (Insomnia/Hypersomnia)		✓	✓
Talkativeness			✓
Tendency to React in a Bipolar Fashion	✓		
Unusual Sexual Behavior for Age			✓

In 1972, Feighner created diagnostic criteria that assisted in the diagnosis of mania in adults; these criteria were subsequently used in the DSM-III. A few years later in 1976, Weinberg and Brumback modified Feighner's adult criteria for children (Findling, Kowatch, & Post, 2003). The researchers created the first set of diagnostic criteria for childhood mania. In their criteria, they emphasized that during manic

episodes children also experienced high rates of depressive symptoms. Irritability often was present during the manic episodes as well. Weinberg and Brumback further discriminated childhood mania from childhood hyperactivity (like ADHD) in that children with mania experienced episodic hyperactivity, while children with "hyperactive child syndrome" experienced chronic hyperactivity (Findling et al., 2003, p. 16)

Davis (1979) identified a syndrome he called Manic-Depressive Variant Syndrome of Childhood. The disorder was considered a variant of the adult disorder because children were displaying behaviors inconsistent with adult manic or depressive episodes. Davis stated that there were primary and secondary criteria for the syndrome. Primary criteria included (1) affective storms, (2) a family history of an affective disorder, (3) hyperactivity, and (4) impaired personal relationships. The secondary criteria included (1) sleeping problems, (2) minimal brain dysfunction, (3) abnormal EEG, (4) enuresis, and (5) neurological problems. Children received a diagnosis of Manic-Depressive Variant Syndrome of Children if they met all of the primary criteria and one of the secondary criteria. Children additionally had to show marked improvement with lithium treatment. Therefore, the treatment predicted the diagnosis, instead of the diagnosis predicting the treatment. Davis' explanation of Manic-Depressive Variant Syndrome differed greatly from Anthony and Scott's early views. The only features the bipolar-like disorders shared were an evidence of impairment, current problems, and a family history of bipolar disorder.

While Anthony and Scott, and Davis' work contributed to the field, the DSM-III and DSM-III-R did not establish specific criteria for bipolar disorder in children. Currently, the DSM-IV-TR states that the criteria for adult bipolar disorder also can be used to diagnose children (APA, 2000). Depression, a characteristic feature of bipolar disorder, has criteria for children, but bipolar disorder or mania do not. Bipolar disorder in adults can appear in many ways (APA, 2000). In bipolar I disorder the client may experience (1) a manic episode, (2) a depressive episode, or (3) a mixed (depressive/manic) episode. Table 2 provides the symptoms of manic and depressive episodes.

Significant impairment to normal functioning must occur to meet criteria for a manic or mixed episode. In bipolar II disorder, the client may experience (1) a hypomanic episode (low-grade mania), (2) a depressive episode, and (3) no manic or mixed episodes. Symptoms of bipolar II do not significantly impair the client's functioning. Neither form of bipolar disorder can be better accounted for by substance use, a medical condition, schizophrenia, or dysthymia (APA, 2000). If rapid cycling between manic and depressive symptoms occurs, then bipolar disorder, not otherwise specified can be diagnosed. Literature on bipolar disorder in children suggests that children often experience rapid cycling (Papolos & Papolos, 1999).

After understanding adult bipolar disorder, the next task is to determine if bipolar disorder exists in children. In pediatric literature, some researchers argue that mood disorders (like bipolar disorder) do not exist in children, but other researchers argue the opposite (Hammen & Rudolph, 1996). For depression, the general consensus is that the

diagnosis of depression is appropriate for children (APA, 2000). Special criteria are included regarding childhood diagnoses (e.g. irritable mood).

Table 2

Manic and Depressive Symptoms (APA, 2000)

Mania	Depression
Abnormally elevated, expansive or irritable mood lasting one week or more	Depressed mood
Inflated self-esteem	Loss of interest in pleasurable activities
Decreased need for sleep	Weight loss or gain
Extreme talkativeness	Insomnia or hypersomnia
Flight of ideas	Thoughts of death
Distractibility	Motor agitation or retardation
Increased goal-directed activity	Fatigue
Excessive involvement in activities that involve high amounts of pleasure	Feelings of worthlessness or guilt
Severe impairment in functioning or need for hospitalization	Poor concentration or indecisiveness
Symptoms not due to substance use or a medical condition	Severe impairment in functioning
	Symptoms not due to a substance or a medical condition
	Symptoms not cause by bereavement

Despite the lack of different criteria, and the controversy regarding the diagnosis, more and more children are being diagnosed with early-onset bipolar disorder. At the same time, early-onset or childhood bipolar disorder has been observed to be very different from the adult form. According to Weckerly (2002):

> Pediatric mania represents a distinct, genetically mediated, severe subtype of bipolar disorder that differs in presentation, correlates, and treatment from the adult-onset form of the disorder. It has also been proposed that differences in presentation between children and adults have more to do with the developmentally mediated expression of symptoms. Findings to date indicate that the notions of developmental variations in disorder presentation, developmental antecedents (i.e. anxiety as a precursor to later mood disorder) as well as the frequency of other psychiatric conditions that co-occur with early-onset mania, complicate the diagnosis and conceptualization of pediatric bipolar disorder. (p. 43)

The psychiatric literature reports that children with bipolar disorder demonstrated unusual behavior from infancy (Papolos & Papolos, 1999). Early signs of bipolar disorder may include night terrors, sleep disturbances, difficulty being soothed, and reacting negatively to sensory input (Papolos & Papolos, 1999). Other early symptoms may include disruptive behaviors, hyperactivity, impulsivity, inattention, irritability, and tantrums (Weller et al., 1995). Many of the manic symptoms are similar to symptoms found in ADHD or normal development.

Current literature indicated that childhood bipolar symptoms also may include rapid speech, talkativeness, grandiosity, racing thoughts, anxiety, and inappropriate sexual behaviors (Child and Adolescent Bipolar Foundation, 2000). Findling, Kowatch, and Post (2003) added that symptoms in children can include physical aggression, mood swings, poor frustration tolerance, suicidal behaviors, grandiosity, and sexual

preoccupation. Weckerly (2002) stated that children with mania can appear irritable and often violent (hitting, kicking, biting). These behaviors are referred to as "affective storms". An affective storm is a prolonged period of tantrums and aggression often directed toward caregivers, teachers, or siblings (Davis, 1979). According to Weckerly (2002), the symptoms of pediatric mania occur every day for at least 4 hours per day (off and on). Rapidly shifting mood swings also are evident. The literature calls these mood swings ultra-rapid cycling (Papolos & Papolos, 1999). In a recent study (Geller et al., 1995) of 26 children diagnosed with bipolar disorder, ultra-rapid cycling occurred in 81% of the cases. Psychotic symptoms, suicidality, and hyperactivity were also evident in the subject pool.

Diagnostic Issues

To make a diagnosis of a psychiatric disorder, one must first understand the basics of classification systems. According to Kamphaus and Frick (1996), "classification refers to the process of placing psychological phenomenon into distinct categories according to some specified set of rules" (p. 41). In the United States, and most countries, psychiatric disorders are classified into groups with similar symptoms sets. This is beneficial for several reasons. First, a classification system allows for professionals to communicate with one another. Second, classification systems assist the professional in conducting and understanding research. Third, classification systems assist the professional in determining the need for psychological services. That is, if a child is identified at having ADHD, then therapy, medical treatment, and school interventions may be necessary. Further, research is available to demonstrate which

treatments are efficacious for children with ADHD. Finally, and most importantly, classification systems allow for a sense of commonality among all professionals, so that each professional is not creating their own diagnostic system (Kamphaus & Frick, 1996).

Classification systems are valuable if they are both reliable and valid. Reliable means that two professionals using the same classification system will come up with the same diagnosis. Valid means that diagnostic criteria for each syndrome is different from another. While psychiatric classifications are useful, they have limitations, too. The professional loses information by squeezing people into categories. In addition, classification systems "foster the illusion of a clear break between normal and pathological functioning. . .The users of classification systems must understand the often arbitrary line between categories and make interpretations accordingly" (Kamphaus & Frick, 1996, p. 43)

In the United States, the International Classification of Diseases-10th Edition (ICD-10) and the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition, Text Revision* (DSM-IV-TR; APA, 2000) are the most commonly used classification systems for psychiatric disorders. The current study will be utilizing the DSM-IV-TR as the classification system. The DSM is a diagnostic classification system based on the medical (based on clinical experience) and multivariate models (based on statistical techniques) of classification (Kamphaus & Frick, 1996) The DSM uses a mult-axial method of communicating information about psychiatric disorders. Axis I includes clinical disorders; Axis II includes personality disorders and mental retardation; Axis III covers medical issues; Axis IV covers psychosocial stressors and Axis V gives

the professional an opportunity to present numerical information regarding the patient's level of functioning.

In this section, information about the diagnosis of bipolar disorder based on the DSM-IV-TR will be covered. In particular, age of onset, prevalence, course, differential diagnosis, and comorbidity are discussed. There are still many questions regarding age of onset, prevalence, course, differential diagnosis, and comorbidity. Overall, the symptoms of mania and bipolar disorder in children reported in the literature vary and do not reflect the adult criteria use for diagnosis. The variety of symptoms can make diagnostic decisions difficult. Some feel it may be easier to make a diagnosis of bipolar disorder in adolescents than younger children; diagnostic reliability is higher in adolescents than children (Faedda et al., 1995).

Age of Onset. Regarding age of onset of bipolar symptoms, there have been inconclusive reports in the literature. Most studies found that bipolar symptoms were found as early as the preschool years (e.g. restlessness, grandiosity, recklessness, increased energy). For example, a retrospective study of adults with bipolar disorder indicated that 0.05% of adults had symptoms between 5-9 years of age. Seven and one-half percent had symptoms between 10-14 years of age (Loranger & Levine, 1978). Another study stated that 25% of adults had an onset of symptoms prior to age 20 **(**Faedda et al., 1995). There are problems with retrospective studies, however, because of the reliance on memory. False memories can affect the reliability of the findings. There is a need for studies within the developmental context. A final study found that 11% of adults with bipolar disorder were symptomatic as adolescents. An additional 2%

were symptomatic prior to age 15 (Baron, Risch, & Mendlewicz, 1982). In children who have been diagnosed with bipolar disorder, 70% had symptoms at age 5 or younger (Wozniak et al., 1995).

Prevalence. Prevalence studies have been limited in the literature. For definition, prevalence refers to the number of cases of a disorder in the population, whereas the incidence refers to the frequency of the occurrence. Lewinsohn, Klein, and Seely **(**1995) interviewed 1709 adolescents with structured diagnostic interviews. Of these adolescents, 5.7% had symptoms of bipolar disorder (e.g., mood swings, irritability, or an elevated or expansive mood). This is not, however, a diagnosis of bipolar disorder. In adults, the prevalence of bipolar disorder is 1% (Faedda, et al., 1995).

Course and Prognosis. The literature reports that children and adolescents with a diagnosis of bipolar have a chronic course. Geller and Delbello (2003) declared that 35% of adolescents who developed bipolar disorder in childhood had not remitted by age 19 and 12% had not remitted by age 24. Other problems were noted as well; young adults, with bipolar disorder had more psychosocial impairment and were less likely to graduate from college (Aalto-Setala et al., 2002; Geller & Delbello, 2003).

Follow-up studies in children with bipolar disorder indicated that recovery time was approximately 36 weeks. The proportion of children that recovered from manic symptoms was 65% and the proportion who relapsed after recovery was 55%. Living with an intact family increased recovery rates. Medication did not predict recovery or relapse (Geller et al., 2002a). Follow-up studies in adolescents with bipolar disorder

revealed that 44% relapsed after 5 years. A quicker recovery was noted in adolescent patients with pure or mixed mania versus pure depression (Strober et al., 1995).

On the whole, when diagnosed with bipolar disorder, a person will have "high rates of relapse, chronicity, and psychosocial disability" and a relatively poor outcome (Geller, Craney, Bolhofner, et al., 2002; Strober et al., 1995, p. 724). Ninety percent of children with bipolar disorder have adult symptoms as well (Kessler, Avenevoli, & Merikangas, 2001). The long term negative impacts of bipolar disorder make accurate early diagnosis critical.

