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Fall 2010

# A case study exploration of placement in a therapeutic day school as an educational intervention package for children and adolescents with bipolar disorders

Wesley Arnold Clevenger  
*University of Iowa*

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A CASE STUDY EXPLORATION OF PLACEMENT IN A THERAPEUTIC DAY  
SCHOOL AS AN EDUCATIONAL INTERVENTION PACKAGE FOR CHILDREN  
AND ADOLESCENTS WITH BIPOLAR DISORDERS

by  
Wesley Arnold Clevenger

An Abstract

Of a thesis submitted in partial fulfillment of the  
requirements for the Doctor of Philosophy degree  
in Psychological and Quantitative Foundations (School Psychology)  
in the Graduate College of  
The University of Iowa

December 2010

Thesis Supervisor: Associate Professor Kathryn C. Gerken

## ABSTRACT

The number of children and adolescents diagnosed with bipolar disorders has increased dramatically since the mid-1990s, while the treatment literature has failed to keep pace. Few studies have explored any aspect of the educational functioning of this population, and no empirically supported educational interventions have been identified. As a result, school psychologists have little guidance regarding how to effectively serve these students.

In this study, case study methodology was utilized to explore the effectiveness of placement in a therapeutic day school as an educational intervention package for eleven (n=11) children and adolescents diagnosed with bipolar disorders. Both quantitative and qualitative data were utilized, and within- and cross-case analyses were conducted. Academic performance was examined in the areas of reading, mathematics, writing, science, and social studies. Behavioral/social-emotional performance was explored in the areas of on task/work completion, compliant (i.e., following instructions), and physically aggressive behaviors, as well as social skills and coping skills. Results indicated that a majority of students with bipolar disorders at least sustained performance in areas of relative academic and behavioral/social-emotional strength, improved performance in areas of relative academic and behavioral/social-emotional weakness, achieved positive immediate educational outcomes (e.g., upper levels of school's behavior modification level system, re-integration into home schools), and ameliorated referral concerns.

Interestingly, all students in this study exhibited relative weaknesses in social and coping skills. Nearly all students demonstrated a relative weakness in mathematics. Another important finding of this study was the identification of two distinct patterns of physically aggressive behavior: a "spike" pattern and a "low levels" pattern. All students exhibited one of these two patterns, either in full or emerging form.

In general, placement in a therapeutic day school was determined to be an effective educational intervention package for students with bipolar disorders. However, degrees, rates, and patterns of success were variable. Future studies should attempt to parse out the treatments that comprised this study's intervention package in an effort to find effective treatments for children and adolescents with bipolar disorders.

Abstract Approved:

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Thesis Supervisor

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Title and Department

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Date

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Graduate College  
The University of Iowa  
Iowa City, Iowa

CERTIFICATE OF APPROVAL

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PH.D. THESIS

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This is to certify that the Ph.D. thesis of

Wesley Arnold Clevenger

has been approved by the Examining Committee  
for the thesis requirement for the Doctor of Philosophy  
degree in Psychological and Quantitative Foundations (School Psychology) at  
the December 2010 graduation.

Thesis Committee: \_\_\_\_\_  
Kathryn C. Gerken, Thesis Supervisor

\_\_\_\_\_  
Stewart W. Ehly

\_\_\_\_\_  
Lynn C. Richman

\_\_\_\_\_  
Scott D. Lindgren

\_\_\_\_\_  
Dennis J. Simon

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## CHAPTER I

### INTRODUCTION

Bipolar disorders in children and adolescents are severe, complex, chronic psychiatric disorders that often entail rapid changes in mood and behavior, and are associated with increased risk for academic, behavioral, legal, and social difficulties, as well as hospitalization, psychosis, substance abuse, and suicide (American Academy of Child and Adolescent Psychiatry (AACAP), 2007; Birmaher & Axelson, 2006; Geller et al., 1995; Geller & Luby, 1997; Goldstein et al., 2009; Pavuluri, O'Connor, Harral, Moss, & Sweeney, 2006; Sala, Axelson, & Birmaher, 2009; Wilens et al., 2008). Until recently, the diagnostic validity of bipolar disorders within this population was the subject of extensive debate (e.g., AACAP, 1997; Biederman, 2003; National Institute of Mental Health (NIMH), 2001; Weckerly, 2002; Weller, Calvert, & Weller, 2002). At this time, bipolar disorders in children and adolescents can be difficult to diagnose, and are only beginning to be well understood. Current thought is that one or more of the following factors may be responsible: 1) many children and adolescents present with multiple symptoms of bipolar disorders but do not meet full *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition, Text Revision (DSM-IV-TR)* (American Psychiatric Association (APA), 2000) criteria for bipolar disorders; 2) developmental issues complicate the clinical manifestation of bipolar disorders in youth; 3) children and adolescents sometimes struggle to verbally express their emotions, which may result in numerous complications for clinicians and researchers; and 4) there is a high rate of comorbidity between bipolar disorders and other psychiatric disorders, including a significant amount of overlap among symptoms (Birmaher, 2007; Sala et al., 2009). Stemming from this complexity and diagnostic confusion, a new pediatric mood disorder, Temper Dysregulation Disorder with Dysphoria (TDDD), is under consideration for inclusion in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*

(DSM-V), which is scheduled to be published in 2013 (APA, 2010; Fristad & Youngstrom, 2010; Parens & Johnston, 2010). Fristad and Youngstrom (2010) suggested that one reason TDDD is being considered for inclusion in DSM-V is to ameliorate the overdiagnosis of bipolar disorders in children and adolescents.

Since the mid-1990s, there has been a dramatic increase in the number of children and adolescents diagnosed with bipolar disorders. In one recent study, it was reported that between 1996 and 2004, the population-adjusted rate of children (ages 5 through 13 years) in the United States who were discharged from a hospital with a primary diagnosis of a bipolar disorder rose linearly from 1.4 per 10,000 to 7.3 per 10,000, an increase of more than 500 percent. Similarly, the rate for adolescents (ages 14 through 18 years) grew linearly from 5.1 per 10,000 to 20.4 per 10,000, an increase of 400 percent (Blader & Carlson, 2007). Another recent study found that the rate of outpatient diagnosis of bipolar disorders among children and adolescents (ages 0 through 19 years) by office-based physicians jumped from 25 per 100,000 to 1,003 per 100,000 population between 1994-1995 and 2002-2003, representing a 40-fold increase (Moreno et al., 2007).

Along with this proliferation of diagnoses of bipolar disorders in children and adolescents, the number of research studies on this topic has increased significantly since the mid-1990s. Utilizing the PubMed database, Leibenluft (2008) found that between 1997 and 2007, there were 294 articles published on bipolar disorders in children and adolescents, in comparison to 15 articles published between 1986 and 1996. Leibenluft noted that more articles on bipolar disorders in children and adolescents were published in January 2008 than during the entire span 1986 to 1996.

Unfortunately, although the number of published studies on bipolar disorders in children and adolescents has expanded during the past two decades, few studies have explored any aspect of the educational functioning of these students. Further, there is a paucity of intervention studies within this population. To this author's knowledge, to date, not a single study has explored any type of educational intervention for children and

adolescents with bipolar disorders. Such deficits in research are problematic, because children and adolescents with bipolar disorders are likely to exhibit significant difficulty at school, within multiple domains of educational functioning (Grier, Wilkins, & Pender, 2007; McIntosh & Trotter, 2006).

### Educational Functioning

In a text written for parents, Fristad and Goldberg-Arnold (2004) outlined potential effects of bipolar disorders on the school performance of children and adolescents:

There are a multitude of ways in which learning can be negatively impacted in children with early-onset bipolar disorder. First, the “primary” symptoms of mania and depression can interfere with classroom learning. A child who is agitated, lethargic, unfocused, or unmotivated is not an ideal student. Second, most children with early-onset bipolar disorder also have comorbid conditions. Impulsivity, hyperactivity, oppositionality, anxiety, and learning disabilities often accompany early-onset bipolar disorder, and each negatively affects school performance. Third, the “secondary” symptoms of early-onset bipolar disorder can interfere with learning. For example, children whose peer relations are not developing adequately tend to feel particularly vulnerable on the playground, in the lunchroom, and at the gym. Being the perennial “last pick” as a science project partner or baseball teammate does not induce peak performance in most of the children we know. Finally, medication side effects can result in poor handwriting, fatigue, and a “duller” class performance. Sometimes this can be managed by reducing the dosage or adjusting the administration time for medication doses. However, some side effects do not completely go away for some children, no matter how carefully medications are prescribed and monitored (pp. 306-307).

Most of the information that has been published on students with bipolar disorders falls into one of two categories. The first category describes the services and accommodations available to them under the Individuals with Disabilities Education Improvement Act (IDEA; 2004), a federal law that guarantees services such as special education to students with disabilities, and Section 504 of the Rehabilitation Act (1973), civil rights legislation that prohibits discrimination against individuals with disabilities and provides for accommodations (e.g., Fristad & Goldberg-Arnold, 2004; Grier, Wilkins, & Szadek, 2005; Papolos & Papolos, 2006). Much of this type of information includes guidelines and general recommendations for providing services and/or

accommodations to students with bipolar disorders that are supported by apparent face validity, but are not backed by relevant empirical outcome data (e.g., Grier et al., 2005; Lofthouse, Mackinaw-Koons, & Fristad, 2004; McClure, Kubiszyn, & Kaslow, 2002; McIntosh & Trotter, 2006). The only data available within this domain are primarily demographic in nature, indicating that students with bipolar disorders are at increased risk for needing tutoring services, being placed in special/remedial classes (including special education classes), repeating a grade, and failing to graduate on time (Doyle et al., 2005; Faedda, Baldessarini, Glovinsky, & Austin, 2004; Findling et al., 2001; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Pavuluri et al., 2006; Wilens et al., 2003; Wozniak et al., 1995). Information presented within this category is generally intended for practitioners and may be considered the “best available” information for making decisions regarding services or accommodations given the dearth of research-based information that is available.

The second type of information available comes from a small number of empirical research studies generally more rigorous than those in the first category, and includes more robust data than those in the first category, but still contains a substantial amount of demographic information only. Currently, the research literature identifies three specific areas of functioning in which students with bipolar disorders are likely to exhibit difficulties at school: academics, behavioral/social-emotional, and cognitive/neuropsychological. While these studies will be discussed in greater detail in Chapter II, it is important to note that bipolar disorders are associated with deficits in all three domains (Althoff, Rettew, Faraone, Boomsma, & Hudziak, 2006; Boomsma et al., 2006; Dickstein et al., 2007; Doyle et al., 2005; Faedda et al., 2004; Fields & Fristad, 2009; Geller, Bolhofner, et al., 2000; Goldstein et al., 2009; Henin et al., 2007; Joseph, Frazier, Youngstrom, & Soares, 2008; Kutcher, Robertson, & Bird, 1998; Lagace & Kutcher, 2005; Lagace, Kutcher, & Robertson, 2003; McClure et al., 2005; McDonough-Ryan et al., 2002; McIntosh & Trotter, 2006; Meyer & Krumm-Merabet, 2003; Mick,

Biederman, Pandina, & Faraone, 2003; Pavuluri et al., 2006; Quackenbush, Kutcher, Robertson, Boulos, & Chaban, 1996; Reichenberg et al., 2002; Rucklidge, 2006; Wilens et al., 2003; Wozniak et al., 1995).

### Intervention Studies

Much is known about treating unipolar depression in children and adolescents; for example, there is solid empirical evidence that supports the use of behavioral and cognitive interventions (McClure et al., 2002; McIntosh & Trotter, 2006; Young & Fristad, 2009). However, the treatment literature for children and adolescents with bipolar disorders is still emerging. At this time, psychosocial interventions are considered only adjuncts to psychopharmacological interventions (AACAP, 2007; Pavuluri, Birmaher, & Naylor, 2005; Young & Fristad, 2009). The available literature on psychosocial interventions for children and adolescents with bipolar disorders may be broken down into three categories: a small number of studies on family-focused therapy (i.e., Fristad, 2006; Fristad, Gavazzi, & Mackinaw-Koons, 2003; Miklowitz et al., 2004; Miklowitz, Biuckians, & Richards, 2006; Young & Fristad, 2007), a small number of studies on cognitive-behavioral therapy (i.e., Danielson, Feeny, Findling, & Youngstrom, 2004; Feeny, Danielson, Schwartz, Youngstrom, & Findling, 2006; Pavuluri et al., 2004; West, Henry, & Pavuluri, 2007), and one study on dialectical behavior therapy (i.e., Goldstein, Axelson, Birmaher, & Brent, 2007). It is important to note that studies in all three categories have yielded promising preliminary results. These studies will be critically reviewed in Chapter II.

### Educational Intervention Studies

While it is critical that students with bipolar disorders are guaranteed services and accommodations in an effort to help them succeed at school, there are no known specific, empirically-supported, educational interventions to accomplish this task (e.g., Lofthouse et al., 2004; Young & Fristad, 2009). To date, no study has explored any kind of



educational intervention for this population. Further, no study has investigated the performance of children and adolescents with bipolar disorders who were placed in a therapeutic day school.

### Purpose of This Study

Broadly, there exists a significant need to find effective, empirically-supported interventions for children and adolescents with bipolar disorders. More specifically, from the author's perspective as a school psychologist, there is a significant need to find effective educational interventions for children and adolescents with bipolar disorders. The present study fills a gap in the literature by exploring placement in a therapeutic day school as an educational intervention package for children and adolescents with bipolar disorders, using a case study format. A description of this educational intervention package, including a list of its specific components, may be found in Chapter III. Ultimately, this investigation provides preliminary data regarding the impact of an educational intervention package for children and adolescents with bipolar disorders rather than exploring specific interventions. It is intended that future studies will parse out and explore the specific interventions that are utilized in this study.

### Research Questions

This preliminary analysis uses a case study research design in which 11 children and adolescents diagnosed with bipolar disorders are followed over the course of at least two full academic years. Both within- and cross-case analyses are utilized. The primary research question of this study is: How does placement in a therapeutic day school as an educational intervention package affect the school functioning of children and adolescents with bipolar disorders over time? Three sub-questions help address this primary question, and each sub-question consists of multiple components, as follows.

- 1) How does placement in a therapeutic day school affect the academic functioning of children and adolescents with bipolar disorders over time?