Differential Diagnosis. Differential diagnosis is the act of determining the difference between two disorders within a classification system. Differential diagnosis is challenging with early-onset bipolar disorder. Bipolar disorder can be difficult to discriminate from other disorders in children because of symptom presentation. When making diagnostic decisions, it is important to rule out neurological disorders, drug use, and other metabolic conditions (Sanchez et al., 1999). Steroid, antidepressant and stimulant use, endocrine disorders, head trauma, multiple sclerosis, temporal lobe seizures, hyperthyroidism also can confuse psychological diagnosis due to similarities in behavior (Weller et al., 1995).

Bipolar disorder also can mimic other disorders like ADHD, Conduct Disorder, schizophrenia, anxiety, depression, Post Traumatic Stress Disorder, language disorders, Oppositional Defiant Disorder, medical conditions, and substance and medication use (Geller & Luby, 1997; McClellan & Werry, 1997). Bipolar disorder also can be comorbid with other disorders. Because of comorbidity, it may be difficult for a child

psychologist to parse out the symptoms of each disorder. Outside of medical conditions, other psychological disorders have features similar to bipolar disorder (see Table 3). These disorders include depression, anxiety, ADHD, Conduct Disorder (CD), and schizophrenia. When diagnosing any disorder, it is also important to rule out symptoms that may be culture bound (APA, 2000). Culture bound symptoms are those that are normal for a child given the culture they grew up in. For example, some Latino cultures find it normal to have a visual hallucination of a recently deceased relative. In the United States, a psychologist might misinterpret the vision as a symptom of a psychotic disorder.

Depressive disorders share half of their features with bipolar disorder. It is important for psychologist to determine if a child has depression or something more complex. Bowden (2001) felt that children who exhibit depression may later reveal bipolar disorder. He stated that "bipolar disorder starts in childhood or early adulthood in most patients-the more likely the first episode or two are to be depression" (p. 52). He also stated that early age on onset of depressive symptoms and multiple depressive episodes are more suggestive of bipolar disorder than depression. Dilsaver (2001) recommended that psychologists be careful in diagnosing depression in children when it is mixed with conduct problems. He stated that children with depression and conduct problems are best diagnosed with bipolar disorder.

Table 3

Symptom Set for Similar Psychiatric Disorders (APA, 2000)

Bipolar Criteria	ADHD	Anxiety	CD	Depression
Abnormally elevated, expansive or irritable mood	✓	✓	✓	✓
Inflated self-esteem			✓	
Decreased need for sleep	✓	✓		
Extreme talkativeness	✓			
Flight of ideas				
Distractibility	✓	✓		✓
Increased goal-directed activity	✓		✓	
Excessive involvement in activities				
Depressed mood			✓	✓
Loss of interest in activities				✓
Weight loss or gain				✓
Insomnia or hypersomnia	✓			✓
Motor agitation or retardation	✓	✓		✓
Fatigue		✓		✓
Feelings of worthlessness or guilt				✓
Poor concentration	✓	✓		✓
Thoughts of death			✓	✓

Anxiety disorders often appear like bipolar disorder as well. In studies of children with symptoms of mania evidence indicates a significant overlap between anxiety disorders, like panic disorder, and mania (Birmaher et al., 2002; Masi et al., 2001). In adults, the comorbidity of anxiety disorders and bipolar disorder occur at a higher frequency than in the general populations. The two types of disorders may be linked because of the influence of similar biological mechanisms, specifically neurotransmitters like norepinephrine, dopamine, gamma-aminobutyric acid (GABA), and serotonin (Freeman, Freeman, & McElroy, 2002). For example, research supports

heightened norepinephrine and dopamine activity in anxiety disorders and bipolar disorder (Freeman et al., 2002). Research linking the two disorders in children is still limited.

ADHD and bipolar disorder have striking similarities. In both disorders, children may display increased restlessness, emotional lability, agitation, aggression, sleep disruption, poor school performance, motor activity, distractibility, impulsivity and hyperactivity (Sarampote et al., 2002; Weckerly, 2002; Weller et al., 1995). Kessler et al. (2001) stated that it is difficult "in the absence of expert clinical evaluation to distinguish pediatric mania from ADHD" because of symptom similarities (p. 1003). Hyperactivity is the most common symptom shared by both disorders. A study using the *Child Behavior Checklist* (CBCL; Achenbach & Edelbrock, 1983) found that children with ADHD did not differ from children with bipolar disorder on several scales of the CBCL (Dienes et al., 2002).

Another study found that 11% of children diagnosed with ADHD (N = 140) had bipolar symptoms at a 4 year follow up using the K-SADS and SCID diagnostic interviews (Biederman et al., 1996). Faraone et al. (1997) reviewed data from 637 consecutive admissions to a pediatric pharmacology clinic and indicated that ADHD, in fact, may be a precursor for bipolar disorder. Other researchers have found a marriage between an early diagnosis of ADHD and a later diagnosis of bipolar disorder (State, Altshuler, & Frye, 2002). In contradiction**,** Roberts, Parker, Woogh, Cripps, and Froese (2000) reviewed a database of 1,697 children from a Canadian hospital and they did not find that children with ADHD diagnosis had bipolar disorder as adults. Indeed, there is

limited consensus in the literature regarding the link between ADHD and bipolar disorder.

In neuropsychology studies, ADHD and bipolar disorder appear similar due to executive functioning deficits, apparent memory problems, and attention abnormalities (Quraishi & Frangou, 2001). For example, adults with bipolar disorder performed worse on neuropsychological measures of verbal memory, executive functioning, speed of information processing, and dexterity (Basso, Lowery, Neel, Purdie, & Bornstein, 2002). In adults, there is evidence of white matter lesions in the frontal lobes and basal ganglia, which can affect overall executive functioning skills, regulation of affect, attention, information processing, learning, and memory (Bearden, Hoffman, & Cannon, 2001). A study of 31 adolescents (aged 12-18) diagnosed with bipolar disorder found executive functioning deficits similar to adults (Shear, DelBello, Rosenberg, & Strakowski, 2002). Right hemisphere abnormalities are often present (Bearden et al., 2001). Attention deficits and memory problems can lead to a poorer course in both disorders especially regarding later occupational functioning (Harmer, Clark, Grayson, & Goodwin, 2002).

So, how can you differentiate bipolar disorder from ADHD? According to Weller and colleagues (1995), children with ADHD may have a lower self-esteem than children with bipolar disorder. Children with bipolar disorder may display delusions of grandeur that are inconsistent with ADHD. At the same time, Biederman et al. (1996) suggested that children with ADHD are at greater risk for bipolar disorder and its associated problems.

Sleep disturbances also are noted in ADHD (as well as depression and anxiety) and bipolar disorder, but children with bipolar disorder show a marked change in their sleep patterns while children with ADHD may have sleep disturbances that are noticeable when compared to same age peers, but their sleep patterns are relatively normal for them (Sanchez et al., 1999). In addition, behavior problems evident in children with ADHD are not a marked change either; behavior problems for children diagnosed with bipolar disorder are felt to be a marked change from what is typical for them (Sanchez et al., 1999). In a recent study of 268 children with bipolar disorder (N= 93), ADHD (N= 81), or no diagnosis (N= 94), five symptoms discriminated bipolar disorder from other groups; these included elation, grandiosity, flight of ideas, racing thoughts, decreased need for sleep, and hypersexuality (Geller et al., 2002b).

Another disorder that is commonly confused with bipolar disorder is Conduct Disorder (CD). Overlapping features include hostility, impulsivity, and irritability. Irritability is more violent in bipolar disorder, however (Kim & Miklowitz, 2002). Conduct Disorder is characterized by risky behavior with a lack of regard for others' feelings (APA, 2000). Children diagnosed with bipolar disorder also can participate in risky behavior. Children with either disorder experience mood swings (Weller et al., 1995). Children with bipolar disorder are believed to be "more mischievous" in their risky behavior without meaning to harm others (Weller et al., 1995, p. 712). This is different from CD in that someone diagnosed with this disorder often shows intent to harm others without remorse.

Research on children of parents with antisocial personality disorder, CD, or bipolar disorder completed by Wozniak, Biederman, Faraone, Blier and Monuteaux (2001) found that children with parents diagnosed with bipolar disorder had increased rates of bipolar disorder, but not CD. Children of parents with a history of antisocial personality disorder or CD had increased rates of CD, but not bipolar disorder. A unique combination of CD + bipolar disorder in parents also led to the unique combination in their children. This combination in children was not found at any other time. Children with features of both disorders have a complex clinical picture. For example, physical restlessness and poor judgment were more common in children with CD + bipolar disorder than with children only diagnosed with bipolar disorder **(**Biederman et al., 2003).

Schizophrenia and bipolar disorder also have overlapping symptoms (Weller et al., 1995). In both disorders, children can display psychotic features such as auditory hallucinations, persecutory delusions, paranoia, loosening of associations, and cognitive problems (Faedda et al., 1995). This can be confusing for a child psychologist because both disorders are felt to be rare in children. The two disorders can be distinguished from one another in several ways. First, children with bipolar disorder are more affectionate than children with schizophrenia (Weller et al., 1995). Second, children with bipolar disorder are noted to have a family history of mood disorders, while children with schizophrenia are noted to have a family history of psychotic disorders (Weller et al., 1995). Third, the engaging, charming qualities of children with bipolar disorder are typically lacking in children with schizophrenia (Sanchez, et al., 1999). Finally,

children with bipolar disorder may perform better on cognitive measures than children with a diagnosis of schizophrenia **(**Faedda et al, 1995).

Another issue complicating the differential diagnosis of bipolar disorder is that rebound effects (increased excitability, moodiness, talkativeness, irritability, and insomnia) from stimulant medications like Ritalin, Adderall, and Concerta can look like the symptoms of bipolar disorder. A case study at the Children's National Medical Center found rebound effects in a child diagnosed with ADHD that were similar to symptoms of bipolar disorder (Botteron & Geller, 1995; Sarampote et al., 2002). Psychologists should be cognizant of medication issues when making diagnostic decisions. Rebound effects for children taking other medications (antihistamines, asthma medications) could not be found in the literature.

Comorbidity. While the underlying rationale of a diagnostic taxonomy is to identify the best explanation of the behaviors being emitted (symptom set), this kind of parsimony is not always helpful. Psychological disorders in childhood are often comorbid with another disorder which can make the diagnosis of bipolar disorder more challenging (Mash & Dozois, 1996). In the National Comorbidity Study, 90-100% of children diagnosed with bipolar disorder had a comorbid condition. Disruptive behavior disorders (like ADHD) were common and from 33-90% of children diagnosed with bipolar disorder met criteria for ADHD (Carlson, 1995; Kessler et al., 2001). According to the literature, both ADHD and CD have been found to co-exist with early-onset bipolar disorder (Carlson, 1998; Giedd, 2000; Kovacs & Pollack, 1995; Sachs et al., 2000; Sanchez, et al., 1999).

Wozniak and colleagues (1995) studied 262 clinically referred children; Sixteen percent met criteria for mania. Of these children, many also met criteria for ADHD and anxiety disorders. Anxiety often co-occurs with bipolar disorder and can "mask evidence of bipolar disorder" (Bowden, 2001, p. 55). For CD, a study of 26 children diagnosed with bipolar disorder suggested that 69% of children have a lifetime comorbidity with CD. Comorbidity with CD is felt to lead to a chronic course overall (Kovacs & Pollock, 1995). Comorbidity can make differential diagnosis extremely complex.

Familial Studies

In making diagnostic decisions, a psychologist also must consider family factors. Much of the literature discusses family context as a risk factor in terms of heritability. Potentially related to this heritability, others have investigated parenting styles and other family factors. Both of these will be discussed in greater detail in this section.