- a. How does reading performance change over time among children and adolescents with bipolar disorders?
  - b. How does mathematics performance change over time among children and adolescents with bipolar disorders?
  - c. How does writing performance change over time among children and adolescents with bipolar disorders?
  - d. How does science performance change over time among children and adolescents with bipolar disorders?
  - e. How does social studies performance change over time among children and adolescents with bipolar disorders?
- 2) How does placement in a therapeutic day school affect the behavioral/social-emotional functioning of children and adolescents with bipolar disorders over time?
- a. How does on task/work completion behavior change over time among children and adolescents with bipolar disorders?
  - b. How does compliant (i.e., following instructions) behavior change over time among children and adolescents with bipolar disorders?
  - c. How does physically aggressive behavior change over time among children and adolescents with bipolar disorders?
  - d. How does general social skills behavior change over time among children and adolescents with bipolar disorders?
  - e. How does general coping skills behavior change over time among children and adolescents with bipolar disorders?
  - f. For those children and adolescents with bipolar disorders receiving medical management, how do medication adjustments and hospitalizations change over time?

- g. How does school attendance change over time among children and adolescents with bipolar disorders?
- 3) How does placement in a therapeutic day school affect the immediate educational outcomes of children and adolescents with bipolar disorders over time?
- a. How does standing within the school's level system change over time among children and adolescents with bipolar disorders?
  - b. How successful are children and adolescents with bipolar disorders at achieving either partial or full re-integration into their home schools, including high school placement (as appropriate)?

## CHAPTER II

### REVIEW OF LITERATURE

#### Overview

A comprehensive review of the literature was conducted in order to summarize the available information on children and adolescents with bipolar disorders. This chapter begins by reviewing the history and clinical features of bipolar disorders among youth. Next, the literature on the educational functioning of these students is reviewed critically, followed by a critical review of the treatment literature. It should be noted that due to the limited number of studies in these areas, in many cases the data gleaned were not the primary focus of a study, but rather were reported as ancillary data.

#### History

A German psychiatrist, Emil Kraepelin, is widely credited as the first to report the occurrence of mania in children and adolescents, and is considered the founder of the modern conceptualization of bipolar disorders occurring within youth (Youngstrom & Kendall, 2009). In his seminal text, *Manic-depressive Insanity and Paranoia* (Kraepelin, 1921/1976), Dr. Kraepelin suggested that onset of illness prior to age 10 years occurred in “rare” cases, and cited its occurrence in 0.4 percent (n=4) of 903 cases of manic-depressive illness. Further, he provided evidence that mania could be present even earlier in life than age 10 years, as he described a case study by a colleague, Liebers, who diagnosed mania in a child prior to age 5 years.

However, the roots of bipolar disorders in youth can be traced much further back in history, all the way to ancient Greece. In some of the earliest writings on record in the field of medicine, physicians such as Alcmaeon of Crotona and Aretaeus of Cappadocia described and discussed the concepts of mania and melancholia, which are similar to today’s conceptualizations of manic and depressive symptoms (Glovinsky, 2002). In fact, some consider Aretaeus of Cappadocia the “father of bipolar disorder,” as he was

the first to describe a single disease that included symptoms of both mania and melancholia (Carlson & Glover, 2009).

During the early 1800s, manic-depressive illness in children was described in case studies by Esquirol, among others (Faedda et al., 2004). In 1851, one of Esquirol's residents, Falret, used the term *folie circulaire* in a published statement to describe a mental disorder in which melancholia and mania continuously succeeded one another, broken up only by short intervals that were asymptomatic. In 1857, another Esquirol resident, Baillarger, used the term *folie a double forme* to describe a similar condition in which melancholia and mania continuously succeeded one another, but the intervals between these two states were felt to have no meaning, unlike Falret's conceptualization. In 1894, Falret and Baillarger received joint credit for their discovery of this mental disorder (Carlson & Glover, 2009; Glover, 2002).

The next major figure in the history of bipolar disorders in youth was Kraepelin. Also within the same time period as Kraepelin, a German psychologist and physician, Ziehen, differentiated unipolar (i.e., "circular insanity") from bipolar (i.e., "periodic") forms of melancholia and mania (Carlson & Glover, 2009; Faedda et al., 2004; Glover, 2002). Group studies involving childhood mania were reported in the 1920s and 1930s (Glover, 2002). Kanner, in his 1935 text *Child Psychiatry*, described five different patterns of manic-depressive illness with different sequences of manic phases, depressive phases, and intervals between them. Interestingly, these descriptions were removed from future editions of this text, perhaps reflecting resistance to accept manic-depressive illness as occurring in childhood, or else reflecting the influence of psychoanalytic theory on children's development (Carlson & Glover, 2009).

During the 1950s, several case studies describing manic-depression in children and adolescents were published in a professional journal, *The Nervous Child*, although manic-depression continued to be described as rare within this population. Interestingly,

at that time, some questions were raised regarding an alternate form of the disorder within childhood psychopathology (Carlson, 2005; Carlson & Glovinsky, 2009).

Anthony and Scott conducted a review of the literature in 1960, exploring the classic form of this disorder in children and adolescents. The authors confirmed the existence of the classic form of manic-depression in childhood and adolescence, but indicated that it occurred rarely. Interestingly, Anthony and Scott generated a set of criteria for diagnosing manic-depression in children and adolescents, but found that only 3 out of 60 cases satisfied their criteria (AACAP, 2007; Carlson, 2005; Glovinsky, 2002). Glovinsky (2002) suggested that in generating these diagnostic criteria, Anthony and Scott "...essentially abolished the diagnosis of the disorder because they excluded almost all children" (p. 457).

In the 1970s, studies involving the use of lithium in children and adolescents regenerated interest in this area, and both research and clinical work helped refine diagnostic criteria (Glovinsky, 2002). In the late 1970s and early 1980s, when large-scale studies were conducted involving adults with bipolar disorders, the possibility of onset of illness prior to adulthood became a widely accepted notion. Retrospective studies by Carlson et al. (1977), Loranger and Levine (1978), and Joyce (1984) found evidence of onset of illness prior to age 19 years in approximately 20 percent of cases (AACAP, 2007). It has been hypothesized that one reason manic-depression was dismissed or under-identified in children and adolescents for so many years is that it was often misdiagnosed as schizophrenia (AACAP, 2007; Carlson, 2005; Carlson & Glovinsky, 2009).

Finally, Bipolar Disorder as a formal psychiatric diagnosis first appeared in 1980 in the *Diagnostic and Statistical Manual of Mental Disorders – Third Edition (DSM-III)* (APA, 1980). The four current diagnostic classifications of Bipolar Disorders (i.e., Bipolar I Disorder, Bipolar II Disorder, Cyclothymic Disorder, and Bipolar Disorder Not Otherwise Specified) first appeared in the *Diagnostic and Statistical Manual of Mental*

*Disorders – Fourth Edition (DSM-IV)* (APA, 1994), and therefore have been in place for less than twenty years (Youngstrom & Kendall, 2009).

### Clinical Features

*DSM-IV-TR* includes diagnostic criteria for four Bipolar Disorders within the general category of Mood Disorders: Bipolar I Disorder, Bipolar II Disorder, Cyclothymic Disorder, and Bipolar Disorder Not Otherwise Specified. However, *DSM-IV-TR* fails to differentiate child-onset or adolescent-onset bipolar disorders from adult-onset bipolar disorders, despite general recognition that bipolar disorders in children and adolescents often present differently than adult-onset bipolar disorders (e.g., AACAP, 2007; Biederman, 2003; Kowatch, Fristad, et al., 2005; Liebenluft, 2008; Weller et al., 2003). Adult-onset bipolar disorders are often characterized by distinct, cyclical episodes of mania and depression (e.g., AACAP, 2007;Smarty & Findling, 2007). While some children and adolescents exhibit classic (i.e., adult) forms of bipolar disorders and satisfy full *DSM-IV-TR* criteria, in general, bipolar disorders in children and adolescents present as more continuous and less episodic than adult-onset bipolar disorders, and involve extreme irritability, severe mood lability (including rapid cycling), high rates of comorbidity with Attention-Deficit/Hyperactivity Disorder (ADHD) and other psychiatric disorders, and various other symptoms of mania and depression (e.g., AACAP, 2007; Geller et al., 1995; Geller & Luby, 1997; Leibenluft, 2008; Sala et al., 2009). It may be difficult to determine the onset and offset of episodes in children, and clinical presentation may be mixed or dysphoric, with brief episodes of intense mood lability/irritability instead of classic symptoms of manic euphoria (Kowatch, Fristad, et al., 2005). Leibenluft, Charney, and Pine (2003) suggested the core feature of bipolar disorders in children and adolescents is marked state fluctuations, using the term *state* instead of *mood* because “mania and depression are characterized by marked episodic

alterations in behavior, cognition, and level of arousal, as well as by alterations in mood” (p. 1009). *DSM-IV-TR* outlines the four Bipolar Disorders as follows:

Briefly, Bipolar I Disorder involves the occurrence of at least one manic or mixed episode, has a lifetime prevalence rate of 0.4 to 1.6 percent, and has an average age at onset of 20 years for both males and females. Six different criteria sets were published for Bipolar I Disorder, distinguishing whether there was a single manic episode, or whether the most recent episode was manic, hypomanic, mixed, depressed, or unspecified. In addition, numerous specifiers were listed to help describe clinical features and patterns (*DSM-IV-TR*).

Bipolar II Disorder involves the occurrence of at least one episode of major depression and at least one episode of hypomania (but neither manic nor mixed episodes may have occurred), has a lifetime prevalence rate of about 0.5 percent, and may occur more commonly among females than males. No average age at onset was reported. Only one set of criteria was published for Bipolar II Disorder, but numerous specifiers were available for describing clinical features and patterns (*DSM-IV-TR*).

Cyclothymic Disorder involves the occurrence of multiple periods of hypomanic symptoms, as well as multiple periods of depressive symptoms, over the course of at least one year (for children and adolescents), with no longer than a two-month symptom-free period. No manic or mixed episodes, or episodes of major depression, may have occurred. Cyclothymic Disorder has a lifetime prevalence rate of 0.4 to 1 percent (3 to 5 percent in mood disorders clinics), and onset is usually in adolescence or early adulthood. Only one set of criteria was published for Cyclothymic Disorder, with no available specifiers (*DSM-IV-TR*).

Lastly, Bipolar Disorder Not Otherwise Specified may involve rapid cycling between manic and depressive symptoms but does not meet duration criteria for another Bipolar Disorder, may involve re-occurring hypomanic episodes without depressive symptoms, or may involve other types of bipolar features. No information was reported



regarding prevalence or average age at onset. Neither a formal set of criteria nor specifiers were published for Bipolar Disorder Not Otherwise Specified (*DSM-IV-TR*). Interestingly, the diagnostic category Bipolar Disorder Not Otherwise Specified is frequently utilized when diagnosing bipolar disorder in children and adolescents (Singh, Pfeifer, Barzman, Kowatch, & DelBello, 2007).

### Prevalence

In what is generally recognized as the first extensive epidemiological study of bipolar disorders in adolescents, Lewinsohn, Klein, and Seeley (1995) administered structured diagnostic interviews to a community-based, random sample of 1,709 adolescents between the ages of 14 and 18 years. Lewinsohn et al. found a lifetime prevalence rate of bipolar disorders (mostly Bipolar II Disorder and Cyclothymia) of approximately 1 percent. Additionally, another 5.7 percent of these subjects endorsed “having experienced a distinct period of elevated, expansive, or irritable mood but...did not meet criteria for bipolar or bipolar II disorder or cyclothymia” (p. 456). Sala et al. (2009) suggested that this additional 5.7 percent of subjects would be classified as Bipolar Disorder Not Otherwise Specified according to *DSM-IV* guidelines.

Goodwin and Jamison (2007) reported data from two unpublished large epidemiological studies on bipolar disorder in children and adolescents that were conducted in the United States in 1992. One of these studies found a lifetime prevalence rate of Bipolar I Disorder of 1.4 percent in 468 subjects between the ages of 15 and 17 years. The other study yielded six-month prevalence rates of mania in 1.2 percent of 1,285 subjects between the ages of 9 and 17 years, and hypomania in 0.6 percent of these subjects.

Some studies have found that bipolar disorders in youth may occur at higher rates in clinical settings than community-based settings. In one example, Wozniak et al. (1995) found that 16 percent of 262 children aged 12 years or below, who were referred

consecutively to a pediatric psychopharmacology clinic, met full diagnostic criteria for mania within the *Diagnostic and Statistical Manual of Mental Disorders – Third Edition – Revised (DSM-III-R)* (APA, 1987). The authors concluded that mania may occur somewhat commonly among children who receive psychiatric referrals. In another example, Youngstrom and Duax (2005) examined published, estimated base rates of bipolar spectrum disorders among youth across a variety of clinical settings. The highest base rate found was for an inpatient setting, where 30 percent of subjects exhibited manic symptoms, although less than 2 percent met strict diagnostic criteria for Bipolar I Disorder. Base rates for three outpatient settings ranged from 5.9 percent at a community mental health center, all the way up to 15 to 17 percent at an ADHD specialty clinic. For purposes of comparison, three epidemiological studies each estimated base rates of pediatric bipolar spectrum disorders at less than 2 percent.

Finally, there is evidence to suggest that prevalence rates of bipolar disorders in children and adolescents may be similar to those of adult-onset bipolar disorders (Kowatch, 2009b). In a recent large-scale study of adults, Merikangas et al. (2007) found a lifetime prevalence rate of 4.4 percent for any bipolar disorder, which included prevalence rates of 1.0 percent for Bipolar I Disorder and 1.1 percent for Bipolar II Disorder. Because many children and adolescents with bipolar disorders do not fully satisfy *DSM-IV* duration criteria for Bipolar I Disorder or Bipolar II Disorder (e.g., Sala et al., 2009), it may be useful to examine bipolar spectrum disorders as a group rather than report data on a single diagnosis such as Bipolar I Disorder. The term *bipolar spectrum disorders* refers to “mania, hypomania, recurrent brief hypomania, sporadic brief hypomania, and cyclothymia” (Goodwin & Jamison, 2007, p. 175). Upon reviewing and summarizing the available literature, Kowatch (2009b) reported the prevalence rate for bipolar spectrum disorders in children and adolescents as approximately 4 percent.

### Age at Onset

There is mounting evidence to suggest that for some individuals, the onset of symptoms of bipolar disorders may occur very early in life, as indicated in the following studies. Essentially, there are two groups of studies to support this claim: those involving children and adolescents with bipolar disorders, and those involving adults with bipolar disorders who reported age of onset retrospectively.