Heritability. Available literature from psychiatric journals propose that a family history of bipolar disorder is an important factor in making diagnoses. In a meta-analysis, children of parents with bipolar disorder are 2.7 times more likely to have a mental disorder and 4.0 times more likely to have an affective disorder (Lapalme, Hodgins, & LaRoche, 1997). Familial studies demonstrate that a when a child has a first degree relative with a diagnosis of bipolar disorder there is a 20% chance that the child will have a diagnosis of bipolar disorder. If one parent has a diagnosis of bipolar disorder and the other parent has a mood disorder, then the risk jumps to 70% in offspring (Findling et al,, 2003). Pediatric bipolar disorder is tied more to family history

than adult-onset bipolar disorder (Faedda et al, 1995). A possibility of chromosomal linkage is possible in the children of parents diagnosed with a psychotic form of bipolar disorder (Potash et al., 2001). In addition, neuroanatomic abnormalities suggestive of bipolar disorder (large hippocampal volumes) have been found in children of parents diagnosed with bipolar disorder. This is more evidence supporting a genetic link (DelBello et al., 2000). Parent may have passed down a neurological propensity to develop a mood disorder like bipolar disorder or depression.

While there is an increased risk for offspring to develop bipolar disorder when a parent has the diagnosis, the risk is not 100%. A unique relationship exists between mood disorders (like bipolar disorder) in first degree relatives and children, in that children may not acquire a mood disorder or they may develop a disruptive behavior disorder or attention problems (Carlson & Weintraub, 1993). One study suggested that 51% of children with a parent diagnosed with bipolar disorder had a psychiatric condition, such as ADHD, depression, or dysthymia (Chang, Steiner, & Ketter, 2000). Familial studies reveal that affective disorders increase in children with a family history of mood disorders (Geller, 1996; Weckerly, 2002).

In contrast to the predominant view that familial history is highly relevant to diagnosis, Wals et al. (2001) found that there was no evidence of higher psychopathology in children (aged 12-20) with parents diagnosed with bipolar disorder. In their study, the researchers evaluated problem behavior in 140 offspring of 86 parents with bipolar disorder using the CBCL, the Teacher's Report Form (TRF), and the Youth Self-Report (YSF). Children and parents also were evaluated with the K-SADS.

Results demonstrated that the sample did not demonstrate statistically significant differences between the children and a control group.

Parenting Style. Parents vary in the treatment of their children. Affection and discipline play a key role in child emotional development. The amount of each can seriously affect a child. Psychologists have studied several types of parenting styles, like authoritarian, authoritative, permissive, and uninvolved parenting (McDevitt & Ormond, 2002). In authoritarian parenting, parents implement discipline with firm consequences, but affection is limited. Children raised by authoritarian parents often have later emotional difficulties (e.g. low self-esteem, poor social skills, aggression). Authoritative parenting leads to the best emotional adjustment in children because parents display warmth and a more democratic discipline style. In contrast, permissive parenting allows children to manage themselves. Children raised by permissive parents may have difficulty in school or they may act aggressive. The final type of parenting style is uninvolved parenting. Uninvolved parents do not make many demands on their children and warmth is limited. The results of this type of parenting are an increase in frustration, emotional problems, school problems, and delinquent behavior in children. According to Lapalme et al. (1997), "the influence of parenting on the risk of mental disorder in children born to bipolar parents remains to be investigated" (p. 628). But, some studies have indicated that parenting style could lead to a positive or negative emotional outcome for children with bipolar parents. Regarding emotional disorders, parenting style has been found to increase the likelihood of childhood behavior problems like tantrums and regulation of self-control (Carlson, 1995).

Assessment Issues

When considering bipolar disorder, an appropriate evaluation may help make diagnostic decisions easier, but what makes an appropriate evaluation? When evaluating a child for a psychiatric disorder, it is important to follow the best practices in assessment. According to McConaughy and Ritter (1995), in the book *Best Practices in School Psychology III*, a multi-faceted evaluation makes use of multiple methods (measures, rating scales, interviews), settings (school, home, community), and sources (parent, teacher, child). The best practice for assessing emotional and behavioral disorders "dictates some combination of the following procedures: standardized behavioral rating scales; standardized self-reports; interviews with parents, teachers, and the child; direct observation of the child; and reviews of relevant background information" (p. 868). In this section, components of a multi-faceted evaluation are elaborated upon with specific information on history, clinical interviews, behavioral checklists, and observation.

History. A thorough history is central to a comprehensive assessment. A history must take into account child strengths and weaknesses, family stressors, development, school information, neurological functioning, history of the present illness, family history of psychiatric conditions, environment, physical health (McClellan & Werry, 1997). The historical information that is gathered is central to understanding any developmental problems and health issues. For example, if a child was born prematurely as a result of drug exposure in utero, the psychologist would consider the impact of this early insult to the child's functioning.

Structured Interviews. Diagnosing bipolar disorder in children with current measures can be challenging. On April 27, 2000, the National Institute of Mental Health Developmental Psychology and Research Branch convened an early-onset bipolar disorder roundtable and agreed that the diagnosis can be made with the present psychiatric assessment instruments (Nottelmann et al., 2001). These instruments included structured interviews such as the *Washington University Kiddie and Young Adult Schedule for Affective Disorders and Schizophrenia* [(WASH-U-KSADS); Geller et al., 1996], the *Schedule for Affective Disorders and Schizophrenia for School-Age Children* [(K-SADS); Puig-Antich, J., & Ryan, N., 1986], and the *Children's Interview for Psychiatric Syndromes* [(ChIPS); Rooney, M., Fristad, M., Weller, B. & Weller, R., 1999] and are presented in Table 4.

Structured interviews can be useful with parents, teachers, and children. Teachers are often a valuable source of information because of the multitude of children they are exposed to. Teachers are able to provide beneficial information on abnormal behaviors. Parents' interviews also are beneficial to understanding the child and family factors related to the child's current psychiatric state. Relying solely on others' reports should not be the only method chosen. Structured interviews have limited reliability; however, structured interviews like the *Diagnostic Interview Schedule for Children* (Shaffer, 1996) have demonstrated high test-retest reliability and high internal consistency for most symptom clusters (Kamphaus & Frick, 1996).

Table 4

Structured Interviews Used for the Diagnosis of Early-Onset Bipolar Disorder

Interview	Author	Description
Washington University Kiddie and Young Adult Schedule for Affective Disorders and Schizophrenia (WASH-U-K-SADS)	Geller, B., et al., 1996.	Modified version of the K-SADS with onset and offset of each symptom, prepubertal mania and rapid cycling sections, and categories for Attention-Deficit/Hyperactivity Disorder expanded.
Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS)	Puig-Antich, J., & Ryan, N., 1986	Structured interview for children and parents primarily used to evaluate depression, internalizing disorders, and psychoses
Children's Interview for Psychiatric Sydromes (ChIPS)	Rooney, M. et al., 1999	Structured interview designed to identify 20 Axis I diagnoses in children age 6 to 18.

Structured interviews can be utilized when assessing children. Sattler (1998) has numerous interviews that can be helpful for child psychologists looking for specific questions to ask. Unfortunately, Sattler does not provide a set of interview questions for bipolar disorder, but a psychologist can borrow questions from related syndromes. Other structured interviews include the *Diagnostic Interview Schedule for Children* (Shaffer, 1996), the *Diagnostic Interview for Children and Adolescents* (Reich, 1996) and the *Schedule for Affective Disorders and Schizophrenia for School-Age Children* (Ambrosini & Dixon, 1996). These interviews are tied to the DSM-IV and they can be used for diagnostic purposes. When using any structured interview it is important to

uncover information about moment-to-moment mood lability (Bowden, 2001). These instruments are solely interviews and only part of a multi-faceted assessment**.**

Checklists. Besides interviews, behavioral checklists also can be used in the diagnosis of early-onset bipolar disorder; however, no checklist is currently available that is specific to early-onset bipolar disorder. Omnibus measures like the *Conners' Parent Rating Scale* (Conners, 1990), the *Behavior Assessment System for Children* (Reynolds & Kamphaus, 1992), and the *Child Behavior Checklist* (CBCL;Achenbach & Edelbrock, 1983), can assist psychologists in making diagnostic decisions. In a recent study, the CBCL was used with 31 children diagnosed with mania (from a structured interview). Results demonstrated that children with mania had elevated delinquent behavior, somatic complaints, anxious/depressed, and thought problems than controls (Biederman et al, 1995). Overall, the aforementioned instruments are general measures of children's behavior, and not specific to bipolar disorder (Sanchez et al., 1999; Weller et al., 1995). There is a current need for an accurate measure of bipolar disorder in children.

The *General Behavior Inventory* (DePue, 1987) was recently adapted for children between the ages of 5-17; researchers found that the measure discriminated between children diagnosed with bipolar disorder and a disruptive behavior disorder (Youngstrom, Findling, Danielson, & Calbrese, 2001). The study was limited, however, because only one method was used to make diagnoses (a structured interview). The *General Behavior Inventory*, a measure of depressive and hypomanic symptoms, has primarily been used with college students and adult psychiatric outpatients. Data

suggest that the measure has good internal consistency, but there is little data on its predictive validity (Geller & Delbello, 2003). While the study showed promising results, a measure specific to childhood bipolar disorder has not been established.

There are several measures available for assessing the adult symptoms of bipolar disorder. Some examples include the *Mania Rating Scale* (Young, Biggs, Ziegler, & Meyer, 1978), the *Clinician-Administered Rating Scale for Mania* (CARS-M; Altman, Hedeker, Janicak, Peterson, & Davis, 1994), the *Altman Self-Rating Mania Scale* (ASRM; Altman, Hedeker, Peterson, & Davis, 1997), and the *Self-Report Manic Inventory* (SRMI; Shugar, Schertzer, Toner, & Di Gasbarro, 1992). The 11-item *Mania Rating Scale*, developed in 1978, was created to assess mania. It is only useful for quantifying mania; it is not useful for diagnosing bipolar disorder. The CARS-M is actually a semi-structured interview in which the interviewee indicates the presence or absence of symptoms. However, not only can the interviewee indicate symptoms, the interviewer and other clinical staff members can as well (through observation). The ASRM and the SRMI are self-report measure of manic symptoms in adults. All four measures evaluate mania only; evaluating the other features of bipolar disorder is left to other measures. In addition, all of the scales have limited research data to support their use.

Observations. Classroom and clinical observations are critical as well (Sanchez et al., 1999; Weller et al., 1995). According to Kamphaus and Frick (1996), **"**direct observations of children's and adolescent's behavior are an important part of an assessment because they provide an objective view of behavior that is not filtered

through an informant" (p. 197). Observations can assess child behaviors and environmental issues. Structured observations can record information on frequency, intensity, and duration of an event. Observations have disadvantages as well; reliability is problematic and children often change their behavior when they know they are being observed (Kamphaus & Frick, 1996).

Summary

Although no epidemiological study documenting prevalence exists, it is estimated that studied the lifetime prevalence rate is less than 1% (Lewinsohn et al., 1995). Research in the area is still limited, but bipolar disorder is becoming an increasingly common diagnosis in children (Findling et al., 2003; Rice et al., 1987). For those individuals with early-onset bipolar disorder, the projected course is chronic. Studies of outcomes for these individuals, without treatment, is limited in the research. Treatment is often facilitated by diagnosis. As such, accurate diagnosis of bipolar in children is critical to the social and emotional development of children.

At the same time, multiple issues complicate the diagnostic process. Developmentally, typical behaviors for a given age can appear symptomatic of bipolar disorder. Parsing out normal from abnormal behavior across childhood is difficult. There is a gap in the literature concerning the symptoms of bipolar disorder that are actually typical for children. Regarding assessment, there is not current measure for childhood bipolar disorder. Often diagnoses are made with structured interviews and omnibus behavioral checklists. According to Weller et al. (1995), it is important to create or refine diagnostic measures so that mania can be better diagnosed and

monitored. Geller and DelBello (2003) stated that it is a "high public health priority [to develop]…cost-effective screeners" (p. 18). As described earlier, there are no reliable and valid measures available to assess bipolar disorder in children. Adding to these issues is the notion that, symptoms of bipolar disorder can seem like other disorders; overall, bipolar disorder is felt to be highly comorbid with other disorders.

The purpose of this study is to begin to address some of these issues and the gaps in the literature. In the current study a measure of early-onset bipolar disorder was administered to parents of children from ages 3 to 15. The measure was compared to an omnibus measure of emotional functioning. The data from the measure were used to compare children across different developmental and psychiatric groups.

CHAPTER III

METHOD

Chapter I presented an overview of the current study, the purpose of the study, and research questions and hypotheses. Chapter II reviewed the pertinent literature regarding the diagnosis of behavioral disorders in children and adolescents, particularly bipolar disorder.

In this chapter, the method and procedures of the current study are reviewed. Details about the participants and demographic data are discussed. In addition, information about assessment measures and the psychometric properties are explored. Finally, the statistical analyses needed to answer the research questions are discussed.

Participants

The total sample used in the current study was 201 participants. Participants were parents with children who range in age from 3 years, 3 months to 15 years, 10 months. Thirty-five percent (N = 71) of the total sample consisted of clinical data (i.e. children and adolescents with an emotional or behavioral diagnosis). Three percent (N = 7) of the total sample consisted of children and adolescents with a diagnosis of bipolar disorder. Table 5 presents demographic data for the parents who completed the study.

Table 5

Parent Demographic Information (N = 201)

		N (%)
Mother Education Level		
	Less than High School	18 (9.0)
	High School	101 (50.2)
	Two Year College	20 (10.0)
	Four Year College	25 (12.4)
	Graduate School	19 (9.5)
	Other/GED/Trade School	12 (6.0)
Father Education Level		
	Less than High School	32 (15.9)
	High School	97 (48.3)
	Two Year College	12 (6.0)
	Four Year College	14 (7.0)
	Graduate School	17 (8.5)
	Other/GED/Trade School	8 (4.0)
Family Psychiatric History		
	Bipolar Disorder	13 (6.5)
	Schizophrenia	2 (1.0)
	ADHD	44 (21.9)
	Depression	51 (25.4)
	Learning Disabilities	33 (16.4)

Note. ADHD = Attention-Deficit/Hyperactivity Disorder

The focus of the study was to evaluate a new measure of bipolar disorder in children and adolescents. Parents completed a demographic questionnaire, a bipolar

measure, and an existing measure. The demographic data for the children evaluated in the study is listed in Table 6. A significant proportion (26.9%) of the children do not have their gender identified because the question was absent from the demographic questionnaire. For those who were identified, parents put the information elsewhere on the questionnaires or the gender of the child was observed by the examiner.

In general, participating parents were located through a variety of sources. Parents with children between the ages of 3-5 were surveyed through their child's daycare, preschool facility, or outpatient therapy clinic. Parents with children between the ages of 6-15 were surveyed through schools, churches, after school programs, community mental health centers, outpatient therapy clinics, and on-going clinical trials.

During the first phase of data collection, parents were recruited in College Station and Navasota, Texas. The primary source of data came from the Navasota Independent School District. In addition, participants also were recruited from a grant-funded research study at Texas A&M University and a community mental health center. During the second phase of data collection, parents were recruited from an outpatient therapy clinic in Baltimore, Maryland. The secondary source of data was parents of patients receiving services through the Kennedy Krieger Institute of the Johns Hopkins University School of Medicine. Data from Texas and Maryland were utilized to represent a cross-section of data from across the United States of America. College Station and Navasota, Texas are rural cities with populations less than 75, 000, while Baltimore, Maryland is an urban city with a population of greater than 750,000

(including the surrounding areas). Table 7 includes demographic information about the children and adolescents from the various data sources.

Table 6

Child and Adolescent Demographic Information (N = 201)

		N (%)
Gender		
	Male	85 (42.3)
	Female	62 (30.8)
	Not Identified	54 (26.9)
Ethnicity		
	African American	62 (30.8)
	Caucasian	88 (43.8)
	Hispanic	37 (18.4)
	Biracial	13 (6.47)
	Not Identified	1 (.497)
Age Group		
	Early Childhood (3-5)	41 (20.4)
	Middle Childhood (6-11)	133 (66.2)
	Adolescence (12-15)	27 (13.4)
Sleep Hours		
	Less than 8 Hours per night	20 (10.4)
	8 or More Hours per Night	172 (89.6)

The sample consists of data on children that is categorized as *clinical* and *non-clinical*. The clinical (N=71) and non-clinical samples (N=130) are based on parent ratings of children from Texas and Maryland. Designation of clinical was based on a

previous psychiatric diagnosis by a mental health professional (DSM-IV-TR identification for psychological services) or previous identification as *Emotionally Disturbed* (Texas Education Agency or Maryland State Department of Education identification for special education services). Diagnoses of children included in the clinical, non-bipolar group fell into categories such as disruptive behavior disorders,

Table 7

Child and Adolescent Demographic Information by Location (N =201)

		Texas N (%)	Maryland N (%)
Gender			
	Male	48 (23.9)	37 (18.4)
	Female	57 (28.4)	5 (2.49)
	Not Identified	48 (23.9)	6 (2.99)
Ethnicity	African American	27 (13.4)	35 (17.4)
	Caucasian	76 (37.8)	12 (5.97)
	Hispanic	37 (18.4)	0 (0.00)
	Biracial	12 (5.97)	1 (.500)
	Not Identified	1 (.500)	0 (0.00)
Age Group			
	Early Childhood	31 (15.4)	10 (4.98)
	Middle Childhood	103 (51.2)	30 (14.9)
	Adolescence	19 (9.45)	8 (3.98)
Psychiatric Group			
	Clinical	24 (11.9)	47 (23.4)
	Non-Clinical	129 (64.2)	1 (.500)

depressive disorders, anxiety disorders, and so on. The child being rated was categorized as non-clinical if there was no reported history of a psychiatric or Emotionally Disturbed diagnosis. If parental report indicated frank neurological disorders (e.g., epilepsy, traumatic brain injury) or mental retardation, data obtained were excluded from analysis so that these variables did not confound the results (N=3). In addition, if more than two items were not completed on the MASC, then the data were excluded from analysis (N=6). Table 8 provides demographic information on the clinical data. Non-clinical data were categorized into *early childhood*, *middle childhood*, and *adolescence* groups. Three developmentally based groups were chosen based on prescribed categories in common textbooks on child development (Cole & Cole, 2001; Shaffer, 1989). Children in the early childhood group were between 3-5 years old. Children in the middle childhood group were between 6-11 years old. Children in the adolescent group were between 12-15 years old. Age was not used as a covariate in the statistical analysis in order to determine the differences between the age groups. These groups were necessary for comparisons of typical behavior across developmental stages.

Table 8

Clinical Sample Demographic Information (N = 71)

		Clinical, Non-Bipolar N (% of total)	Clinical, Bipolar N (% of total)
Gender			
	Male	46 (22.9)	5 (2.49)
	Female	10 (4.98)	1 (.497)
	Not Identified	8 (3.98)	1 (.497)
Ethnicity			
	African American	38 (18.9)	1 (.497)
	Caucasian	21 (10.4)	6 (2.99)
	Hispanic	1 (.497)	0 (.000)
	Biracial	3 (1.50)	0 (.000)
	Not Identified	1 (.497)	0 (.000)
Age Group			
	Early Childhood	11 (5.47)	0 (.000)
	Middle Childhood	40 (19.9)	4 (1.99)
	Adolescence	13 (6.47)	3 (1.49)
Location			
	Texas	22 (10.9)	5 (2.49)
	Maryland	42 (20.9)	2 (.995)

In order to compare the clinical and overall non-clinical data (bipolar and non-bipolar), a sub-sample from the non-clinical group was matched to the clinical group. Matching was based on gender and age group of the child rated. That is, for each data point that was categorized as a clinical, female adolescent there was a similar data point for a non-clinical, female adolescent. This comparison controls for potential confounds of gender, and age group. The total sample size for the match comparison was 90 with 45 clinical and 45 non-clinical data points. A matched comparison based on gender, age, and ethnicity was attempted but there were not sufficient cases to complete the analysis.

Instruments

Behavior Assessment System for Children (BASC). The Behavior Assessment System for Children (BASC) was first available in 1992. The purpose of the BASC is to assess a variety of behaviors in children. It is a "multidimensional measure in that it measures numerous aspects of behavior and personality, including positive (adaptive) as well as negative (clinical) dimensions" (Reynolds & Kamphaus, 1992**,** p. 1). Children between the ages of 2 years, 6 months and 18 years, 0 months can be assessed using the measure, with three different forms (preschool, child, and adolescent). The BASC has approximately 130-150 items and can be completed within 20 minutes. The BASC comes in parent, teacher, and self-report versions; only the parent version was used for this study. In addition, normalized T-scores (general norms) were used for comparison purposes.

The BASC has excellent reliability and validity. On the Parent Rating Scales (BASC-PRS), the internal consistency reliability is between the middle .80s and the low .90s. The test-retest reliability is between the .70s and .90s. Interrater reliability calculated between parents of children assessed is somewhat lower (i.e., between .46 and .67 for different age levels; Reynolds & Kamphaus, 1992).

The construct validity BASC-PRS is excellent when compared to other similar measures. In the early stages of development the BASC was compared to the Child Behavior Checklist **(**Achenbach & Edelbrock, 1983), the Personality Inventory of Children (Lachar, 1982), the Conners' Parent Rating Scales (Conners, 1990), and the Behavior Rating Profile (Brown & Hammill, 1983). Correlational studies indicated high

positive correlations with the Child Behavior Checklist and the externalizing scales of the Conners' Parent Rating Scales. Correlations with the Personality Inventory for Children and the Behavior Rating Profile are less impressive, but still moderate. Overall, externalizing symptoms were measured more consistently across measures than internalizing symptoms (Reynolds & Kamphaus, 1992).

Demographic Questionnaire. A demographic questionnaire was completed by parents (See Appendix A). The questionnaire contained questions related to the child and the parent(s). For example, parents were asked to provide the child's date of birth, ethnicity, gender, grade in school, any previous diagnosis, and average hours of sleep per night. Parents also were asked to provide information on their educational level as a measure of socioeconomic status. Information from the demographic questionnaire was used when identifying the clinical and non-clinical samples for comparison.

Mania Assessment Scale for Children (MASC). The Mania Assessment Scale for Children (MASC) is a newly developed measure meant to assess behaviors consistent with a diagnosis of bipolar disorder in children. The MASC is a 30-item measure that was created based on symptoms discussed in recent literature on the disorder, the DSM-IV-TR, and information from data collected by a research team at Texas A&M University. Once the measure was created it was reviewed by psychologists and researchers in the areas of assessment, psychopathology, and child development. In addition, several parents completed the measure to assess the face validity of the MASC. Feedback on item presentation and format was collected and used to modify the measure (See Appendix B)

Each of the 30 items on the MASC is presented in the same format. A statement is made, such as "Screaming", and the examinee chooses an answer from one of four choices. Choices are presented in a Likert-type format (i.e. Never, Sometimes, Often, Always). The format is similar to the Behavior Assessment System for Children described below. Similar formats were established to assist the participant completing the measures.

Procedure

The early childhood data (ages 3-5 years) were obtained from parents of children in area daycare centers, preschools, and Head Start centers. The middle childhood and adolescent data were obtained from parents of children in schools, churches, after school programs, and on-going clinical trails. Parents surveyed from this group had children aged 6-15 years old. Informed consent was obtained and parents had the option not to participate if they feel uncomfortable. In addition, written permission was obtained from administrative staff at the various sites. Parents completed two measures (MASC and BASC) and a demographic questionnaire. Materials were organized in packets and distributed by staff at the schools or daycare centers, or by the principal investigator. Within three weeks, the packets were collected. A total of 1200 packets were distributed and 204 were returned yielding a response rate of 17%.

Data Analysis. Data obtained for this dissertation were analyzed through several methods. All data were entered into a software program called the *Statistical Program for the Social Sciences* (SPSS), version 11.5 (2002). Original raw data on the measure were in a Likert-type format in which the respondents chose from four responses. The

four responses were never, sometimes, often, and always. These responses were transformed to numeric scores of 1, 2, 3, or 4 respectively.

In order to answer the first research question specific to the latent factor structure of the MASC, an exploratory factor analysis was conducted to identify the underlying factors within the newly developed measure (MASC). Factors were determined based on scree plot results, eigenvalues greater than 1, and factor loadings greater than an absolute value of .30 (Stevens, 1996). Factors identified through the analysis were then used in the reliability and validity analysis. Further analyses looked at mean differences between groups on the MASC.