Within the first group of studies, Wozniak et al. (1995) indicated the presence of mania at or prior to age 5 years in 70 percent of 43 subjects (mean age  $7.9 \pm 2.6$  years) who met full *DSM-III-R* diagnostic criteria for mania, as determined by parental report. Wilens et al. (2003) studied clinically-referred children who met *DSM-III-R* criteria for bipolar disorders, comparing 44 pre-school aged children (mean age  $5.1 \pm 0.8$  years) to 29 school-aged children (mean age  $7.8 \pm 0.9$  years). Results indicated that 86 percent of school-aged subjects experienced onset of symptoms either prior to or while they were pre-school aged. Further, pre-school aged subjects experienced onset of bipolar disorders on average at  $2.5 \pm 1.4$  years, while school-aged subjects experienced onset of bipolar disorders on average at  $3.9 \pm 2.1$  years, as reported by parents during a structured interview.

Tillman et al. (2003) reported that among 93 subjects (mean age  $10.9 \pm 2.6$  years) who were selected based on meeting *DSM-IV* criteria for a current manic episode at baseline, as well as for exhibiting at least one of two “cardinal symptoms” of mania (i.e., elation and/or grandiosity), the mean age of onset for mania was  $6.8 \pm 3.4$  years. At baseline, these subjects had been chronically suffering from mania for an average of  $3.6 \pm 2.6$  years. Although not stated explicitly, it seems these figures were reported by parents during a semi-structured interview. Faedda et al. (2004) found that among 82 subjects (mean age  $10.6 \pm 3.6$  years) with bipolar disorders who satisfied modified *DSM-IV* criteria, the onset of first symptoms occurred prior to age 3 years in 74 percent of subjects, and prior to age 13 years in 95 percent of subjects, as reported by parents. The

authors stated that on average, about seven years passed between the reported onset of first symptoms and the time at which subjects were first evaluated or treated.

In a study that explored bipolar spectrum disorders within 438 children and adolescents with bipolar disorder (mean age  $12.7 \pm 3.2$  years), Axelson et al. (2006) found that the age of onset varied by type of bipolar disorder. For 255 subjects with Bipolar I Disorder, the average age of onset was  $9.5 \pm 4.0$  years. The average age of onset was  $11.2 \pm 3.4$  years for 30 subjects with Bipolar II Disorder. Finally, for 153 subjects with Bipolar Disorder Not Otherwise Specified, the average age of onset was  $8.7 \pm 3.5$  years.

Finally, two studies on adults with bipolar disorders highlight the relatively common nature of early onset of symptoms, as reported retrospectively. In the first study, Perlis et al. (2004) utilized data from the first 1,000 subjects enrolled in the Systematic Treatment Enhancement Program for Bipolar Disorder (STEP-BD). Perlis et al. found that among 983 adults with bipolar disorders for whom information on the age of first symptoms was available, 27.7 percent experienced onset of symptoms prior to age 13 years, and 37.6 percent experienced onset of symptoms between the ages of 13 and 18 years. In the second study, Post and Kowatch (2006) also utilized data from the STEP-BD project, in addition to data from another large outpatient study on adults with bipolar disorders, the Bipolar Collaborative Network (BCN). STEP-BD data remained fairly consistent with results reported in the Perlis et al. (2004) study, as 28 percent of 913 subjects reported onset of bipolar disorders prior to age 13 years. Within the BCN study, data from 521 subjects indicated that 15 percent experienced onset of bipolar disorders prior to age 13 years.

### Symptoms

While there is significant heterogeneity in the presentation of bipolar disorders among children and adolescents, the professional literature indicates clearly that these

individuals are likely to present with a host of impairing symptoms (e.g., Birmaher et al., 2009; Geller, Zimmerman, Williams, DelBello, Bolhofner, et al., 2002; Geller, Zimmerman, Williams, DelBello, Frazier, et al., 2002; Kowatch, Youngstrom, Danielyan, and Findling, 2005; Pavuluri et al., 2005; Weckerly, 2002).

Barbara Geller and colleagues (e.g., Geller & DelBello, 2003) were responsible for one of the most significant, formative lines of research on the symptomology of bipolar disorders in youth, which emerged between the mid-1990s and mid-2000s. Geller et al.'s findings included: bipolar disorders could be differentiated from ADHD by mania-specific symptoms, grandiose delusions, and ultradian or ultra-rapid cycling (Geller, Williams, et al., 1998); illustrative examples of developmental differences in manifestations of manic symptoms between children and adults with bipolar disorders (Geller, Zimmerman, Williams, DelBello, Frazier, et al., 2002); five mania-specific symptoms – decreased need for sleep, elation, flight of ideas or racing thoughts, grandiosity, and hypersexuality – were the best diagnostic discriminators between bipolar disorders and ADHD, while accelerated speech, distractibility, hyperactivity, and irritability demonstrated little utility in differential diagnosis (Geller, Zimmerman, Williams, DelBello, Bolhofner, et al., 2002); and proposed definitions of *episodes* and *cycles* in bipolar disorders in youth to avoid confusion and help clarify clinical characteristics (Tillman & Geller, 2003). Throughout this line of research, Geller et al. identified and adhered to the idea that there were two “cardinal symptoms of mania” (i.e., elation and grandiosity), although this notion would be debated by other researchers (e.g., Geller, Zimmerman, Williams, DelBello, Bolhofner et al., 2002; Craney & Geller, 2003).

As for common clinical symptoms of bipolar disorders in youth, Geller, Zimmerman, et al. (2000) and Geller, Zimmerman, Williams, DelBello, Bolhofner et al. (2002) identified the following symptoms as present within a significant proportion of 93 subjects (mean age  $10.9 \pm 2.6$  years) who met *DSM-IV* criteria for mania, with elation and/or grandiosity endorsed as at least one of the criteria for mania: increased energy

(100.0 percent) (including hyperenergetic (94.6 percent), sharpened thinking (49.5 percent), increased goal-directed (46.2 percent), and increased productivity (33.3 percent)); irritable mood (97.9 percent); accelerated speech (96.8 percent); distractibility (93.6 percent); poor judgment (90.3 percent) (including daredevil acts (65.6 percent), uninhibited people-seeking (65.6 percent), silliness/laughing (63.4 percent), and hypersexuality (43.0 percent)); elated mood (89.3 percent); rapid cycling (87.1 percent); grandiosity (86.0 percent); flight of ideas and/or racing thoughts (71.0 percent) (including flight of ideas (57.0 percent), racing thoughts (49.5 percent)); total psychosis (60.2 percent) (including grandiose delusions (50.5 percent)); mixed mania (54.8 percent); and suicidality (24.7 percent).

Faedda et al. (2004) reported that within a sample of 82 subjects (mean age  $10.6 \pm 3.6$  years) with bipolar disorders who satisfied modified *DSM-IV* criteria, the following symptoms were present at the time of assessment in over 90 percent of subjects: mood lability, irritability, sleep disturbance, impulsivity, anger, agitation, and aggression. In addition, these symptoms were present in over 50 percent of subjects: anxiety (80.5 percent), racing thoughts (78.0 percent), pressured speech (68.3 percent), and euphoric/grandiose (59.8 percent).

Kowatch, Youngstrom, et al. (2005) conducted a meta-analysis regarding the clinical characteristics and phenomenology of mania in pediatric populations. After searching both the PsycInfo and MedLine databases, a total of seven studies met rigorous inclusion criteria. Some of these criteria were: publication in a peer-reviewed journal, utilization of a diagnostic system (either a version of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* or RCD (Research Diagnostic Criteria)), subjects between the ages of 5 and 18 years, and methodology for establishing consensus diagnoses of bipolar disorders. One of the seven studies included in this meta-analysis was that by Faedda et al. (2004), referenced earlier in this section. Across studies, weighted averages revealed that more than 80 percent of cases involved symptoms of

increased energy (89 percent), distractibility (84 percent), pressured speech (82 percent), and irritability (81 percent). At least 70 percent of cases exhibited symptoms of grandiosity (78 percent), racing thoughts (74 percent), decreased need for sleep (72 percent), and euphoria and/or elation (70 percent). The symptom of poor judgment was present in 69 percent of cases. Finally, two symptoms were exhibited in less than 60 percent of cases: flight of ideas (56 percent) and hypersexuality (38 percent). In their discussion section, Kowatch, Youngstrom, et al. (2005) made two critical statements: it is important to examine the complete clinical picture when diagnosing mania rather than relying on any single diagnostic symptom of mania; and it is possible to meet full *DSM* criteria for a bipolar disorder without exhibiting either of the “cardinal symptoms of mania” that were endorsed by Geller and colleagues.

Birmaher et al. (2009) compared symptomology among 173 children (12 years old or younger) with bipolar disorders, 101 adolescents with childhood-onset bipolar disorders, and 90 adolescents with adolescent-onset bipolar disorders. All subjects met either *DSM-IV* criteria for Bipolar I Disorder or Bipolar II Disorder, or criteria for Bipolar Disorder Not Otherwise Specified that were established by the Course and Outcome for Bipolar Youth multicenter study. Results indicated that the two adolescent groups were more likely to have an initial depressive episode, as well as a lifetime history of a depressive episode, than the children with bipolar disorders group. The children were more likely to have an initial subsyndromal manic/hypomanic episode. Upon adjusting for duration of illness, gender, and socioeconomic status, more severe symptomology was reported for both adolescent groups while either manic or depressed. Mood lability was more common among the children with bipolar disorders and adolescents with childhood-onset bipolar disorders group than the adolescents with adolescent-onset bipolar disorders group.

At present, controversy continues regarding delineating the key symptoms of bipolar disorders in children and adolescents, including the relative role of irritable mood

versus elated/euphoric mood. Irritable mood is present in most cases of bipolar disorders in children and adolescents, but occurs within a number of other psychiatric disorders as well, and therefore is not a specific indicator for bipolar disorders. Euphoric or elated mood is specific to bipolar disorders in children and adolescents, but does not occur in all cases, and by itself is not enough to diagnose a bipolar disorder. As a result, these two symptoms are reported at highly discrepant rates across studies of bipolar disorders in children and adolescents (Youngstrom, Birmaher, & Findling, 2008). In their review of the past ten years of research on bipolar disorders in children and adolescents, Pavuluri et al. (2005) reported that in addition to the two cardinal symptoms of mania (i.e., elation and grandiosity) proposed by Geller and colleagues, some researchers have considered irritability as a core symptom of bipolar disorders in youth, while others have considered irritability as a core symptom only in the presence of elation or grandiosity, but grandiosity as a core symptom has been deemed insufficient.

#### Comorbidity

Bipolar disorders in children and adolescents “seldom” occur without at least one comorbid psychiatric disorder, and “the presence of comorbidity compounds disability, complicates treatment, and appears to worsen the prognosis in this population” (p. 291) (Joshi & Wilens, 2009). Tillman et al. (2003) found that within a sample of 93 children and adolescents who met *DSM-IV* criteria for a current manic episode and also exhibited at least one of two “cardinal symptoms” of mania (i.e., elation and/or grandiosity), 97.9 percent met *DSM-IV* criteria for at least one comorbid psychiatric disorder. Further, 81.7 percent met *DSM-IV* criteria for at least two comorbid psychiatric disorders, 41.9 percent met criteria for at least three comorbid psychiatric disorders, and 20.4 percent met criteria for at least four comorbid psychiatric disorders.

While it is well-established that bipolar disorders in children and adolescents are highly comorbid with other psychiatric disorders, reported rates of comorbidity vary



greatly among studies, and there is no consensus concerning rates of comorbidity (Pavuluri et al., 2005). Pavuluri et al. suggested that comorbidity rates vary according to the age of subjects, type of sample (i.e., community-based versus clinical), type of research instruments/methods, and diagnostic classification (e.g., whether *DSM-IV* criteria are strictly followed). Bipolar disorders in children and adolescents seem to be most highly comorbid with ADHD, Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), and anxiety disorders (Joshi & Wilens, 2009; Kowatch, 2009a; Pavuluri et al., 2005), while they are also frequently comorbid with substance use disorders and pervasive developmental disorders (PDDs) (Joshi & Wilens, 2009). In general, bipolar disorders in youth have the highest rate of comorbidity with ADHD (Kowatch, 2009a). It should be noted that bipolar disorders are often comorbid with learning disorders, also, although this issue will be discussed at length later in this chapter.

In their literature review, Pavuluri et al. (2005) reported the rate of comorbidity for ADHD was between 11 and 75 percent, while in a more recent literature review, Joshi and Wilens (2009) reported this rate at 60 to 90 percent. Some researchers have noted that children with bipolar disorders are more likely to exhibit ADHD than adolescents with bipolar disorders (Pavuluri et al., 2005; Sala et al., 2009). Comorbidity rates for ODD ranged from 46.4 to 75 percent (Pavuluri et al., 2005), and 47 to 88 percent (Joshi & Wilens, 2009). Regarding CD, Pavuluri et al. (2005) reported a comorbidity rate between 5.6 and 37 percent, while Joshi and Wilens (2009) reported 69 percent, although the latter rate was based on one study only.

Pavuluri et al. (2005) indicated that the rate of comorbidity with anxiety disorders was between 12.5 and 56 percent. Joshi and Wilens (2009) cited literature pertaining to both pediatric and adult subjects with bipolar disorder, with rates of comorbidity ranging from 12.5 to 76 percent. In one of the studies cited by Joshi and Wilens, Harpold et al. (2005) found that 76 percent of 297 children and adolescents with bipolar disorders met diagnostic criteria for at least one comorbid anxiety disorder, and 51 percent of these

children and adolescents with bipolar disorders met diagnostic criteria for at least two comorbid anxiety disorders. Joshi and Wilens (2009) suggested that at this time, more clarification is required concerning the comorbidity of specific anxiety disorders, as many studies group all anxiety disorders together. However, bipolar disorders in youth may be associated with Panic Disorder in particular (Joshi & Wilens, 2009; Pavuluri et al., 2005).

Comorbidity rates for substance use disorders ranged from 0 to 40 percent (Pavuluri et al., 2005), and 10 to 40 percent (Joshi & Wilens, 2009). Wilens et al. (2004) found that youth with bipolar disorders were much more likely to have a substance use disorder than healthy controls (i.e., 32 percent of 57 subjects with bipolar disorders versus 7 percent of 46 healthy controls,  $p = .004$ ), even after controlling for comorbid CD. In addition, the onset of a bipolar disorder during adolescence (i.e.,  $\geq 13$  years) was associated with significantly greater risk for a substance use disorder than the onset of a bipolar disorder during childhood. In another study involving youth with bipolar disorders, Wilens et al. (2008) found that bipolar disorders were associated with significantly greater age-adjusted risk for any substance use disorder, alcohol abuse, drug abuse or dependence, and cigarette smoking, regardless of psychiatric comorbidity with ADHD, CD, or multiple anxiety disorders. Older age was the best predictor of a substance use disorder in these youth with bipolar disorders.