To compare the BASC and the MASC (research question two), correlational analyses were conducted based on the MASC factor found in the factor analysis. Clinical and all non-clinical data were used in the correlation analysis. The BASC Behavior Symptom Index and the MASC total score were correlated; secondary analyses investigated MASC total score and BASC subscale correlations. The correlational analysis used the Pearson Product Correlation. Correlational analyses between the two measures were used to determine the content validity of the MASC.

To evaluate the extent to which bipolar-type behaviors occur in the normal population (research question three), means and standard deviations were obtained for individual items and the total raw score on the MASC in the non-clinical sample. Then, to evaluate group differences between age, gender, and ethnic groups, analyses of variance (ANOVA) were conducted with the non-clinical population. Age was categorized into three groups: early childhood (3-5 years old), middle childhood (6-11

years old), and adolescence (12-15 years old). Gender had two groups, female and male. Ethnicity had four groups, Caucasian, Hispanic, African-American, and Biracial. For age and ethnicity, Tukey post-hoc analyses were used when necessary. The total raw score on the MASC was the dependent variable. Effect sizes were computed for all comparisons.

To compare results for data from the clinical group (bipolar and non-non-bipolar clinical combined) to the sub-sample from the non-clinical group (research question four), the mean total raw scores from the MASC were examined using analysis of variance (ANOVA). The .05 alpha level was used for adequate statistical significance. Because there are only two groups in this comparison, no post-hoc measures were conducted. Effect sizes were computed for all dependent variables.

In Chapter IV, the statistical results are presented. In Chapter V, a discussion of the research findings and directions for future research will be covered; limitations are presented as well.

CHAPTER IV

RESULTS

Chapter I provided an overview of the current study along with research questions and hypotheses. Chapter II reviewed the literature relevant to the diagnosis of bipolar disorder in children. Chapter III examined the method and procedures of the current study. In Chapter IV, the results of the study are discussed. The data are analyzed and the findings are presented in tabular format. Specifically, the four research questions are addressed in detail. Conclusions and implications for the analyses are offered in Chapter V, Discussion.

Research Question One

In order to evaluate the results of the MASC, the first step was to determine the underlying factor structure of the data. Two hundred and four parents completed the MASC; three were dropped due to child diagnosis of a developmental disorder or mental retardation. An exploratory factor analysis was performed on the 30 items of the MASC. When the data were initially evaluated all eigenvalues over 1.0 were extracted. The result of the factor analysis indicated that there were 10 factors in the 30-item measure. Factor one accounted for 26.8% of the variance. The other factors accounted for 3-6% of the variance each for a total of 67.6% of the variance. The scree plot for the 10 factor solution is shown in Figure 1.

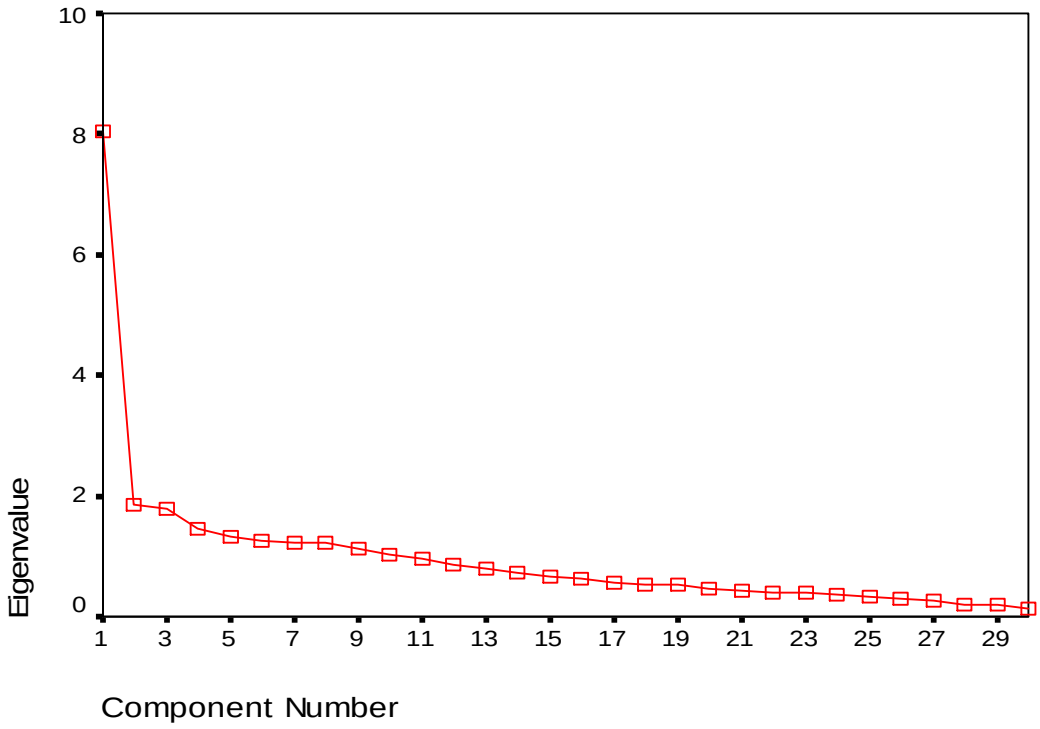

Figure 1. Scree Plot of Items of the Ten Factor Model of the MASC

After reviewing the scree plot and the variance accounted for by the individual factors, one, two and three factor solutions were attempted. A factor analysis was run with three factors pre-selected in the extraction. The number of factors was constrained to three by not allowing the items to load on more than three factors. Table 9 provides the factor solution for the three factor model.

Table 9

Factor Loadings for the Three Factor Model of MASC Items (N = 201)

Item	Factor One	Factor Two	Factor Three
Irritable Mood	.62	.02	-.35
Mood Swings	.74	.05	-.25
Sleeping A Lot	.23	.05	.26
Explosive Anger	.71	-.06	-.42
Inappropriate Sexual Behaviors	.44	-.16	.49
Impulsivity	.74	-.19	.25
Overactivity	.74	.03	.16
Inattention	.66	-.28	.19
Expression of Guilt or Remorse	.32	-.02	-.22
Fluctuation in School Performance	.64	-.20	.14
Sulking or Pouting	.67	.00	-.23
Nightmares	.20	.25	-.07
Happiness or an Elevated Mood	.15	.38	.07
Restlessness	.66	-.05	.12
Talking Quickly	.48	.58	.27
Talking A Lot	.46	.57	.24
Sadness or a Depressed Mood	.61	-.14	.17
Hearing and Seeing Things Other Do Not	.36	.11	.09
Daredevil or Risk-Taking Behavior	.60	-.14	.17
Poor Judgment	.65	-.33	.10
Bed Wetting	.37	-.24	.20
Craving Sweets or Starches	.36	.18	.07
Involvement in Multiple Activities	-.11	.38	-.14
Low Energy Level	.28	-.08	.10
Change in Appetite	.31	.44	.28
High or Inflated Self-Esteem	.31	.40	-.04
Withdrawal from Peers or Activities	.49	.02	.03
Crying	.48	.19	-.54
Temper Tantrums	.71	-.02	-.46
Sleeping Very Little	.39	-.08	-.05

Note. Extraction method was Principal Components Analysis with three factors extracted.

The scree plot changed very little, and the items still correlated highly with factor one. Figure 2 presents the scree plot from the three factor solution. It is very similar to the ten factor scree plot, with factor one evident as the strongest factor. Factor one

accounted for 26.8% of the variance (eigenvalue = 8.1), factor two accounted for 6.1% of the variance (eigenvalue = 1.8), and factor three accounted for 5.9% of the variance (eigenvalue = 1.8) for a total of 38.8% of the variance accounted for.

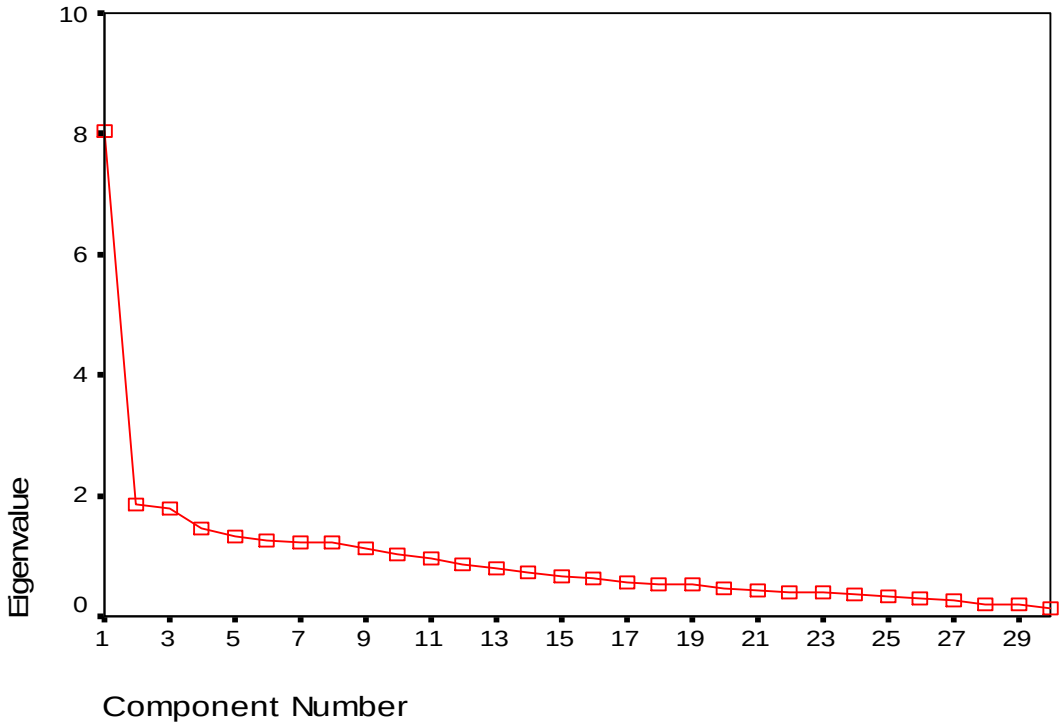

Figure 2. Scree Plot of Items of the Three Factor Model of the MASC

The three factor solution was dismissed as the best model because most items correlated highly with factor one. Clinically, the three factor model was not hypothesized. Bipolar disorder is a syndrome of mania and depression, so a three factor solution did not make sense, clinically. Factor two also had items with high correlations, so a two factor model was chosen next. An exploratory factor analysis was run with two

factors pre-selected in the extraction. The number of factors was constrained to two by not allowing the items to load on more than two factors. Table 10 provides the factor solution for the two factor model.

The scree plot changed very little, and the items still correlated highly with factor one. Figure 3 presents the scree plot from the two factor solution. It is very similar to the other scree plots, with factor one still the strongest factor. Factor one accounted for 26.8% of the variance (eigenvalue = 8.1), factor two accounted for 6.1% of the variance (eigenvalue = 1.8) for a total of 33.0% of the variance accounted for. While the two factor model was hypothesized before the data were collected, the two factor model is not the most accurate representation of the scores. Clinically, the two factor model made sense, because of the division between symptoms of mania and depression in bipolar disorder, but the actual results do not substantiate this model.

Table 10

Factor Loadings for the Two Factor Model of MASC Items

Item	Factor One	Factor Two
Irritable Mood	.62	.02
Mood Swings	.74	.05
Sleeping A Lot	.23	.05
Explosive Anger	.71	-.06
Inappropriate Sexual Behaviors	.44	-.16
Impulsivity	.74	-.19
Overactivity	.74	.03
Inattention	.66	-.28
Expression of Guilt or Remorse	.32	-.02
Fluctuation in School Performance	.64	-.20
Sulking or Pouting	.67	.00
Nightmares	.20	.25
Happiness or an Elevated Mood	.15	.38
Restlessness	.66	-.05
Talking Quickly	.48	.58
Talking A Lot	.46	.57
Sadness or a Depressed Mood	.61	-.14
Hearing and Seeing Things Other Do Not	.36	.11
Daredevil or Risk-Taking Behavior	.60	-.14
Poor Judgment	.65	-.33
Bed Wetting	.37	-.24
Craving Sweets or Starches	.36	.18
Involvement in Multiple Activities	-.11	.38
Low Energy Level	.28	-.08
Change in Appetite	.31	.44
High or Inflated Self-Esteem	.31	.40
Withdrawal from Peers or Activities	.46	.02
Crying	.48	.19
Temper Tantrums	.71	-.02
Sleeping Very Little	.39	-.08

Note. Extraction method was Principal Components Analysis with two factors extracted.