Finally, the rate of comorbidity for PDDs was 11 percent, although both literature reviews obtained this rate from the same single study by Wozniak et al. (1997) (Joshi & Wilens, 2009; Pavuluri et al., 2005). Wozniak et al. (1997) found that 11 percent of 128 children and adolescents with mania met diagnostic criteria for PDD, while 21 percent of 66 children and adolescents with PDD met diagnostic criteria for mania, highlighting a significant amount of overlap between these two disorders. Pavuluri et al. (2005) suggested that Asperger's Disorder (one type of PDD) in particular is associated with bipolar disorders in youth.

### Course and Outcomes

Adult-onset bipolar disorders are generally recognized as chronic, progressive disorders characterized by symptoms of mania and depression occurring to varying degrees of severity, broken up by symptom-free periods of euthymia. Symptoms of mania and depression may occur together at times in mixed episodes, and subsyndromal mood episodes may also occur (Findling, 2009). In comparison to adult-onset bipolar disorders, it is believed that the course of bipolar disorders in children and adolescents may be more chronic, complex, severe, and treatment-refractory, with long-term prognosis similar to or worse than adult-onset bipolar disorders (AACAP, 2007; Perlis et al., 2004; Post & Kowatch, 2006; Sala et al., 2009). In describing the course of bipolar disorders in children and adolescents, Birmaher and Axelson (2006) wrote: “Youth with BP manifests with frequent changes in symptom polarity in a fluctuating course showing a dimensional continuum of BP symptom severity from subsyndromal to mood syndromes meeting full *DSM-IV* criteria. These rapid fluctuations in mood appear to be more accentuated than in adults with BP” (p. 1032). Miller and Barnett (2008) suggested that it is important to differentiate youth with an episodic course of a bipolar disorder from those with a chronic course, as the authors’ review of recent research highlighted discrepancies between these two courses in the areas of genetics, long-term outcomes, neurocognitive abilities, neuropsychiatric functioning, and symptom presentation.

At this time, only a few longitudinal studies have been published on the course of bipolar disorders in children and adolescents (Findling, 2009). Strober et al. (1995) conducted a naturalistic, prospective follow-up study five years after 54 inpatient adolescents (i.e., 13 to 17 years old) were diagnosed with Bipolar I Disorder. Results suggested that both relapse and recovery rates varied by type of episode at admission, with quicker recoveries noted for individuals who exhibited manic or mixed moods, and higher relapse rates for individuals who experienced mixed or cycling moods.

In two- and four-year prospective follow-up studies on youth with bipolar disorders, Geller and colleagues found generally poor outcomes. In the two-year follow-up study, Geller, Craney, et al. (2002) assessed 89 subjects (mean age  $10.9 \pm 2.7$  years) who met *DSM-IV* criteria for mania and exhibited elation and/or grandiosity. Twenty-four months after baseline, 65.2 percent of subjects had recovered from mania (mean time  $36.0 \pm 25$  weeks), but 55.2 percent had relapsed (mean time  $28.6 \pm 13.2$  weeks). In the four-year follow-up study, Geller, Tillman, Craney, and Bolhofner (2004) assessed 86 subjects (3 had dropped out), and results continued to highlight long durations of episodes with a chronic, severe course. Geller et al. commented that approximately 20 percent of adults with bipolar disorders exhibited a similar type of course, while such a course was present in the majority of subjects included in this study.

Citing data from both naturalistic longitudinal studies and retrospective studies of youth with bipolar disorders, Sala et al. (2009) reported that 40 to 100 percent of children and adolescents with bipolar disorders recovered within one to two years. Recovery was defined as eight consecutive weeks in which a subject failed to meet *DSM-IV* criteria for mixed affective state, depression, mania, or hypomania. However, following recovery, 60 to 70 percent of those subjects exhibited recurrence within ten to twelve months on average. These figures are fairly consistent with earlier data reported in a review of the literature by Birmaher and Axelson (2006), who found that between 70 and 100 percent of youth with bipolar disorders recovered from their initial episode, but relapse occurred in up to 80 percent of the subjects who recovered.

Although not many longitudinal studies have been conducted, other types of research have yielded important information about the course of bipolar disorders in children and adolescents. Axelson et al. (2006) examined 438 subjects with bipolar disorders who were between 7 and 17 years old. The following features were endorsed during the subjects' lifetime: psychopharmacological treatment (93.2 percent), suicidal ideation (76.2 percent), major depressive episode (52.7 percent), psychiatric

hospitalization (52.2 percent), suicide attempt (30.7 percent), and psychosis (27.6 percent). Psychotropic medications such as lithium, atypical antipsychotics, and anticonvulsants are often utilized in treating bipolar disorders in children and adolescents (e.g., AACAP, 2007; Smarty & Findling, 2007). Treatment of bipolar disorders with psychotropic medication may result in one or more significant side effects, including weight gain and/or diabetes, cognitive side effects (including cognitive dulling, word retrieval difficulties, and/or working memory deficits), Polycystic Ovarian Syndrome, and a host of other potentially serious side effects (Kowatch, Fristad, et al., 2005). It has been suggested that environmental stressors may exacerbate the course of bipolar disorders in youth, including the following stressors associated with school: academic stressors; conflict with teachers, peers, and/or family members; and disturbed sleep-wake cycle (Lofthouse et al., 2004).

Castilla-Puentes (2008) analyzed data on 8,129 children and adolescents with bipolar disorders from a large healthcare information database to study the effects of multiple episodes (defined as four or more occurrences of inpatient treatment for a mood disorder per year) on rates of comorbidity, hospitalization, and treatment. Castilla-Puentes found that in comparison to subjects who were not treated for multiple episodes annually, those who were treated for multiple episodes exhibited significantly higher rates of comorbidity with major depressive disorder/suicidality, ADHD, psychosis, separation anxiety disorder, phobias, and panic disorder; significantly higher rates of admission to a hospital for depression, another psychiatric condition, and a medical condition; and significantly higher rates of prescribed mood stabilizers, antidepressants, and antipsychotics.

There is also evidence to suggest that a significant amount of time may pass between the onset of symptoms and treatment in children and adolescents with bipolar disorders, likely wiping out any potential gains of early intervention. Post and Kowatch (2006) found that an average of  $16.8 \pm 10$  years passed between the initial onset of

symptoms and initial treatment in childhood-onset bipolar disorders, as reported retrospectively by adults with bipolar disorders.

Finally, drawing on data from several studies, Birmaher and Axelson (2006) reported that the following variables are associated with worse longitudinal outcomes in bipolar disorders among youth: comorbid disorders, early onset, family psychopathology, long duration, low socioeconomic status, mixed episodes, psychosis, rapid mood fluctuation, and subsyndromal mood symptoms.

### *Current Issues in Clinical Features*

Two prominent current issues surrounding bipolar disorders in children and adolescents are the perceived inadequacy of *DSM-IV-TR* in operationally defining and outlining diagnostic criteria for bipolar disorders, and the promise of neuroimaging techniques to aid in diagnosis of bipolar disorders.

In 2000, NIMH sponsored a roundtable meeting among leading experts in the field of bipolar disorders in youth in order to discuss unresolved diagnostic issues. An important outcome of this meeting was agreement on two essential characterizations of bipolar disorders in children and adolescents: one set of phenotypes – commonly referred to as a “narrow phenotype” – that aligned with *DSM-IV* criteria for Bipolar I Disorder and Bipolar II Disorder; and another set of phenotypes – a “broad phenotype” – that was more heterogeneous and did not align with *DSM-IV* criteria for Bipolar I Disorder and Bipolar II Disorder, but reflected mood instability that resulted in severe impairment, and was referred to as “basically BP-NOS” (i.e., Bipolar Disorder Not Otherwise Specified) (NIMH, 2001, p. 871). In 2003, a group of researchers expanded upon these notions of narrow and broad phenotypes of bipolar disorders in children and adolescents to include a narrow phenotype, two intermediate phenotypes, and a broad phenotype, distinguished by the presence of clear-cut episodes and hallmark symptoms (Leibenluft, Charney, Towbin, Bhangoo, & Pine, 2003). The implications of these distinctions are important; it has been

demonstrated that the inclusion and exclusion criteria for subjects used in studies of bipolar disorders in children and adolescents (e.g., whether subjects exhibited a broad versus narrow phenotype) may significantly impact results (Youngstrom, Meyers, Youngstrom, Calabrese, & Findling, 2006).

Currently, identifying the boundaries of a broad phenotype of bipolar disorders remains controversial, as does the question of whether *DSM-IV* includes the most clinically meaningful categories or subtypes of bipolar disorders (AACAP, 2007; Carlson & Glovinsky, 2009; Youngstrom et al., 2008). In addition, questions still exist concerning whether bipolar disorders in children and adolescents and adult-onset bipolar disorders represent the same affliction (AACAP, 2007). Faedda et al. (2004) suggested that *DSM-IV-TR* criteria need to be revised, due to differing presentations of bipolar disorders in children versus adults. Specifically, the authors advocated revision of two aspects of the current published criteria, which they indicated do not reflect accurately the manifestation of bipolar disorders in most cases: 1) their emphasis on “episodic and euphoric presentations of mania and hypomania, with decreased need for sleep, based on findings in some adult patients with BD” (p. 311); and 2) episode-duration criteria for mania, hypomania, and major depression, claiming that the current published criteria “are essentially arbitrary and not firmly based on empirical evidence concerning untreated episodes at any age” (p. 311).

Carlson (2005) suggested that since operational definitions began appearing in the *DSM*, a significant number of mentally ill individuals have not fit neatly into one of the included diagnostic categories. As a result, three ad hoc strategies have been developed to account for these people: bending or broadening criteria to make them fit into a category; developing the concept of a spectrum for a disorder; and developing subtypes of a disorder that may or may not accurately reflect the original disorder. Carlson suggested that the controversy associated with bipolar disorders in children and adolescents was not about whether classical forms of bipolar disorders existed in children

and adolescents, but what was represented when mania was defined more broadly within this population, and included increased rates of comorbidity, fewer clear-cut episodes, and more psychopathology. Carlson suggested that this conceptualization of bipolar disorders in children and adolescents may actually represent one of the following: a more severe form of adult-onset bipolar disorders that has a worse prognosis (e.g., childhood schizophrenia versus adult-onset schizophrenia); a temperamental construct with a genetic base (e.g., hyperthymic temperament); a subtype of a classical bipolar disorder; or a condition that is altered per developmental stage, and may change in adulthood.

At present, the issue of bipolar disorders occurring in children and adolescents is being addressed in the development of DSM-V, which is scheduled to be published in 2013. APA (2010) indicated that three measures have been proposed that are relevant to this issue: 1) criteria for manic and hypomanic episodes should be further clarified in order to improve operationalization; 2) a new pediatric mood disorder, TDDD, should be added; and 3) a way to categorize short-duration episodes of hypomania (i.e., less than four days in duration) should be considered, possibly as a sub-group of the diagnostic label Bipolar Disorders Not Elsewhere Classified. In brief, proposed criteria for a diagnosis of TDDD include: the occurrence of severe temper outbursts at least three times per week on average; the presence of a persistent negative mood between temper outbursts; these symptoms must be exhibited for at least twelve months, and symptom-free periods may occur for no longer than three months at any time; the individual must have a chronological age/developmental level of at least six years, and onset must occur prior to age ten years; the symptoms of temper outbursts and/or persistent negative mood must be exhibited in more than one setting, and occur to a degree that is considered severe in at least one setting; the individual must not exhibit abnormally elevated/expansive mood with co-occurring symptoms of mania for more than one day at a time; and these symptoms may not occur within the context of another mood or psychotic disorder, or be better explained by another psychiatric disorder (APA, 2010). It



should be mentioned that Fristad and Youngstrom (2010) are opposed to the inclusion of TDDD in DSM-V as it stands currently, and instead advocate for improving the parameters and patterns of symptom presentation required for a diagnosis of Bipolar Disorder Not Otherwise Specified.

Secondly, an increasing amount of attention has been paid to neuroimaging techniques (e.g., magnetic resonance imaging (MRI), functional MRI (fMRI)) as promising diagnostic tools for bipolar disorders in children and adolescents (Blumberg et al., 2003; Chang, Adleman, Wagner, Barnea-Goraly, & Garrett, 2006; Davanzo et al., 2003; DelBello & Kowatch, 2003; Frazier et al., 2005; Terry, Lopez-Larson, & Frazier, 2009). The literature on adults with bipolar disorders has identified abnormalities in frontostriatal brain circuitry, while preliminary findings related to bipolar disorders in youth have suggested the presence of neuroanatomical abnormalities in similar brain systems, as well as some important differences (Blumberg et al., 2003). In a review of the literature over the past fifteen years on neuroimaging in bipolar disorders in youth, Frazier et al. (2005) found abnormalities in “brain regions consistent with prevailing neuroanatomic models of emotion processing and regulation: the limbic-thalamic-prefrontal circuit and the limbic-striatal-pallidal thalamic circuit” (p. 130). Terry et al. (2009) confirmed the continued implication of these brain systems in a recent review of the literature, and went on to cite the existence of anatomic, biochemical, and functional abnormalities in these circuits. Finally, Davanzo et al. (2003) demonstrated the potential utility of neuroimaging techniques in differential diagnosis, as they successfully employed proton magnetic resonance spectroscopy to distinguish bipolar disorders in youth from Intermittent Explosive Disorder, disorders with significant symptom overlap.

#### Educational Functioning

Two categories of information have been published concerning the educational functioning of children and adolescents with bipolar disorders. The first category relates

to the provision of educational services and accommodations available to these students under IDEA 2004 and Section 504 of the Rehabilitation Act of 1973 (Fristad & Goldberg-Arnold, 2004; Grier et al., 2005; Papolos & Papolos, 2006). Published data suggested students with bipolar disorders are at increased risk for needing tutoring services, being placed in special/remedial classes (including special education classes), repeating a grade, and failing to graduate on time, although these data are primarily demographic in nature (Doyle et al., 2005; Faedda et al., 2004; Findling et al., 2001; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Pavuluri et al., 2006; Wilens et al., 2003; Wozniak et al., 1995).

The second category of information identified deficits in three specific areas of educational functioning among children and adolescents with bipolar disorders: academic, behavioral/social-emotional, and cognitive/neuropsychological (Althoff et al., 2006; Boomsma et al., 2006; Dickstein et al., 2007; Doyle et al., 2005; Faedda et al., 2004; Fields & Fristad, 2009; Geller, Bolhofner, et al., 2000; Goldstein et al., 2009; Henin et al., 2007; Joseph et al., 2008; Kutcher et al., 1998; Lagace & Kutcher, 2005; Lagace et al., 2003; McClure et al., 2005; McDonough-Ryan et al., 2002; McIntosh & Trotter, 2006; Meyer & Krumm-Merabet, 2003; Mick et al., 2003; Pavuluri et al., 2006; Quackenbush et al., 1996; Reichenberg et al., 2002; Rucklidge, 2006; Wilens et al., 2003; Wozniak et al., 1995). Although this category included more robust empirical data derived from more rigorous studies than those in the first category, it still included a substantial amount of demographic data. These studies are critically reviewed as well.