After the first three factor analyses were completed, a one factor solution was chosen to achieve parsimony and because of the high internal consistency of the items. Table 11 provides the results from the one factor model. Figure 4 presents the scree plot of the one factor solution. The results suggest that a total score better represents the measure, as opposed to using two or more subscale scores. Given the scree plot results and the factor loadings, the one factor solution is ideal. For the MASC, the solution that makes the most sense (especially given the high internal consistency of the items) is the one factor solution.

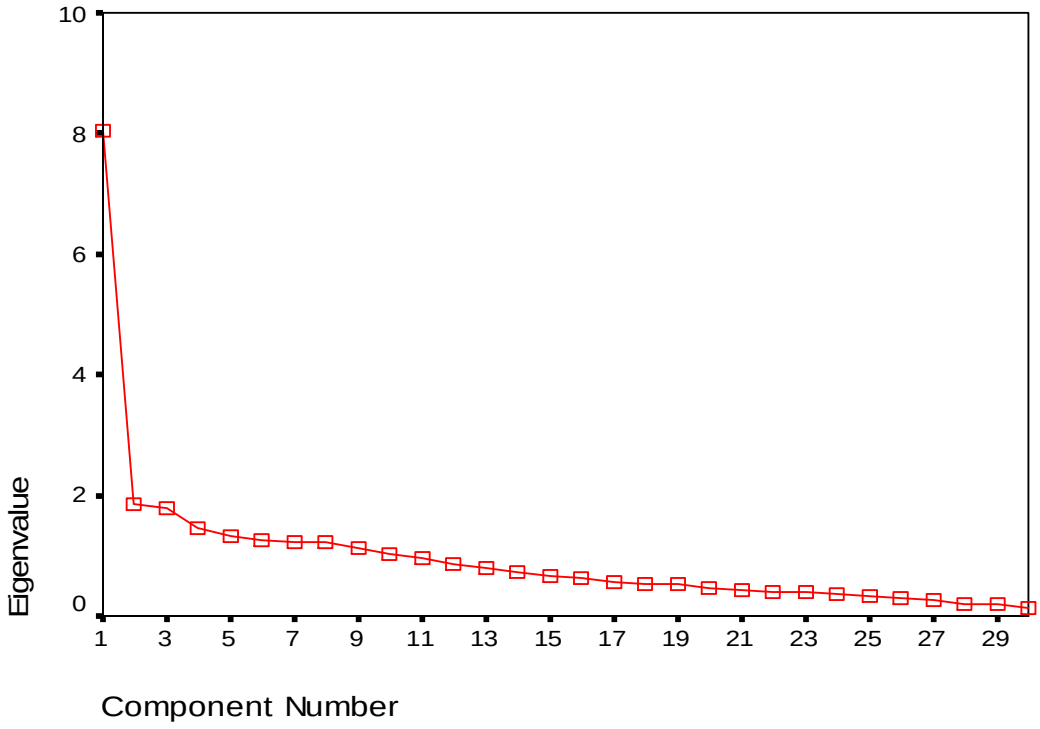

Figure 3. Scree Plot of Items of the Two Factor Model of the MASC

Table 11

Factor Loadings for the One Factor Model of MASC Items

Item	Factor Loading
Irritable Mood	.62
Mood Swings	.73
Sleeping A Lot	.23
Explosive Anger	.71
Inappropriate Sexual Behaviors	.44
Impulsivity	.74
Overactivity	.74
Inattention	.66
Expression of Guilt or Remorse	.32
Fluctuation in School Performance	.64
Sulking or Pouting	.67
Nightmares	.20
Happiness or an Elevated Mood	.15
Restlessness	.66
Talking Quickly	.48
Talking A Lot	.46
Sadness or a Depressed Mood	.61
Hearing and Seeing Things Other Do Not	.36
Daredevil or Risk-Taking Behavior	.60
Poor Judgment	.65
Bed Wetting	.37
Craving Sweets or Starches	.36
Involvement in Multiple Activities	-.11
Low Energy Level	.28
Change in Appetite	.31
High or Inflated Self-Esteem	.31
Withdrawal from Peers or Activities	.49
Crying	.48
Temper Tantrums	.71
Sleeping Very Little	.39

Note. Extraction method was Principal Components Analysis with one factor extracted.

The single factor accounts for 26.8% of the variance (eigenvalue = 8.1). The items which load on the factor are irritable mood, mood swings, explosive anger,

inappropriate sexual behavior, impulsivity, overactivity, inattention, expression of guilt or remorse, fluctuation in school performance, sulking or pouting, restlessness, talking quickly, talking a lot, sadness or depressed mood, hearing or seeing things others do not, daredevil or risk-taking behavior, poor judgment, bed wetting, craving sweets or starches, low energy level, change in appetite, high or inflated self-esteem, withdrawal from peers or activities, crying, temper tantrums, and sleeping very little. These items represent the varied and complex clinical picture of bipolar disorder.

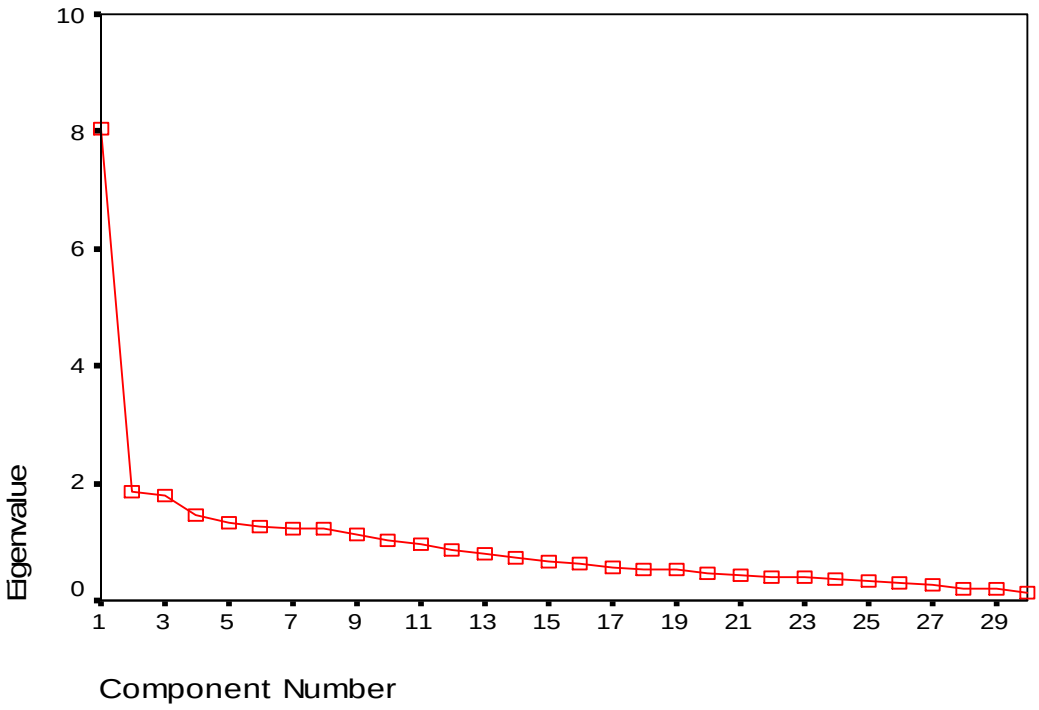

Figure 4. Scree Plot of Items of the One Factor Model of the MASC

Items that did not correlate highly with the factor were considered to determine if they should be dropped from other analyses (i.e. items with less than .30 correlation). Items dropped included sleeping a lot, nightmares, happiness or an elevated mood, and involvement in multiple activities. Low energy level did not correlate with the factor at the .30 level, but was kept in the other analyses due to its clinical significance. Low energy level is a key aspect of the depressive symptoms associated with bipolar disorder. In addition, the item correlated .28 with the factor. While not at the .30 level, it is likely that the item would have correlated higher with a larger sample size.

Once the factor structure of the MASC was identified, a reliability analysis was completed. Using Cronbach's alpha, the internal consistency of the 26-item measure was found to be .90, indicating excellent internal reliability for the measure. Removing the four items from the measure increased the internal consistency from .89 to .90.

Research Question Two

The second research question focused on a comparison between the results of the MASC and the *Behavior Assessment Scale for Children* (BASC) scales. In order to determine the content validity of the MASC, the total score for each subject was correlated with the BASC Behavior Symptom Index (BSI) and other BASC scales. The total score from the MASC (26-item) is highly correlated (using the Pearson Product Correlation) with the BASC BSI score as well as the BASC Internalizing, and Externalizing scales (see Table 12). In addition, the MASC is negatively correlated with the Adaptive Skills scale (a scale measuring pro-social skills such as leadership, social skills, and adaptability).

Table 12

Correlation of MASC Total Score and BASC Scales (N = 201)

	MASC	BSI	Externalizing	Internalizing	Adaptive Skills
MASC	____	.84**	.80**	.63**	- .42**
BSI		____	.87**	.79**	- .53**
Externalizing			____	.53**	- .49**
Internalizing				_____	- .29**
Adaptive Skills					____

Note. *p < .05. **p < .01.

The MASC total score positively correlated with the BSI (r = .84, p < .001), the Externalizing scale (r = .80, p < .001), and the Internalizing scale (r = .63, p < .001). The MASC total score correlated negatively with the Adaptive Skills scale of the BASC (r = -.42, p < .001). It was expected that the MASC total score would correlate negatively with the Adaptive Skills scale due to the opposite characteristics evaluated in the measures. The MASC evaluates maladaptive behaviors while the Adaptive Skills scale measures prosocial behaviors.

In addition to the global scales listed above, the MASC also correlated with specific subscales. Most correlations reached statistical significance (see Table 13). For example, the MASC total score correlated with the Hyperactivity subscale (r = .80, p < .001), the Aggression subscale (r = .73, p < .001), the Conduct Problems subscale (r = .68, p < .001), the Anxiety subscale (r = .36, p < .001), the Depression subscale (r = .77, p < .001), the Somatization subscale (r = .27, p < .001), the Attention Problems subscale (r = .66, p < .001), the Atypicality subscale (r = .65, p < .001), and the Withdrawal subscale (r = .29, p < .001). In contrast, the MASC total score correlated negatively with the subscales that comprised the Adaptive Skills Scale: Adaptability (r = -.54, p < ,001), Leadership (r = -.19 , p < .05), and Social Skills (r = -.37, p < .001). The positive correlation with maladaptive scales and the negative correlation with the adaptive scales was expected because the MASC is a measure or psychopathology or maladaptive behaviors.

Table 13

Correlation of MASC Total Score and BASC Subscales (N = 201)

	MASC	1	2	3	4	5	6	7	8	9
MASC	____	.80**	.73**	.68**	.36**	.77**	.27**	.66**	.65**	.29**
1		____	.81**	.73**	.29**	.71**	.19*	.73**	.63**	.19*
2			____	.77**	.27**	.67**	.20**	.62**	.51**	.28**
3				____	.06	.64**	.15	.61**	.54**	.17
4					____	.54**	.37**	.30**	.41**	.40**
5						____	.29**	.62**	.64**	.42**
6							____	.20**	.40**	.40**
7								____	.61**	.25**
8									____	.33**
9										____

Note. 1 = Hyperactivity subscale, 2 = Aggression subscale, 3 = Conduct Problems subscale, 4 = Anxiety subscale, 5 = Depression subscale, 6 = Somatization subscale, 7 = Attention Problems subscale, 8 = Atypicality subscale, 9 = Withdrawal subscale. *p < .05. **p < .01.

Research Question Three

Research question three asked, "To what extent do behaviors associated with bipolar disorder occur at differing developmental levels across groups of children and adolescents" and "Do behavioral levels change depending on the age, gender, and ethnicity of the child? In order to discuss the first part of the question, means and standard deviations by item were obtained for children in the non-clinical group. Table

14 presents the results from the analysis. These results provide normative information from the 26 MASC items.