### *Educational Services and Accommodations*

#### Remedial Classes/Special Education

Eight studies contained information about rates of placement in special/remedial classes or special education programs among children and/or adolescents with bipolar disorders. First, Wozniak et al. (1995) found that 33 percent of 43 clinically-referred

subjects (mean age  $7.9 \pm 2.6$  years) who met *DSM-III-R* criteria for mania had been placed in “special classes.” In comparison, 32 percent of 164 subjects (mean age  $8.8 \pm 2.2$  years) with ADHD but not mania, and 2 percent of 84 non-mania/non-ADHD control subjects (mean age  $9.0 \pm 2.1$  years) had been placed in “special classes.” Limitations of this study included the use of vague terminology (i.e., “special classes”) in describing the academic supports that were utilized, which may affect the generalizability of results; reliance solely on parent report when collecting this information (i.e., did not review school records to confirm accuracy of reports), which may have affected the reliability and/or validity of results; and lack of specificity in the defining the diagnostic group that was studied (i.e., meeting *DSM-III-R* criteria for mania does not provide useful information regarding specific types/subtypes of bipolar disorders), which may affect the generalizability or utility of results.

Geller, Bolhofner, et al. (2000) reported that 10.8 percent of 93 clinically-referred subjects (mean age  $10.9 \pm 2.65$  years) who met *DSM-IV* criteria for either mania or hypomania and exhibited symptoms of elation and/or grandiosity (with or without ADHD) had been placed in a “remedial class,” based on parent report. In comparison, 12.3 percent of subjects (mean age  $9.7 \pm 2.0$  years) with ADHD, and no community control subjects (mean age  $11.1 \pm 2.6$  years) had been placed in a “remedial class.” Concerns about these data included: the use of vague terminology (i.e., “remedial class”) in describing academic supports; failure to confirm parent-reported information by checking school records; and the implementation of modified diagnostic criteria, which may affect the generalizability or utility of results.

Findling et al. (2001) reported that 24.4 percent of 90 outpatient subjects (mean age  $10.8 \pm 3.5$  years) who met full *DSM-IV* criteria for Bipolar I Disorder had ever been placed in special education, based on information provided by their guardians. While this study specified that subjects had been placed in special education rather than using vague terminology, Findling et al. did not confirm the information provided by guardians by

checking school records. Also, inclusion of only subjects with Bipolar I Disorder may limit the generalizability of results, as the most common diagnosis of a bipolar disorder among children and adolescents is Bipolar Disorder Not Otherwise Specified (Singh et al., 2007).

Wilens et al. (2003) compared 29 school-aged subjects (mean age  $7.8 \pm 0.9$  years) who met *DSM-III-R* criteria for bipolar disorders to 44 pre-school aged subjects (mean age  $5.1 \pm 0.8$  years) who met the same diagnostic criteria. All subjects had been referred to a pediatric psychopharmacology clinic. Wilens et al. found that 28 percent of school-aged subjects had been placed in a “special class” at school, compared to 39 percent of pre-school aged subjects, based on parent report. Limitations of this study were: the authors’ failure to provide more specific diagnostic information about subjects (e.g., specifying types/subtypes of bipolar disorders rather than generally stating that each subject met *DSM-III-R* criteria for bipolar disorders), which may affect the generalizability of results; reliance on parent report for information about school services without verifying results by checking school records; and the use of vague language (i.e., “special class”) when describing the academic supports utilized by subjects.

Faedda et al. (2004) found that 18.3 percent of 82 clinically-referred subjects (mean age  $10.6 \pm 3.6$  years) who met modified *DSM-IV* criteria for bipolar disorders had been placed in a special education program, based on reviewing information provided by parents as well as school records. In this study, *DSM-IV* criteria were altered by waiving duration criteria for depression and mania. Of the 82 subjects, about 52 percent met criteria for Bipolar I Disorder, approximately 40 percent met criteria for Bipolar II Disorder, and around 7 percent met criteria for Cyclothymia. Faedda et al. reported that about 52 percent of subjects met full *DSM-IV* duration criteria for bipolar disorders. While this study appears more methodologically rigorous than those reviewed in this section so far, it still excluded subjects with the most common diagnosis of a bipolar disorder among children and adolescents (i.e., Bipolar Disorder Not Otherwise Specified

(Singh et al., 2007)). In addition, it utilized modified diagnostic criteria. Implications for both of these factors are that results may not be sufficiently generalizable.

Doyle et al. (2005) studied 57 subjects (mean age  $13.3 \pm 2.4$  years) who met *DSM-IV* criteria for either Bipolar I Disorder or Bipolar II Disorder at some point in their lives, and 46 control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders. Subjects were participating in an ongoing family study related to bipolar disorders, and had been either clinically-referred or self-referred. Doyle et al. found that after controlling for ADHD, 53 percent of subjects with bipolar disorders had been placed in a “special class” at school, compared to 7 percent of control subjects, according to parent reports. Concerns related to this study include: the fact that “special class” is a vague description that may not refer to placement in special education classes; reliance solely on parent report for this information, without verifying it by reviewing school records; and exclusion of subjects with Bipolar Disorder Not Otherwise Specified, the most commonly diagnosed bipolar disorder among children and adolescents (Singh et al., 2007).

Pavuluri et al. (2006) reported that 67.3 percent of 55 subjects (mean age  $11.97 \pm 3.18$  years) who met full *DSM-IV* duration and symptom criteria for bipolar disorders, in addition to manifesting “at least two of the three core symptoms of PBD (i.e., elated mood, irritability, and grandiosity)” (p. 952), had received special education services, based on parent report. All subjects had been recruited through a university-based pediatric mood disorders program as well as through the community. Pavuluri et al. broke down their data to show that 70 percent of 27 subjects (mean age  $11.25 \pm 3.01$  years) with comorbid bipolar disorders and ADHD received special education services, compared to 64 percent of 28 subjects (mean age  $12.50 \pm 3.19$  years) with bipolar disorders but not ADHD. Similar to several other studies, limitations of this study include reliance on unverified parent reports for information about school services, and the use of modified diagnostic criteria.

Finally, Henin et al. (2007) found that 23 percent of 73 clinically-referred subjects (mean age  $9.7 \pm 2.5$  years) who met full *DSM-IV* criteria for both Bipolar I Disorder and ADHD had been placed in a “special class,” according to parents. In comparison, 18 percent of 102 subjects (mean age  $10.7 \pm 2.8$  years) with ADHD but not bipolar disorders, and 5 percent of 120 non-bipolar disorders/non-ADHD control subjects (mean age  $11.9 \pm 2.7$  years) had been placed in a special class. Limitations include: use of vague language in describing academic supports; reliance on parent report for information about school services without verifying this information by checking school records; and inclusion of only subjects with Bipolar I Disorder, which is not the most commonly diagnosed bipolar disorder among youth (Singh et al., 2007), and may impact the generalizability of results.

### Summary

Across eight studies, rates of placement in special/remedial classes or special education programs ranged from 10.8 to 67.3 percent of school-aged subjects (Doyle et al., 2005; Faedda et al., 2004; Findling et al., 2001; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Pavuluri et al., 2006; Wilens et al., 2003; Wozniak et al., 1995). However, it should be noted that terminology varied across studies, and in some cases it was difficult to ascertain whether the authors intended to refer exclusively to placement in special education classes when describing their results, or whether placement in special or remedial classes may have referred to something other than special education programs. An additional concern was the fact that the vast majority of subjects in these studies were clinic-referred (a small number were self-referred or recruited from the community), therefore results may not be generalizable to a community-based setting such as a school.

### Tutoring

In addition to receiving special education services, students with bipolar disorders are likely to require academic support in the form of tutoring services, either inside or

outside of school. Four studies explored rates of tutoring services for students with bipolar disorders. First, Wozniak et al. (1995) reported that 45 percent of 43 clinically-referred subjects (mean age  $7.9 \pm 2.6$  years) who met *DSM-III-R* criteria for mania received “in-school tutoring,” based on parent reports. In comparison, 52 percent of 164 subjects (mean age  $8.8 \pm 2.2$  years) with ADHD but not mania, and 21 percent of 84 control subjects (mean age  $9.0 \pm 2.1$  years) (i.e., non-mania/non-ADHD subjects) received in-school tutoring. A concern about this study was its lack of diagnostic specificity among subjects (e.g., identifying types/subtypes of bipolar disorders), which may limit the generalizability or utility of results.

Wilens et al. (2003) found that 48 percent of 29 clinically-referred school-aged subjects (mean age  $7.8 \pm 0.9$  years) who met *DSM-III-R* criteria for bipolar disorders had received “extra help” with schoolwork, compared to 30 percent of 44 clinically-referred pre-school aged subjects (mean age  $5.1 \pm 0.8$  years) who also met *DSM-III-R* criteria for bipolar disorders. Similar to Wozniak et al.’s (1995) study, a limitation of this study was also its failure to differentiate its subjects in terms of diagnostic categories.

Doyle et al. (2005) reported that after controlling for ADHD, 73 percent of 57 subjects (mean age  $13.3 \pm 2.4$  years) who met *DSM-IV* diagnostic criteria sometime in their lives for either Bipolar I Disorder or Bipolar II Disorder had received either in-school or out-of-school tutoring services, as indicated by parents. In comparison, 28 percent of 46 control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders received either in-school or out-of-school tutoring services. Subjects were either clinically-referred or self-referred, and were participating in another ongoing family study on bipolar disorders. One concern about these data was the authors failure to include subjects with Bipolar Disorder Not Otherwise Specified, the most common diagnosis among children and adolescents with bipolar disorder (Singh et al., 2007), which may affect the generalizability of results.

Lastly, Henin et al. (2007) revealed that 64 percent of 73 clinically-referred subjects (mean age  $9.7 \pm 2.5$  years) who met *DSM-IV* criteria for both Bipolar I Disorder and ADHD received either in-school or out-of-school tutoring, based on parent reports. In comparison to 60 percent of 102 subjects (mean age  $10.7 \pm 2.8$  years) who met *DSM-IV* criteria for ADHD but not bipolar disorders, and 33 percent of 120 non-bipolar disorders/non-ADHD control subjects (mean age  $11.9 \pm 2.7$  years), received either in-school or out-of-school tutoring. One limitation of this study was its inclusion of subjects with Bipolar I Disorder but not Bipolar Disorder Not Otherwise Specified, which may impact the generalizability of results.

### Summary

Data from four studies indicated that between 45 and 73 percent of school-aged subjects with bipolar disorders received tutoring services (Doyle et al., 2005; Henin et al., 2007; Wilens et al., 2003; Wozniak et al., 1995). However, it is important to note that two limitations that were present in all four studies: 1) the data collected were based solely on parent/guardian reports (i.e., authors did not review school records to confirm information), which may affect the reliability and/or validity of results; and 2) vague terminology (e.g., “in-school tutoring,” “extra help”) was employed which did not provide information regarding the frequency, intensity, duration, quality, or nature of tutoring services/assistance provided, and therefore may limit the utility of the results.

### Grade Retention

Although the professional literature on grade retention generally does not support this practice (Rafoth, 2002), there is evidence from five studies that a significant number of students with bipolar disorders have repeated grades. First, Wozniak et al. (1995) indicated that 19 percent of 43 clinically-referred subjects (mean age  $7.9 \pm 2.6$  years) who met *DSM-III-R* criteria for mania had repeated a grade, in comparison to 18 percent of 164 subjects (mean age  $8.8 \pm 2.2$  years) with ADHD but not mania, and 5 percent of 84



non-mania, non-ADHD control subjects (mean age  $9.0 \pm 2.1$  years). A concern about this study was its lack of diagnostic specificity among subjects (e.g., subjects were identified simply as meeting *DSM-III-R* criteria for mania, not as having specific types/subtypes of bipolar disorders), which may limit the generalizability of results.

Geller, Bolhofner, et al. (2000) found that 7.5 percent of 93 clinically-referred subjects (mean age  $10.9 \pm 2.65$  years) who met *DSM-IV* criteria for mania or hypomania and exhibited elation and/or grandiosity (with or without ADHD) had repeated a grade, according to parent report. For purposes of comparison, the authors found that 7.4 percent of 81 subjects (mean age  $9.7 \pm 2.0$  years) with ADHD, and no community control subjects (mean age  $11.1 \pm 2.6$  years) had repeated a grade, based on parent report. A limitation of this study was its implementation of modified diagnostic criteria, which may affect the generalizability of results.

Wilens et al. (2003) studied clinically-referred subjects who met *DSM-III-R* criteria for bipolar disorders, and found that 17 percent of 29 school-aged subjects (mean age  $7.8 \pm 0.9$  years) had repeated a grade in school, compared to 5 percent of 44 pre-school aged subjects (mean age  $5.1 \pm 0.8$  years), according to parent reports. One concern about this study was its failure to provide more specific diagnostic information about subjects (i.e., specifying types/subtypes of bipolar disorders), which may limit the generalizability of results.

Doyle et al. (2005) compared 57 subjects (mean age  $13.3 \pm 2.4$  years) who met *DSM-IV* diagnostic criteria for either Bipolar I Disorder or Bipolar II Disorder at some point in their lifetime, to 46 control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders. All subjects were either clinically-referred or self-referred, and were participating in an ongoing family study of bipolar disorders. Doyle et al. found that after controlling for ADHD, 12 percent of subjects with bipolar disorders had repeated a grade, in comparison to 7 percent of control subjects without mood disorders, based on parent report. A primary limitation of this study was its exclusion of subjects having a diagnosis

of Bipolar Disorder Not Otherwise Specified, as this is the most frequently diagnosed bipolar disorder among children and adolescents (Singh et al., 2007).

Finally, Henin et al. (2007) reported that 14 percent of 73 clinically-referred subjects (mean age  $9.7 \pm 2.5$  years) who met *DSM-IV* criteria for both Bipolar I Disorder and ADHD had repeated a grade, according to parent report. In comparison, 16 percent of 102 subjects (mean age  $10.7 \pm 2.8$  years) with ADHD but not bipolar disorders, and 7 percent of 120 non-bipolar disorders/non-ADHD control subjects (mean age  $11.9 \pm 2.7$  years), had repeated a grade. One limitation of this study was that it involved only subjects with Bipolar I Disorder, therefore generalizability of results may be limited, because no subjects with the most commonly diagnosed type of bipolar disorder among youth (i.e., Bipolar Disorder Not Otherwise Specified) were included (Singh et al., 2007).

### Summary

Across five studies, rates of grade retention for school-aged subjects with bipolar disorders ranged from 7.5 to 19 percent (Doyle et al., 2005; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Wilens et al., 2003; Wozniak et al., 1995). It should be noted that all five studies had two shortcomings in common: 1) they failed to report information concerning which grade levels were repeated, or the number of times a student had repeated a grade level, thus the utility of results may be limited; and 2) the data were based solely on parent report (i.e., were not confirmed by reviewing school records), which may have impacted the reliability and/or validity of results.

### Graduation Rates

Perhaps the ultimate negative impact bipolar disorders may have on school functioning is delay or failure altogether to graduate from high school or a postsecondary education program. As such, two studies explored graduation rates for subjects with bipolar disorders. First, Quackenbush et al. (1996) studied 44 clinically-referred adolescent subjects (mean age 17.8 years, standard deviation not reported) who met

*DSM-III-R* criteria for Bipolar Affective Disorder. Quackenbush et al. found that only 38 percent of the 37 subjects (mean age and standard deviation for this subgroup were not reported) who were old enough at the time of assessment had graduated on time from a secondary school (i.e., 62 percent failure rate), based on interviews with subjects and a review of school records. In addition, no subjects who were old enough to have graduated from a post-secondary education program had done so. Concerns about this study included: provision of insufficient information regarding the demographic characteristics of subjects (e.g., did not include standard deviation associated with mean age of subjects); and lack of diagnostic specificity (i.e., identifying types/subtypes of bipolar disorders), which may limit the generalizability of results.

Next, in a narrative article for psychiatrists that summarized their own research data, Lagace and Kutcher (2005) reported that 58 percent of “euthymic youth with bipolar disorder” graduated from high school (i.e., 42 percent failure rate) (p. 112). In comparison, 85 percent of subjects with “unipolar disorder” and 92 percent of psychiatrically healthy controls graduated from high school (p. 112). However, this information came with numerous significant limitations, some of which included: the experimental methodology used to collect these data was not described; ages and standard deviations of subjects were not reported; and a lack of diagnostic specificity significantly limited the generalizability of results. Although this source cannot be considered methodologically rigorous or perhaps even credible given its failures to report such critical information, it may lend further qualitative support to the idea that bipolar disorders may have a significant impact on graduation rates.

### Summary

While minimal data are available, two studies suggest that between 42 and 62 percent of students with bipolar disorders fail to graduate high school on time (Lagace & Kutcher, 2005; Quackenbush et al., 1996). However, these data should be interpreted

cautiously due to the presence of numerous, significant limitations within the two publications that reported these figures.

### *Specific Deficits in Educational Functioning*

While it has been suggested that each student with a bipolar disorder may exhibit a unique pattern of symptoms (e.g., Grier et al., 2007), bipolar disorders in children and adolescents are associated with specific deficits in three areas of educational functioning: academic, behavioral/social-emotional, and cognitive/neuropsychological.

#### Academic Functioning

Bipolar disorders in children and adolescents are associated with “significant and varied” academic impairment, with deficits noted in the areas of mathematics, reading, and writing (Fields & Fristad, 2009). As such, the available literature on academic functioning among children and adolescents with bipolar disorders may be broken down into the following categories: general functioning, reading/writing, and mathematics.

#### General Functioning

Among students with bipolar disorders, academic performance may be inconsistent or erratic, and linked to one’s ability to regulate one’s affect (McIntosh & Trotter, 2006). Four studies investigated general academic difficulties associated with bipolar disorders among children and adolescents. First, Geller, Bolhofner, et al. (2000) found that 44.1 percent of 93 clinically-referred subjects (mean age  $10.9 \pm 2.65$  years) who met *DSM-IV* criteria for mania or hypomania and exhibited elation and/or grandiosity (with or without ADHD) received low grades, based on parent report. In comparison, 21.0 percent of 81 subjects (mean age  $9.7 \pm 2.0$  years) with ADHD, and 1.1 percent of community control subjects (mean age  $11.1 \pm 2.6$  years) received low grades. In addition, 4.3 percent of subjects with mania took advanced placement courses (compared to 1.2 percent of subjects with ADHD, and 17.0 percent of community control

subjects), and 14.0 percent of subjects with mania had a learning disability (in comparison to 25.9 percent of subjects with ADHD, and no community control subjects). Limitations of this study included: using vague terminology and modified diagnostic criteria, which may affect the utility and/or generalizability of results; and reliance on unverified parent reports for this data.

Other researchers found similar rates of learning disabilities within subjects with bipolar disorders. For example, Faedda et al. (2004) reported learning disabilities in 15.9 percent of 82 clinically-referred subjects (mean age  $10.6 \pm 3.6$  years) who met modified *DSM-IV* criteria for bipolar disorders, based on parent reports and a review of school records. Of course, by using modified diagnostic criteria in which duration criteria were waived for depression and mania, generalizability of results may be limited. Other studies involving learning disabilities associated with bipolar disorders will be discussed in greater detail in this section.

Finally, two other groups of researchers delineated additional types of academic impairment that may be associated with bipolar disorders. Quackenbush et al. (1996) found that for a sample of 44 clinically-referred adolescent subjects (mean age 17.8 years, standard deviation not reported) who met *DSM-III-R* criteria for Bipolar Affective Disorder, teachers noted difficulties in several areas following the onset of illness, including motivation, lower grades, homework completion, and attending class. A significant limitation of this study was its failure to include specific diagnostic categories for subjects (e.g., delineate types/subtypes of bipolar disorders), which may affect the generalizability of results. Goldstein et al. (2009) studied 446 subjects (mean age  $12.7 \pm 3.3$  years) who either met *DSM-IV* criteria for Bipolar I Disorder ( $n=260$ ) or Bipolar II Disorder ( $n=32$ ), or study-specific criteria for Bipolar Disorder Not Otherwise Specified ( $n=154$ ), who were participating in an ongoing study related to course and outcomes associated with bipolar disorders. Subjects were administered the Psychosocial Functioning Schedule of the *Adolescent Longitudinal Interval Follow-up Evaluation-*

*Baseline (A-LIFE)*, which involved interviewing both adolescents and their parents. In general, Goldstein et al. found mild to moderate impairment in the *work* domain of functioning, which included academics. It was noted that older age, greater severity of mania, and mood episode predicted poorer functioning within this domain. Limitations of this study included: reliance on retrospective reports from subjects and their parents regarding functioning; failure to account for medication effects on subjects' functioning; and failure to include subjects from all four *DSM-IV* diagnostic categories of bipolar disorders.

### Summary

Students with bipolar disorders are at risk to exhibit declines in motivation, homework completion rates, and class attendance rates following the onset of illness (Quackenbush et al., 1996); receive low grades (Geller, Bolhofner, et al., 2000; Quackenbush et al., 1996); not take advanced placement classes (Geller, Bolhofner, et al., 2000); be diagnosed with learning disabilities (Faedda et al., 2004; Geller, Bolhofner, et al., 2000); and exhibit general impairment in academic functioning (Goldstein et al., 2009).

### Reading/Writing

While several studies have examined the relation between bipolar disorders and reading and writing performance, many have grouped together reading and writing in their analyses. For this reason, reading and writing are included together in this summary. Following is a critical review of six studies that directly examined reading and/or writing abilities among children and adolescents with bipolar disorder, and two studies that indirectly explored this area.

Wozniak et al. (1995) reported that 42 percent of their sample of 43 clinically-referred subjects who met *DSM-III-R* criteria for mania (mean age  $7.9 \pm 2.6$  years) also met criteria for a learning disability in reading. For purposes of comparison, the authors

reported that 14 percent of a sample of 164 children with ADHD but not mania (mean age  $8.8 \pm 2.2$  years), and 5 percent of a sample of 84 non-ADHD/non-manic controls (mean age  $9.0 \pm 2.1$  years) also met criteria for a learning disability in reading. Unfortunately, Wozniak et al. failed to clarify the process they used for diagnosing a learning disability, although it seems likely the authors utilized an ability-achievement discrepancy formula. The authors may have compared a subject's performance on selected subtests from the *Wechsler Intelligence Scale for Children – Revised (WISC-R)* with that subject's scores on the *Wide Range Achievement Test (WRAT)* and *Gilmore Oral Reading Test*, looking for a significant difference between scores. However, without clarification of the diagnostic process, and without confirmation from school records as to whether a subject had been diagnosed with a learning disability, it is difficult to ascertain the validity of these data. A final concern about this study was the authors' failure to include diagnostic specificity among the subjects (e.g., no information was reported regarding types/subtypes of bipolar disorders), as this may limit the generalizability of results.

In a study that primarily focused on mathematics deficits among adolescent subjects with bipolar disorders, Lagace et al. (2003) included reading and writing subtests of the *Wide Range Achievement Test – Revised 2 (WRAT-R2)* and *Peabody Individual Achievement Test (PIAT)* in their assessment battery. The authors compared the performance of three groups on these measures: 44 subjects (mean age  $19.4 \pm 2.9$  years) who met *DSM-III-R* criteria for Bipolar I Disorder but were in remission; 30 subjects (mean age  $18.5 \pm 2.8$  years) with major depressive disorder in remission; and 45 healthy control subjects (mean age  $18.2 \pm 1.6$  years). Methods of subject recruitment were unclear. Results indicated there were no significant differences between groups in reading or spelling on the *WRAT-R2*. On the *PIAT*, there were also no significant differences between groups in reading, based on analyzing age-corrected percentiles. Limitations of this study included: its primary focus on the mathematics performance of

subjects with bipolar disorders; its inclusion of only subjects with Bipolar I Disorder, which may limit the generalizability of results; and its inclusion of subjects with mean ages at or above 18 years (i.e., adulthood), resulting in lack of ability to draw pure conclusions about the impact of bipolar disorders.

Doyle et al. (2005) compared performance on the Reading subtest of the *Wide Range Achievement Test – Third Edition (WRAT-3)* among 57 subjects (mean age  $13.3 \pm 2.4$  years) who met *DSM-IV* criteria for either Bipolar I Disorder or Bipolar II Disorder at some point in their lifetime and 46 control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders. Subjects were either clinically-referred or self-referred. Results indicated that after controlling for the effects of comorbid ADHD, there were no significant differences between groups in reading achievement. One significant limitation of this study was its failure to include subjects who had been diagnosed with Bipolar Disorder Not Otherwise Specified, as this is the most common diagnosis of bipolar disorder among youth (Singh et al., 2007).

In a study of 55 subjects (mean age  $11.97 \pm 3.18$  years) who met *DSM-IV* symptom and duration criteria for bipolar disorders and also manifested “at least two of the three core symptoms of PBD (i.e., elated mood, irritability, and grandiosity)” (p. 952), Pavuluri et al. (2006) found that 45.5 percent of subjects exhibited a history of reading and/or writing difficulties, based on parent report. Within this subgroup, parents indicated that 52 percent of subjects had co-occurring math difficulties. Subjects had been clinically-referred as well self-referred from within the community. Limitations of this study included: reliance on unverified parent reports for this information (i.e., did not check school records to confirm data); use of modified diagnostic criteria, which may limit the generalizability of results; and use of vague terminology (e.g., “reading/writing difficulty” may not equate to a diagnosed learning disability).

Henin et al. (2007) administered the Reading subtest of the *WRAT-3* to 73 clinically-referred unmedicated subjects (mean age  $9.7 \pm 2.5$  years) who met full *DSM-IV*



criteria for both Bipolar I Disorder and ADHD, 102 unmedicated subjects (mean age  $10.7 \pm 2.8$  years) with ADHD but not bipolar disorders, and 120 control subjects (mean age  $11.9 \pm 2.7$  years) with neither bipolar disorders nor ADHD. The authors found that subjects with comorbid Bipolar I Disorder and ADHD scored significantly lower on the Reading subtest than the control group, while subjects with ADHD but not bipolar disorders did not differ significantly from the control group. Limitations of this study included: reliance on a single subtest of the *WRAT-3* for assessing reading ability rather than conducting a comprehensive assessment of reading ability; and inclusion of only subjects with Bipolar I Disorder, which may limit the generalizability of results.

In a meta-analytic review of the literature, Joseph et al. (2008) found small to medium effect sizes for reading achievement when comparing youth with bipolar disorders to healthy control subjects. A major limitation of this study is that while meta-analyses are useful for discovering general trends by examining aggregate data, this study did not provide information regarding specific types of reading deficits (e.g., fluency, comprehension), nor about deficits associated with specific types/subtypes of bipolar disorders.

Finally, two additional studies indirectly explored reading and/or writing abilities and bipolar disorders. In the first study, Reichenberg et al. (2002) analyzed data from the Israeli Draft Board Registry to investigate the premorbid intellectual, language, and behavior/personality functioning of 16- and 17-year-olds who exhibited no evidence of mental illness but went on to be hospitalized later in life for schizophrenia ( $n=536$ ), schizoaffective disorder ( $n=31$ ), or nonpsychotic bipolar disorders ( $n=68$ ). Subjects with nonpsychotic bipolar disorders included 38 males who were first hospitalized at a mean age of  $21.5 \pm 2.8$  years, as well as 30 females who were first hospitalized at a mean age of  $20.3 \pm 1.5$  years. After matching each subject with a healthy control subject, Reichenberg et al. found that subjects who went on to develop nonpsychotic bipolar disorders exhibited no significant premorbid deficits on measures of reading fluency,

reading comprehension, and writing/spelling, based on completion of an assessment battery which included subtests designed to specifically measure each area. Significant limitations of this study included: inclusion of subjects with adult-onset bipolar disorders, rather than child- or adolescent-onset bipolar disorders; inclusion of subjects from outside the United States; utilization of an assessment battery not commercially available in the United States, therefore little is known regarding its psychometric properties; and failure to identify types/subtypes of bipolar disorders, which may limit generalizability of results.