From the normative data, it appears that typically developing children (with no psychiatric diagnosis) may exhibit a variety of symptoms characteristic of bipolar disorder. The items with the highest mean scores include irritable mood, overactivity, talking quickly, and talking a lot. Thus, these behaviors are likely to occur some of the time in the non-clinical population. Items with the lowest mean scores include inappropriate sexual behaviors, hearing and seeing things others do not, daredevil or risk-taking behavior, bed wetting, and sleeping very little. These behaviors are less likely to occur in the non-clinical population.

While data indicate that some bipolar symptoms may occur in the non-clinical population, it is also important to determine if bipolar symptoms vary across age, gender, and ethnic group in the non-clinical population. The findings of analyses of variance (ANOVA) reveal that behavioral levels (total score) on the MASC vary by age groups, but not by gender or ethnic groups.

Table 14

Bipolar Symptoms Occurring in the Non-Clinical Sample (N = 130)

Item from MASC	*M*	*SD*
Irritable Mood	2.0	.67
Mood Swings	1.8	.78
Explosive Anger	1.7	.75
Inappropriate Sexual Behaviors	1.1	.30
Impulsivity	1.9	.75
Overactivity	2.0	.91
Inattention	1.8	.74
Expression of Guilt or Remorse	1.8	.78
Fluctuation in School Performance	1.5	.79
Sulking or Pouting	1.9	.77
Restlessness	1.7	.68
Talking Quickly	2.1	.91
Talking A Lot	2.5	1.0
Sadness or a Depressed Mood	1.5	.65
Hearing and Seeing Things Other Do Not	1.1	.34
Daredevil or Risk-Taking Behavior	1.2	.44
Poor Judgment	1.6	.61
Bed Wetting	1.2	.59
Craving Sweets or Starches	1.9	.92
Low Energy Level	1.3	.58
Change in Appetite	1.8	.76
High or Inflated Self-Esteem	1.7	.85
Withdrawal from Peers or Activities	1.3	.57
Crying	1.9	.74
Temper Tantrums	1.7	.80
Sleeping Very Little	1.2	.50
Total Score	42.7	9.1

Note. Items were coded as "1" = Behavior Never Occurs, "2" = Behavior Sometimes Occurs, "3" = Behavior Often Occurs, and "4" = Behavior Always Occurs.

Table 15 represents the information from the one-way ANOVA of the MASC total scores of the age groups. A power analysis revealed adequate sample size for the calculation. Statistically significant results were found [F (2, 127) = 3.56, $p < .05$]

between the three age groups. A small effect was found for age group (η^2 = .05). Tukey post-hoc analysis indicated that the mean score of the early childhood group (*M* = 46.5, *SD* = 8.89) was higher than the mean score of the middle childhood group (*M* = 41.6, *SD* = 8.89). As such, many of the behaviors of interest are more likely to be evident in younger children. No other statistically significant mean differences were uncovered.

Table 15

Analysis of Variance of Age Group Total Scores on the MASC (N = 130)

Source	*df*	*F*	η	*p*
Age Group	2	3.56*	.23	.03
Within-group error	127			

Note. * p < .05. ** p < .01. Early Childhood *M* = 46.5 (*SD* = 8.89); Middle Childhood *M* = 41.6 (*SD* = 8.89); Adolescence *M* = 41.3 (*SD* = 9.20).

Table 16 represents the information from the one-way ANOVA of the MASC total scores of the two gender groups (male and female). A third group with gender not identified (N = 45) was excluded from the analysis, making the ANOVA a partial representation of the non-clinical data. A power analysis revealed adequate sample size for the calculation. No statistically significant results were found [*F* (1, 83) = 1.49, *p* >

.05] between the gender groups. Mean differences between the gender group MASC scores were not statistically equivalent. For males, the mean score was 44.2 (*SD* = 9.96); for females, the mean score was 41.7 (*SD* = 8.61). Due to non-significant findings, post-hoc analyses and effect size calculations were not conducted.

Table 16

Analysis of Variance of Gender Group Total Scores on the MASC (N = 85)

Source	*df*	*F*	η	*p*
Gender	1	1.49	.13	.225
Within-group error	83			

Note. * p < .05. ** p < .01. Male *M* = 44.2 (*SD* = 9.96); Female *M* = 41.7 (*SD* = 8.61).

Table 17 represents the information from the one-way analysis of variance of the MASC total scores of the four ethnic groups (African American, Hispanic, Caucasian, and biracial). A power analysis revealed adequate sample size for the calculation. No statistically significant results were found [*F* (3, 126) = 2.25, *p* > .05] between the four ethnic groups. Mean differences between the ethnic group MASC scores were statistically equivalent. The mean score for African American children was 42.3 (*SD* = 8.58), the mean score for Hispanic children was 39.9 (*SD* = 9.00), the mean score for

Caucasian children was 43.8 (*SD* = 8.84), and the mean score for biracial children was 46.9 (*SD* = 10.4). Due to non-significant findings, post-hoc analyses and effect size calculations were not conducted.

Table 17

Analysis of Variance of Ethnic Group Total Scores on the MASC (N = 130)

Source	*df*	*F*	η	*p*
Ethnicity	3	2.25	.23	.09
Within-group error	126			

Note. * p < .05. ** p < .01. African American *M* = 42.3 (*SD* = 8.58); Hispanic *M* = 39.9 (*SD* = 9.00); Caucasian *M* = 43.8 (*SD* = 8.84); Biracial *M* = 46.9 (*SD* = 10.4).

Research Question Four

To answer research question four ("To what extent do children in a clinical group differ from a matched non-clinical group on the MASC"?), the database was reduced by selecting a group of subjects matched on the characteristics of age group and gender. Age group, instead of chronological age, was chosen for a greater choice of subjects. Ethnicity was initially chosen as a third matching variable, but using three matching

variables decreased the database to an insufficient number. Thus, only two matching variables were chosen. Given that no significant differences emerged for ethnic groups in the previous ANOVA, the deletion of ethnicity as a matching variable was deemed appropriate. Forty-five children categorized as non-clinical were matched to 45 children categorized as clinical; a one-way ANOVA was completed to determine between group differences on the MASC total scores. Table 18 presents the findings from the ANOVA.

A power analysis revealed adequate sample size for the calculation. Statistically significant results were found [F (1, 88) = 17.48, $p < .01$] between the clinical and non-clinical groups. A small effect was found for group ($\eta^2 = .17$). Because there were only two groups, Tukey post-hoc analyses were not conducted. Results, however, demonstrate that the mean score of the clinical group ($M = 52.6$, $SD = 12.3$) was significantly higher than the mean score of the non-clinical group ($M = 42.9$, $SD = 9.51$).

In the next section, Chapter V, Discussion, the findings will be discussed in greater detail. Implications for the findings and directions for future research are included.

Table 18

Analysis of Variance of MASC Total Scores for Clinical and Non-Clinical Groups (N = 90)

Source	*df*	*F*	η	*p*
Clinical Group	1	17.48**	.40	.00
Within-group error	88			

Note. *p < .05. **p < .01. Clinical Group *M* = 52.6 (*SD* = 12.3); Non-Clinical Group *M* = 42.9 (*SD* = 9.51).

CHAPTER V

SUMMARY AND DISCUSSION

In Chapter I, an introduction to the current study was offered. An overview of the study, the statement of the problem, a brief review of the literature, and the purpose of the study was given. Research questions and corresponding hypotheses were discussed. Chapter II provided a review of the literature. The literature covered developmental perspectives, assessment considerations, a history of the diagnosis of bipolar disorder, and current research findings from peer reviewed journals. Chapter III followed with an explanation of the study participants, the instruments utilized, the procedures used, and the data analyses conducted. Sample demographics were provided.

Chapter IV presented the results of the study in graphic, narrative, and tabular format. In this chapter, the research questions are reviewed and the findings are interpreted. Limitations, implications, and future directions are identified. General conclusions are discussed.

Summary of Findings

In this study a new measure, created for the assessment of the symptoms of bipolar disorder in children, was investigated. Despite a growing literature on the diagnosis of bipolar disorder, a measure had not been developed to assist professionals in making diagnoses. Based on the literature, the DSM-IV-TR, and consultation with colleagues, the Mania Assessment Scale for Children was created. Parents with children

of various ages, ethnicities, genders, and diagnoses completed the measure as well as the Behavior Assessment Scale for Children. Chapter IV reviewed the statistical analyses of the data in the study. Now a discussion of the findings occurs with step-by-step interpretations of the results.

Research question one asked, "*What is the underlying latent factor structure of the results obtained from the MASC? Are results better understood/interpreted as a single score or factors? If more than one factor exists, then what is the internal consistency of the factors*"? The hypothesis was there were at least two factors obtained from the MASC; the factors were expected to represent manic and depressive symptoms. The hypothesis was not proven correct; the best possible solution was a one factor model. The one-factor model yielded high internal consistency. Five items from the scale did not correlate well with the factor, so based on theoretical and clinical judgment, four items were excluded from further analyses. The fifth item (low energy level) was left in the further analyses because it was felt that with a larger sample, the item would have correlated at the desired level with the factor. In addition, a low energy level is a key component to the depressive symptoms associated with bipolar disorder.

The one factor model for the measure is also the best model due to the items in the measure. Items represented a wide variety of behaviors including disruptive behaviors, depression, elation, sexuality, and mania. With the multiple symptoms being addressed, the two factor model was not representative of the items. Perhaps that is because the symptoms of bipolar disorder are complex and varied, including many symptoms that are characteristic of other disorders (ADHD, depression, etc.). A single

score best represents the construct represented in the measure (i.e., the overall symptoms of bipolar disorder).

Research question two asked, *"How do the results of the MASC relate to the Behavior Assessment Scale for Children (BASC) scale"*? It was expected that the factors obtained from the MASC would have comparable scores to the BASC. That is, if the factor/total scores were elevated on the MASC, then similar factor/total scores would be elevated on the BASC (e.g. Depression scale on BASC similar to depression factor on MASC and the Behavior Symptom Index of the BASC and the total MASC score). Statistical analysis demonstrated that the BASC, an omnibus measure of children's behavior, was highly correlated with the score obtained from the MASC (or the total score from the 26-item measure).

The MASC total score was correlated with most subscales from the BASC and the Externalizing scale, Internalizing scale, and Behavior Symptom Index. The MASC was negatively correlated with the Adaptability scale and the subscales that comprised the Adaptability scale. This finding was expected due to the fact that the MASC was developed as a measure of maladaptive behaviors and the Adaptability scale is a measure of adaptive behaviors.

The positive correlation between the MASC total score and the maladaptive scales on the BASC was an ideal finding because this finding increases the content validity of the MASC. The MASC was created to be a measure of psychopathology in children. Because it was highly correlated with the BASC, it appears as if the MASC is a valid measure of child psychopathology. The MASC could not be compared to

another measure of bipolar disorder because one is not in existence. The BASC, a widely used measure with excellent reliability and validity, was chosen instead. Overall, the MASC was highly correlated with all scales (and subscales) of the BASC, either negatively or positively. A strong relationship exists between the two measures. At the same time, correlations are not so high as to suggest that the MASC duplicates the findings of the BASC.

Research question three asked, *"To what extent do behaviors associated with bipolar disorder occur at differing developmental levels across groups of children and adolescents? Do behavioral levels change depending on the age of the child? Do behavioral levels change depending on the gender of the child? Do behavioral levels change depending on the ethnicity of the child"*? It was expected that behavioral levels would vary across age and gender, but not ethnicity based on the literature in the field. The hypothesis that behavioral levels would vary across age and gender was only partially proven correct. Statistical analysis found that there were significant group differences between age groups. Children in the early childhood age group had higher MASC total scores than children in the middle childhood group. No significant gender or ethnic effects were discovered.

In the first part of this analysis, the data were examined in non-clinical populations to determine the extent to which bipolar symptoms occur in the "normal" or non-clinical population. Bipolar symptoms occurred to some degree in many of the non-clinical subjects assessed. This is an important finding for psychologists because it helps psychologists understand the normative sample better. Diagnostic decisions are often

difficult to make and understanding the prevalence of symptoms in the "normal" population may assist the professional in discriminating between "normalcy" and abnormal behavior.