In the second study, McDonough-Ryan et al. (2002) studied 28 children (mean age  $10.2 \pm 2.7$  years) of clinically-referred adults with bipolar disorders in an investigation of Nonverbal Learning Disability (NLD). Subjects were deemed at-risk for bipolar disorders based on having at least one biological parent diagnosed with Bipolar I Disorder. A comparison group of 24 healthy control subjects (mean age  $10.0 \pm 1.3$  years) was utilized. Results indicated the subjects at-risk for bipolar disorders scored significantly lower than healthy controls on measures of reading and spelling from the *WRAT-3*, a brief screening instrument. In addition, subjects at-risk for bipolar disorders were significantly more likely to meet criteria for a learning disability in spelling, based on utilization of an ability-achievement discrepancy formula that involved a difference of at least one standard deviation between Verbal IQ (VIQ) and achievement test standard scores. Obviously, a significant limitation of this study is the fact that subjects had not been diagnosed with bipolar disorders, but because evidence has shown that bipolar disorders have a biological basis and are highly heritable (e.g., AACAP, 2007; Faraone, Glatt, & Tsuang, 2003; Pavuluri et al., 2005), the potential implications of these results are interesting.

### Summary

Among these six studies, results were mixed regarding the reading and writing performance of children and adolescents with bipolar disorders. In some cases, bipolar disorders were associated with significant deficits in reading and writing, including increased risk for learning disabilities (Henin et al., 2007; Joseph et al., 2008; Pavuluri et al., 2006; Wozniak et al., 1995). In other studies, there was no difference between groups of students with bipolar disorders and other clinical and control groups in reading and writing performance (Doyle et al., 2005; Lagace et al., 2003). Two supplemental studies continued this trend of mixed results. One study found no premorbid deficits in reading and writing performance among subjects with adult-onset bipolar disorders (Reichenberg et al., 2002), while another study found that children at risk for bipolar disorders exhibited deficits in both areas (McDonough-Ryan et al., 2002).

### Mathematics

In addition to exhibiting difficulties in the academic areas of reading and writing, there is evidence that suggests many students with bipolar disorders struggle with mathematics. Following are seven studies that support this notion directly, and an additional three studies that support it indirectly.

First, Wozniak et al. (1995) found that 30 percent of their clinically-referred sample of 43 subjects who met *DSM-III-R* criteria for mania (mean age  $7.9 \pm 2.6$  years) also met criteria for a learning disability in arithmetic. In comparison, 24 percent of a sample of 164 children with ADHD but not mania (mean age  $8.8 \pm 2.2$  years), and 6 percent of a sample of 84 non-ADHD/non-manic controls (mean age  $9.0 \pm 2.1$  years) met criteria for a learning disability in arithmetic. However, just as Wozniak et al. did not clarify the process used to diagnose a learning disability in reading, they did not clarify how a learning disability in arithmetic was diagnosed. It is assumed that an ability-achievement formula was utilized, and a subject's performance on selected subtests of the

*WISC-R* was compared with performance on the *WRAT*. Additionally, because Wozniak et al. failed to confirm diagnoses of learning disabilities by checking school records, the validity of these data was questionable. A final concern is that failure to include more diagnostic specificity (i.e., identifying types/subtypes of bipolar disorders) may limit the generalizability of these results.

Quackenbush et al. (1996) investigated the premorbid and postmorbid functioning of 44 clinically-referred adolescents (mean age 17.8 years, standard deviation not reported) who satisfied *DSM-III-R* diagnostic criteria for Bipolar Affective Disorder. The authors found that mathematics was the area of premorbid academic difficulty identified most frequently among subjects, affecting 39 percent of adolescents in this study. This information was obtained by reviewing school records and interviewing subjects. Following the onset of illness, about 67 percent of subjects had difficulty in mathematics, as determined by reviewing grades and teacher evaluations, and interviewing subjects. One significant limitation of this study was its failure to include more diagnostic specificity among subjects (i.e., identify types/subtypes of bipolar disorders), which may affect the generalizability of results.

In one of the more rigorous studies that investigated the impact of bipolar disorders on mathematics performance, Lagace et al. (2003) explored the mathematics abilities of 44 subjects (mean age  $19.4 \pm 2.9$  years) who met *DSM-III-R* criteria for Bipolar I Disorder, but were in remission. The method(s) by which subjects were recruited for this study was unclear. For purposes of comparison, this study also included 30 subjects (mean age  $18.5 \pm 2.8$  years) with major depressive disorder in remission, and 45 healthy control subjects (mean age  $18.2 \pm 1.6$  years). All subjects were administered two standardized achievement test batteries (i.e., *WRAT-R2*, *PIAT*), the money and marketing subtest of the *Bay Area Functional Performance Evaluation Task-Oriented Assessment (BAFPETA)*, and a self-report question regarding achievement in mathematics. Results indicated that subjects with bipolar disorders scored significantly

lower in mathematics than control subjects on the *WRAT-R2*, while the scores for the major depressive disorder group fell in between those of the other two groups. On the *PIAT*, the subjects with bipolar disorders achieved significantly lower percentile rankings (corrected for age) in mathematics than the other two groups. On the *BAFPETA*, subjects with bipolar disorders took significantly longer than the other two groups to complete a functional mathematics task, but there were no significant differences between groups for task accuracy. On a self-report question regarding mathematics achievement, the bipolar disorders group was significantly less likely to report above-average achievement than the other two groups, as well as more likely (though not statistically significant) to report below-average achievement in mathematics than the other two groups. While this study is the only available study on bipolar disorders in youth that included empirical data on multiple measures of mathematics performance, it still had two important limitations. First, by including only subjects with Bipolar I Disorder, the generalizability of results may be limited. Next, by including subjects in all three groups with mean ages at 18 years or above (i.e., adulthood), one cannot draw pure conclusions regarding the impact of pediatric bipolar disorder on mathematics performance.

As described previously, Doyle et al. (2005) administered the Arithmetic subtest of the *WRAT-3* to 57 subjects (mean age  $13.3 \pm 2.4$  years) who satisfied *DSM-IV* criteria for Bipolar I Disorder or Bipolar II Disorder within their lifetime, and 46 control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders. All subjects were either self-referred or clinically-referred. Results indicated that subjects with bipolar disorders scored significantly lower in arithmetic achievement than control subjects, after controlling for the effects of comorbid ADHD. A significant limitation of this study was its inclusion of only subjects with Bipolar I Disorder or Bipolar II Disorder, which may limit the generalizability of results.

Lagace and Kutcher (2005) summarized data from other studies (including those by Quackenbush et al. (1996) and Lagace et al. (2003)) in a narrative article for

psychiatrists regarding academic functioning among adolescents with bipolar disorders. As such, the authors highlighted the deterioration of academic functioning following onset of bipolar disorders in adolescence, reporting that deterioration occurred most notably in the area of mathematics. Lagace and Kutcher cited data that indicated 60 percent of subjects ranked mathematics as their greatest academic weakness. While interesting, this article presented a host of limitations, including: lack of information regarding the mean ages and standard deviations for subjects; lack of description of experimental methodologies; and failure to include diagnostic specificity for subjects.

Pavulri et al. (2006) found that parents reported math difficulties in 29.1 percent of 55 subjects (mean age  $11.97 \pm 3.18$  years) who manifested “at least two of the three core symptoms of PBD (i.e., elated mood, irritability, and grandiosity)” (p. 952) and met full *DSM-IV* duration and symptom criteria for bipolar disorders (with or without comorbid ADHD). Subjects were recruited through two sources: the community, and a university-based pediatric mood disorders clinic. Within this subgroup of subjects with difficulties in mathematics, 81 percent had difficulties in reading also, as reported by parents. Two limitations of this study were: relying solely on parent reports for information and not checking school records to verify its accuracy; and using modified diagnostic criteria, which may limit the generalizability of results.

Henin et al. (2007) administered the Arithmetic subtest of the *WRAT-3* to 73 clinically-referred, unmedicated subjects (mean age  $9.7 \pm 2.5$  years) who satisfied *DSM-IV* criteria for both Bipolar I Disorder and ADHD. For purposes of comparison, Henin et al. included two other groups of subjects: 102 unmedicated subjects (mean age  $10.7 \pm 2.8$  years) with ADHD but not bipolar disorders, and 120 control subjects (mean age  $11.9 \pm 2.7$  years) with neither bipolar disorders nor ADHD (control group). The authors found that both the comorbid Bipolar I Disorder and ADHD group and the ADHD but not bipolar disorders group scored significantly lower on the Arithmetic subtest than the control group. One significant limitation of this study was the inclusion of subjects with

only one type of bipolar disorder (i.e., Bipolar I Disorder), which may restrict the generalizability of results.

In addition to these seven studies that directly explored the mathematics functioning of children and adolescents with bipolar disorders, three other studies made contributions to the relevant literature by using more indirect approaches. In the first, McDonough-Ryan et al. (2002) found that a group of 28 children (mean age  $10.2 \pm 2.7$  years) deemed at-risk for bipolar disorders (i.e., had at least one biological parent with Bipolar I Disorder) scored significantly lower in arithmetic achievement on the *WRAT-3* than a group of 24 healthy control subjects (mean age  $10.0 \pm 1.3$  years). A major limitation of this study was the fact that subjects did not carry bipolar disorder diagnoses themselves, although evidence suggests bipolar disorders are highly heritable (e.g., AACAP, 2007; Faraone et al., 2003; Pavuluri et al., 2005).

Next, using data from the Israeli Draft Board Registry, Reichenberg et al. (2002) explored the premorbid functioning of 16- and 17-year-olds who went on to be hospitalized later in life for schizophrenia ( $n=536$ ), schizoaffective disorder ( $n=31$ ), or nonpsychotic bipolar disorders ( $n=68$ ). Of the 68 subjects who would develop nonpsychotic bipolar disorders, 38 were males (first hospitalized at a mean age of  $21.5 \pm 2.8$  years) and 30 were females (first hospitalized at a mean age of  $20.3 \pm 1.5$  years). After matching each of these subjects to a psychiatrically healthy control subject, it was determined that subjects who would go on to develop bipolar disorders did not differ significantly from healthy controls on an arithmetic test that measured mathematical concept manipulation, reasoning, and concentration abilities. Limitations of this study included: utilization of data from another country; utilization of an assessment battery with unknown psychometric properties; and the inclusion of subjects who were not diagnosed with child- or adolescent-onset bipolar disorders, but rather adult-onset bipolar disorders.

Finally, Meyer and Krumm-Merabet (2003) explored the relation between academic performance and hypomanic temperament, which is thought to indicate vulnerability to bipolar disorders. The authors surveyed 2,562 students (mean age  $15.07 \pm 0.78$  years) in Germany regarding both their current academic performance and expected future performance, as measured by their grades in specific academic subjects. Results suggested that subjects with high scores on the Hypomanic Personality Scale, an instrument developed to measure the premorbid temperament of individuals with bipolar disorders, were associated with overly optimistic views of their performance in the distant future (e.g., getting a dream job), but not the near future. In addition, both high scores on the Hypomanic Personality Scale and current symptoms of depression were associated with relatively poor performance in mathematics – but not German or English as a foreign language – to a degree that was statistically significant. Two significant limitations of this study were: including subjects who had not been diagnosed with bipolar disorders; and reliance on a subjective measure of performance (i.e., grades) for statistical analyses.

### Summary

Seven studies that directly examined mathematics performance among children and adolescents with bipolar disorders somewhat consistently found that these subjects were more likely to exhibit deficits in mathematics than clinical or control groups, although it is important to note that many children and adolescents with bipolar disorders did not exhibit deficits in mathematics (Doyle et al., 2005; Henin et al., 2007; Lagace et al., 2003; Lagace & Kutcher, 2005; Pavulri et al., 2006; Quackenbush et al., 1996; Wozniak et al., 1995). Among three supplemental studies, two found that youth at risk for bipolar disorders also exhibited difficulties in mathematics (McDonough-Ryan et al., 2002; Meyer & Krumm-Merabet, 2003), while a study involving subjects with adult-



onset bipolar disorders indicated there were no significant premorbid deficits in mathematics (Reichenberg et al., 2002).

### *Behavioral/Social-Emotional Functioning*

This section begins by reviewing a small number of studies that examined some aspect of the behavioral functioning of children and adolescents with bipolar disorders. Next, a few studies are discussed that examined the social/emotional functioning of this population. It is important to note that bipolar disorders in children and adolescents are associated with difficulties in both areas.

### Behavioral Functioning

To date, no studies have reported empirical data on the day-to-day school-based behavioral functioning of students with bipolar disorders. In fact, very few studies have explored any aspect of behavioral functioning associated with bipolar disorders in children and adolescents. Relevant existing data are general and vague, and as a result, not very meaningful. Currently, existing information about the behavioral functioning of children and adolescents with bipolar disorders falls into one of four categories: 1) one study provided vague data regarding an association between bipolar disorders and behavior problems (Geller, Bolhofner, et al., 2000); 2) a small number of journal articles and one study provided anecdotal information about the school-based behavior of students with bipolar disorders (e.g., Grier et al., 2007; McIntosh & Trotter, 2006; Sala et al., 2009; Wozniak et al., 2003); 3) a cluster of primarily assessment-focused studies included information on bipolar disorders in youth ascertained via administration of a behavior rating scale, the *Child Behavior Checklist (CBCL)* (Althoff et al., 2006; Boomsma et al., 2006; Meyer et al., 2009; Mick et al., 2003); and 4) one study provided data that were collected during adolescence from subjects who went on to develop bipolar disorders in adulthood (Reichenberg et al., 2002).

First, Geller, Bolhofner, et al. (2000) found that “behavior problems” were endorsed for 78.5 percent of 93 subjects (mean age  $10.9 \pm 2.65$  years) who were clinically-referred, met *DSM-IV* criteria for mania or hypomania (with or without comorbid ADHD), and exhibited symptoms of elation and/or grandiosity. These data were based on parent report. In comparison, behavior problems were reported for only 29.6 percent of subjects (mean age  $9.7 \pm 2.0$  years) with ADHD and 4.3 percent of community control subjects (mean age  $11.1 \pm 2.6$  years). Limitations of this study included: reliance on unverified parent reports for information, which could result in compromised reliability and/or validity; utilization of vague terminology (i.e., the term “behavior problems” was not defined), which may limit the utility of these findings; and utilization of modified diagnostic criteria, which may affect the generalizability of results.

Next, three journal articles included anecdotal information regarding the behavioral functioning of students with bipolar disorders. McIntosh and Trotter (2006) published a set of recommendations for teachers and parents about managing problematic school behaviors exhibited by children and adolescents with bipolar disorders, including the following behaviors: difficulty completing work on time and/or difficulty producing high quality work; over-committing to projects or making outrageous claims; falling asleep at school; engaging in reckless activities or risk-taking behaviors (often impulsively); and engaging in hypersexualized behaviors. In an article on bipolar disorders written for secondary school principals, Grier et al. (2007) described behaviors such as: disrupting class with hysterical laughter; exhibiting irritability or having a short-temper with friends; having difficulty concentrating in class; exhibiting a loss of interest and/or energy related to a favorite subject; and displaying anxious, aggressive, or argumentative behaviors with adults or peers. Drawing on results from several studies, Sala et al. (2009) suggested that students with bipolar disorders may exhibit “aggressive

behavior, attention problems, anxious and depressed symptoms, delinquent behavior, social problems, withdrawal, and thought problems” (p. 284).