The question persists, why do non-clinical children exhibit symptoms of bipolar disorder? It is likely that mood swings and erratic behavior are just part of the developmental process. Children must learn to regulate their behavior. Through life experiences they learn what behaviors to diminish and which to expand upon. This is the most probable explanation for the increase in bipolar symptoms in the early childhood population. As they develop into middle childhood and adolescence, they are exposed to other peers and adults who help them learn affect modulation and regulation. Some children do not develop these skills or are emotionally unable, and these are the children who may have later psychopathology. Development is a key variable in the clinical picture of bipolar disorder in children. To understand the level of behavioral symptoms, one must first consider the developmental age of the child and their ability to regulate their emotions.

Research question four asked*, "To what extent do children in a clinical group differ from a matched non-clinical group on the MASC"*? It was expected that scores on the MASC would be significantly higher for clinical groups. The hypothesis was proven correct.

The data were split into a sample of 45 clinical subjects and a sample of 45 non-clinical subjects. The data were matched on age level (early childhood, middle childhood, and adolescence) and on gender (male and female). Matching was attempted

based on age, gender, and ethnicity, but there were insufficient cases to create an ample matched sample on three variables.

The 45 children identified as clinical had significantly higher scores on the MASC than the 45 children identified as non-clinical. The MASC total score adequately discriminated between the two groups. The effect size was small, but with a larger sample, it is likely that the effect would have been greater ($\eta^2 = .17$). It is not surprising that children with psychological and educational diagnoses had greater bipolar-type symptoms. Even when not diagnosed with bipolar disorder, they still evidenced more psychopathology than their non-clinical peers.

Implications for Practice

The results of the study are beneficial for the field of psychology. First, practicing psychologists can utilize the instrument in determining the level of psychopathology in a child or adolescent. Regarding psychopathology, psychologists also can understand the behaviors associated with different developmental levels, gender, and ethnicities. In addition, psychologists also can utilize the results to determine what behaviors are normal and what are not. These concepts will be expanded upon in the next few paragraphs.

In this study, an experimental measure of child psychopathology was piloted. The results of the statistical analyses demonstrate good internal consistency for a global factor of "pathology". The measure is similar to, but does not replicate other measures of ADHD, depression, anxiety, etc. The measure, does, however, capture the range of behaviors associated with bipolar disorder. The results also determined that in a

normative population, the likelihood that many of these behaviors will occur varies by age, suggesting and supporting the need to take developmental concerns into account. At the same time, specific behaviors emerge as "unusual" or "atypical" regardless of age and may therefore warrant additional attention.

A benefit of the MASC is its ability to discriminate abnormal and normal behavior. The ANOVA between the clinical and non-clinical subjects provided the first example of the MASC's ability to discriminate between clinical and non-clinical populations. The study determined that as a "screener" of pathology the MASC is effective at discriminating non-clinical from clinical populations. Another benefit is that the 26 item measure is quicker and shorter than many other scales.

Normative data with a greater sample of children is needed in the future. By collecting more normative data, psychologists can reliably discriminate abnormal from normal behavior and better determine what is developmentally appropriate. This study demonstrated the MASC's ability to discriminate abnormal from normal behavior in a limited sample. Overall, it appeared that children exhibit symptoms of bipolar disorder to some extent and thus a larger normative sample will be beneficial to understanding the non-clinical population overall.

Understanding the diagnosis of bipolar disorder in children is needed at present. The best way to understand the diagnosis of bipolar disorder in children is to utilize the measure with different clinical groups. The MASC should be given to parents of children with similar disorders like ADHD, Depression, Bipolar Disorder, Anxiety

disorders, and so on. to aid in making differential diagnoses. Future research should look at the normative samples of these clinical groups on the MASC.

Limitations

While there are many possible applications for the study, there are limitations to consider as well. Limitations for the study include a small sample size, a limited group of children diagnosed with bipolar disorder, reliance on practitioner's diagnoses of psychological disorders, reliance on parent report, comparison of the MASC with only one measure, and limited generalizability of the findings to the population at large. The next few paragraphs will cover these limitations in detail.

First, the overall sample size in the study was minimal for data analysis purposes. The number of subjects was sufficient for factor analyses and ANOVA calculations, but a larger sample may have provided additional information. While a large number of participants were approached, the resulting sample size and response rate was small. The subject matter of the study was sensitive, so it is likely that this was the reason for the small sample size. Parents, especially in the public schools, may not have wanted to divulge the sensitive information to the researchers.

Second, there was a limited group of children identified as having the diagnosis of bipolar disorder (N = 7). Ideally, a study analyzing the validity of a measure for bipolar disorder would have a larger sample of children diagnosed with bipolar disorder. A majority of the children evaluated had similar disorders (ADHD, Disruptive Behavior Disorder, Not Otherwise Specified, Major Depressive Disorder, etc.) which led to a large clinical subject pool. Because of the reliance on volunteers from public school, clinical

settings, and research trials, it was difficult to get a larger bipolar sample. Future research should investigate the use of the measure in discriminating bipolar disorder from other disorders and the non-clinical population. In addition, the study parameters allowed for parents to make the report to the researcher on the child's diagnosis (or lack thereof). There are many problems with this scenario. For example, the parent may not remember the child's diagnosis. In addition, the parent may choose to report only partial information on diagnoses. Again, it is up to future researchers to make the diagnostic decision themselves, for a clearer picture.

Third, the study parameters allowed for the children to have diagnoses from other practitioners. Reliance on the ability of other practitioners making diagnostic decisions can lead to less reliability in the study's findings. In the future, the MASC should be given to groups diagnosed in a systematic and controlled manner by the research team. For example, the diagnoses could be made by structured interviews and behavioral checklists completed by teachers, parents, and even the child themselves.

Fourth, the MASC was compared to only one other measure to determine its content validity. While this is sufficient, it is not ideal. The MASC could not be compared to another measure of bipolar disorder in children, because there is not another measure available. However, the MASC could be compared, in future studies, to the Children's Depression Inventory, the Child Behavior Checklist, the Conners' Parent Rating Scales and other such measures. The BASC was chosen for its high reliability and validity. While an omnibus measure, it does contain subscales that are similar to

what children may experience with bipolar disorder (e.g., depression, attention problems, and hyperactivity).

Fifth, and finally, the results of the study may have limited generalizability for the population at large. As mentioned a small sample size was used. A larger sample may have been more representative of the population, but due to various constraints 201 participants completed the study. Other aspects that may affect generalizability may include the characteristics of the sample of children. A good mix of ethnic and gender groups occurred, but there were less children in the adolescent and early childhood groups. These features of the study should be improved upon in future research.

Future Directions of Research

This study was a first step in creating a measure for the accurate diagnosis of bipolar disorder in children. Because this is a growing field of study, there is much to anticipate in future research.

Directions for research include using the MASC with different clinical groups. Making comparisons between children diagnosed with bipolar disorder and children with other clinical diagnosis will be beneficial in differential diagnosis decisions and in establishing its ability to reliably diagnose bipolar disorder as opposed to "pathology". The MASC should be further studied with a greater number of children diagnosed with bipolar disorder as well. As mentioned, this study only had a small sample of children with the diagnosis. The use of the MASC as part of clinical trials research for children with bipolar disorder could add to the external validity data on the MASC with larger samples of diagnosed children. A comparison of the MASC results of children

consistently diagnosed with bipolar disorder, ADHD, depression, and conduct disorder, with a larger sample of children would be useful as well. Additional research to establish developmental trends and identify age-dependent manifestations of bipolar disorder is needed.

The measure also could be used in other studies of childhood bipolar disorder as a tool for making diagnosis. For example, if researchers were trying to determine the effects of medication on children with bipolar disorder, then they could use the MASC in making the initial diagnosis (as part of a multi-faceted evaluation).

Finally, the MASC could be developed into teacher and child versions and studied in this manner. Use of the MASC as a parent report measure is the first step to understanding its properties. Now research should look at the use of the MASC with teachers and children as well.

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APPENDIX A

Parent Survey

Directions:
Parent(s) please fill out the following information regarding your child and family. The answers you provide will be used for statistical purposes only. Any information provided is considered confidential and will not be shared with others.

Child Information

1. **What is your child's age?** _____

2. **What is your child's date of birth?**_____

3. **What is your child's ethnicity?** (circle one)

African American | Asian/Asian American

Hispanic/Latino/a | Native American/Pacific Islander

White, non-Hispanic | Other (specify): _____

4. **What is your child's grade in school?** (if applicable):_____

5. **How many hours does your child sleep per night** (on average)? _____

6. **Has your child ever been diagnosed with a medical, educational, or psychological disorder?**

a. **Medical:** **YES** **NO**

Diagnosis: _____

b. **Educational:** **YES** **NO**

Diagnosis: _____

c. **Psychological:** **YES** **NO**

Diagnosis: _____

7. **Is your child in special education?**

YES **NO**

If yes, for what?_____

8. **Does your child take medication?**

YES **NO**

If yes, what type?_____

Parent/Family Information

7. **Highest educational level completed by mother** (circle one):

Less than High School High School

Two Year College Four Year College

Graduate School Other (specify): _____

8. **Highest educational level completed by father** (circle one):

Less than High School High School

Two Year College Four Year College

Graduate School Other (specify): _____

9. **Is there a family history of any of the following conditions?** (circle if applicable)

Bipolar disorder Depression

Schizophrenia Attention-Deficit Hyperactivity Disorder

Learning Disability/Dyslexia Other (specify): _____

Thank you for completing the parent survey.

APPENDIX B

Child Behavior Survey

Instructions

This form provides statements on different ways children behave. Please read each statement and then select the response that relates to the behavior your child has displayed over the ***last 6 months***. Make your selection by circling the appropriate response.

Key

N = Behavior ***never*** happens
S = Behavior ***sometimes*** happens
O = Behavior ***often*** happens
A = Behavior ***always*** happens

1.	**Irritable mood**…… (touchy, cranky, overly critical)	N	S	O	A
2.	**Mood swings**…… (switching from happiness to sadness/anger)	N	S	O	A
3.	**Sleeping a lot**…… (sleeping more than 12 hours per night)	N	S	O	A
4.	**Explosive anger**…… (sudden yelling, screaming, or fits of rage)	N	S	O	A
5.	**Inappropriate sexual behaviors**……. **or interest for age**	N	S	O	A
6.	**Impulsivity**……... (not thinking before acting)	N	S	O	A
7.	**Overactivity**…….. (cannot sit still, moves around a lot)	N	S	O	A
8.	**Inattention**……	N	S	O	A
9.	**Expression of guilt/remorse**……	N	S	O	A
10.	**Fluctuation in school performance**……	N	S	O	A
11.	**Sulking/pouting**…….....	N	S	O	A

12.	**Nightmares**……..	N	S	O	A
13.	**Happiness or an elevated mood**……..	N	S	O	A
14.	**Restlessness**……..	N	S	O	A
15.	**Talking/speaking quickly**……	N	S	O	A
16.	**Talking/speaking a lot**…….	N	S	O	A
17.	**Sadness or a depressed mood**……	N	S	O	A
18.	**Hearing/seeing things that others do not**……...	N	S	O	A
19.	**Dare devil or risk-taking behavior**…… (e.g., running into a busy street or taking drugs)	N	S	O	A
20.	**Poor judgment**……. (not making good decisions)	N	S	O	A
21.	**Bed wetting**……...	N	S	O	A
22.	**Craving sweets and/or starches**……..	N	S	O	A
23.	**Involvement in multiple**…….. **projects and activities**	N	S	O	A
24.	**Low energy level**……..	N	S	O	A
25.	**Change in appetite**……... (eating more/less than usual)	N	S	O	A
26.	**Displays high or inflated self-esteem**……. (overly confident in own abilities)	N	S	O	A
27.	**Withdrawing from peers or activities**……	N	S	O	A
28.	**Crying**…….....	N	S	O	A
29.	**Temper tantrums**…….	N	S	O	A
30.	**Sleeping very little**……... (less than 7 hours per night)	N	S	O	A

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SELECTED PUBLICATIONS

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