In the discussion section of a study that compared clinical evaluations and structured diagnostic interviews in assessing mania, Wozniak et al. (2003) described possible differences between the manifestation of symptoms at home and school for subjects with bipolar disorders. Wozniak et al. suggested that in general, children and adolescents exhibited more severe symptoms of bipolar disorders at home in comparison to school or public settings. The authors speculated that when students began exhibiting such symptomology at school, it was likely due to a more advanced progression of the disorder, and greater severity of illness.

The third category of information that has been published on bipolar disorders in children and adolescents pertains to a set of studies that focused on utilizing a particular behavior rating scale, the *CBCL*, in clinical assessment. Mick et al. (2003) conducted a meta-analysis of seven studies that utilized the *CBCL* in assessment of bipolar disorders. Mick et al. found that subjects with bipolar disorders consistently received clinically elevated scores on three subscales: Aggression, Anxious/Depressed, and Attention Problems; this cluster of elevated scores would be referred to by later researchers as the *CBCL*-PBD (Pediatric Bipolar Disorder) phenotype. Mick et al. suggested that these results supported the notion that bipolar disorders are characterized by mixed states, irritability, aggressive behavior, and high rates of comorbidity with ADHD and anxiety disorders. In addition, Mick et al. reported that the *CBCL* was useful in discriminating bipolar disorders from ADHD. A significant limitation of this study was a lack of uniformity in diagnostic criteria for bipolar disorders across studies.

Extending Mick et al.'s (2003) findings, two follow-up studies investigated the stability and heritability of the *CBCL*-PBD phenotype. Boomsma et al. (2006) investigated the developmental stability of this phenotype by analyzing data from subjects participating in an ongoing longitudinal study that explored the development of

problem behavior and was conducted in the Netherlands. Subjects were 8,013 pairs of twins (both monozygotic and dizygotic twins), and data were collected at ages 7, 10, and 12 years. Results indicated that this phenotype was highly stable (correlations ranged from .66 to .77 across the ages studied), and the heritability of the phenotype increased with age, while environmental effects decreased with age. Two important limitations of this study were its inclusion of subjects from outside the United States, and its lack of firm diagnoses of bipolar disorders among subjects. Althoff et al. (2006) explored the heritability of this phenotype. Also drawing on data from a large-scale twins study in the Netherlands, subjects were 6,246 twins at age 10 years. Using latent class analysis methods, Althoff et al. found that 4 percent of female subjects and 5 percent of male subjects fit the *CBCL*-PBD phenotype, and that this phenotype was highly heritable, based on odds ratios. Just as with the Boomsma et al. (2006) study, limitations of this study included using data from outside the United States, and lacking firm diagnoses of bipolar disorders for subjects.

Recently, Meyer et al. (2009) examined long-term outcomes associated with subjects who fit the *CBCL*-PBD phenotype. Subjects were 101 young adults (mean age  $21.67 \pm 2.47$  years) who were participating in a twenty-three year longitudinal study of individuals at-risk for mood disorders (i.e., subjects were the children of mothers diagnosed with bipolar disorder, unipolar depression, or no psychiatric disorder (control group)). Results indicated that 16 percent of subjects ( $n=16$ ) met criteria (i.e., T-scores  $\geq 60$ ) for the *CBCL*-PBD phenotype at some point in the study, although no subjects met more stringent criteria (i.e., T-scores  $\geq 70$ ) for this phenotype. Results indicated that as young adults, subjects who had met criteria for the *CBCL*-PBD phenotype exhibited significantly lower rates of social and occupational functioning (as measured by the GAF scale) than those who had never met criteria for this phenotype. However, only 31 percent ( $n=5$ ) of the 16 subjects who had met criteria for the *CBCL*-PBD phenotype during childhood and/or adolescence met diagnostic criteria for either Bipolar I Disorder

or Bipolar II Disorder in adulthood. Interestingly, 69 percent (n=11) of these 16 subjects exhibited comorbid behavior, attention, and mood/anxiety disorders in adulthood; 44 percent (n=7) exhibited an anxiety disorder; 43 percent (n=6) had a Cluster B Personality Disorder; 40 percent met criteria for ADHD; and 38 percent (n=6) exhibited major depression. Meyer et al. concluded that rather than being a specific indicator for bipolar disorders, the *CBCL*-PBD phenotype was more useful for predicting comorbidity of psychopathology and associated impairment in functioning. Limitations of this study included failure to include subjects who met stringent criteria (i.e., T-scores  $\geq 70$ ) for the *CBCL*-PBD phenotype, and utilization of a small sample size.

Lastly, in the fourth category of available information on the behavioral functioning of children and adolescents with bipolar disorders, Reichenberg et al. (2002) utilized data from the Israeli Draft Board to explore the premorbid adolescent behavioral functioning (i.e., at age 16 or 17 years) of male subjects (female subjects were excluded from this assessment) who would go on to develop nonpsychotic bipolar disorders later in life. Reichenberg et al. analyzed data from 38 male subjects with nonpsychotic bipolar disorders who were first hospitalized at a mean age of  $21.5 \pm 2.8$  years. After matching each subject to a psychiatrically healthy control subject and administering a structured interview that explored several categories (i.e., social functioning, functioning in structured environments, physical activity, individual autonomy, organization ability), Reichenberg et al. found that subjects who would go on to develop nonpsychotic bipolar disorders did not exhibit significant deficits when compared to healthy control subjects. Limitations of this study included: using subjects who were not diagnosed with child- or adolescent-onset bipolar disorders but rather adult-onset bipolar disorders; using only male subjects; using subjects from outside the United States; and failing to identify types/subtypes of bipolar disorders included in this study.

### Summary

A total of ten studies were reviewed that indicated children and adolescents with bipolar disorders are likely to exhibit a host of behavioral difficulties, including aggressive behaviors, attentional difficulties, symptoms of anxiety and depression, social difficulties, delinquency, and thought problems. A series of research studies that utilized the *CBCL* found that students with bipolar disorders often received elevated scores on three clinical subscales – Aggression, Anxious/Depressed, and Attention Problems – although this pattern was found to be more closely associated with comorbid psychopathology and impairment in functioning rather than a specific indicator for bipolar disorders. Finally, a study involving subjects with adult-onset bipolar disorders found no behavioral deficits in their premorbid functioning.

### Social/Emotional Functioning

Children and adolescents with bipolar disorders are also likely to exhibit deficits within the domain of social/emotional functioning. Seven studies (i.e., Geller, Bolhofner, et al., 2000; Goldstein et al., 2009; Kutcher et al., 1998; Lagace & Kutcher, 2005; Quackenbush et al., 1996; Wilens et al., 2003; Wozniak et al., 1995) explored some aspect of the social/emotional functioning of youth with bipolar disorders, while one additional related study (Reichenberg et al., 2002) contributed to the relevant literature in a more indirect manner.

First, in a general study of the characteristics of youth with mania, Wozniak et al. (1995) reported that 43 clinically-referred subjects (mean age  $7.9 \pm 2.6$  years) who met *DSM-III-R* criteria for mania received significantly lower scores on the *DSM-III* GAF scale (mean GAF  $43.0 \pm 7.3$ ) than two comparison groups. These comparison groups were comprised of 164 children with ADHD but not mania (mean age  $8.8 \pm 2.2$  years) (mean GAF  $50.0 \pm 5.1$ ), and 84 non-ADHD/non-mania control subjects (mean age  $9.0 \pm 2.1$  years) (mean GAF  $72.0 \pm 8.2$ ). Significant limitations of this study were: the GAF

scale is a broad measure of psychosocial functioning that does not indicate specific strengths or deficits, therefore its utility is limited; and the authors failed to provide more diagnostic specificity among subjects with bipolar disorders, which may limit the generalizability of results.

Next, in a study that examined changes in functioning associated with the onset of bipolar disorders during adolescence, Quackenbush et al. (1996) studied 44 clinically-referred adolescent subjects (mean age 17.8 years, standard deviation not reported) who met *DSM-III-R* criteria for Bipolar Affective Disorder. Premorbid social/emotional functioning was assessed by interviewing subjects and reviewing existing school records (in most cases), while postmorbid functioning was assessed via subject interviews and reviewing current school records (including grades and teachers' evaluations). Results indicated that prior to the onset of illness, most subjects exhibited good peer relations, 68 percent of subjects were involved in extracurricular activities, and about 33 percent of subjects demonstrated leadership qualities. Regarding post-morbid functioning, significant declines were noted in the areas of peer relations, involvement in extracurricular activities, and leadership potential. Data indicated that 65 percent of subjects exhibited significant peer difficulties, none of the subjects demonstrated leadership qualities, and anecdotal reports suggested "markedly diminished extracurricular activities" (p. 18). Limitations of this study were: a lack of any objective measures of social/emotional functioning, with reliance on subjective measures only; failure to provide more diagnostic specificity among subjects, which may limit the generalizability of results; and failure to report more detailed demographic information for subjects (e.g., standard deviation associated with mean age of subjects).

Kutcher et al. (1998) investigated the premorbid peer functioning of 28 clinically-referred subjects (mean age and standard deviation not reported) who met diagnostic criteria for adolescent-onset Bipolar I Disorder. Mean age at onset for the first depressive episode was 15.8 years, and mean age at onset for the first manic episode was 16.7 years.

Both school records and parent reports were utilized to evaluate premorbid peer functioning, and a qualitative rating of *excellent*, *expected*, or *problematic* was assigned for each subject. Results indicated that the majority of subjects demonstrated *expected to excellent* premorbid peer functioning: 30 percent of subjects were rated as *excellent*, while 60 percent were rated as *expected*. Only 10 percent of subjects had premorbid peer relationships rated as *problematic*. Limitations of this study included: provision of insufficient demographic information for subjects, particularly the mean age of subjects and associated standard deviation; inclusion of only subjects with Bipolar I Disorder, which may limit the generalizability of results; reliance on qualitative ratings to assess functioning instead of quantitative data; and failure to include a comparison group of subjects.

In a more detailed investigation of psychosocial functioning in bipolar disorders among youth, Geller, Bolhofner, et al. (2000) studied 93 clinically-referred subjects (mean age  $10.9 \pm 2.65$  years) with mania or hypomania (according to *DSM-IV* criteria), who also exhibited symptoms of elation and/or grandiosity (with or without ADHD). Comparison groups were 81 subjects with ADHD (mean age  $9.7 \pm 2.0$  years) and 94 community control subjects (mean age  $11.1 \pm 2.6$  years). Subjects and their mothers were separately administered the *Psychosocial Schedule for School Age Children-Revised*. Results indicated that 55.9 percent of subjects with mania/hypomania had few or no friends, compared to 24.7 percent of subjects with ADHD, and 6.4 percent of community control subjects. Additionally, 19.4 percent of subjects with mania/hypomania had trouble keeping friends (compared to 6.2 percent of subjects with ADHD, and no community control subjects); 52.7 percent of subjects with mania/hypomania experienced teasing frequently (compared to 35.8 percent (ADHD), 9.6 percent (community controls)); 63.4 percent of subjects with mania/hypomania exhibited poor social skills (compared to 29.6 percent (ADHD), 5.3 percent (community controls)); and 40.7 percent of subjects with mania/hypomania had poor relations with siblings



(compared to 22.5 percent (ADHD), 6.8 percent (community controls)). Finally, the authors reported that subjects with mania/hypomania were significantly more impaired than both subjects with ADHD and community controls on measures of parent-child warmth and parent-child tension. Limitations of this study were: utilization of modified diagnostic criteria for subjects with mania/hypomania, which may affect the generalizability of results; and reliance on mother and child reports for information rather than seeking information from objective reporters.

Wilens et al. (2003) explored the psychosocial functioning of pre-schoolers and school-aged children who met *DSM-III-R* criteria for bipolar disorders. Subjects were 44 clinically-referred pre-school aged children (mean age  $5.1 \pm 0.8$  years) and 29 clinically-referred school-aged children (mean age  $7.8 \pm 0.9$  years). The *Social Adjustment Inventory for Children and Adolescents (SAICA)* was used to investigate social functioning, the *Moos Family Environment Scale (MFES)* was used to assess family functioning, and overall functioning was assessed with the *DSM-III-R* GAF scale. Results from the *SAICA* indicated comparable levels of social dysfunction among these two groups, while results from the *MFES* suggested there were no significant differences in family functioning (i.e., cohesiveness, conflict, expressiveness) between groups. GAF scores were within the “marked severity range of dysfunction” for both groups (p. 501). Limitations of this study were: failure to include a comparison group consisting of subjects who did not have bipolar disorders; and failure to include more diagnostic specificity among subjects (i.e., identifying types/subtypes of bipolar disorders), which may limit the generalizability of results.

Lagace and Kutcher (2005) wrote an article for psychiatrists on the academic functioning of adolescents with bipolar disorders, in which they addressed social/emotional functioning as well. Summarizing data from other studies, including those by Quackenbush et al. (1996) and Kutcher et al. (1998), the authors found a pattern of a significant decline in interpersonal functioning following the onset of bipolar

disorders in adolescence. Obviously, this information came with numerous limitations, some of which were: this article was not an original research study; experimental methodologies were not described in sufficient detail; and reported demographic characteristics among subjects were inadequate.

Finally, Goldstein et al. (2009) specifically investigated psychosocial functioning among youth with bipolar disorders. Subjects were 446 children and adolescents (mean age  $12.7 \pm 3.3$  years) who satisfied *DSM-IV* criteria for Bipolar I Disorder ( $n=260$ ) or Bipolar II Disorder ( $n=32$ ), or met study-specific criteria for Bipolar Disorder Not Otherwise Specified ( $n=154$ ). Administration of the Psychosocial Functioning Schedule of the *A-LIFE* to both adolescents and their parents yielded results that suggested mild to moderate levels of impairment in interpersonal relations (including relations with both family and friends), mild to moderate levels of impairment in work functioning (including academic, employment, and household), mild to moderate levels of dissatisfaction with level of functioning, and yet little to no impairment in recreational functioning (e.g., reading, sports, socializing). Higher levels of impairment were found across categories for subjects who were experiencing a mood episode than those in partial remission or recovery, yet both groups reported significant levels of impairment. Also, overall levels of impairment were higher for adolescent subjects, regardless of age of onset of symptoms. Significant limitations of this study were: failure to include subjects who represented all four *DSM-IV* categories of bipolar disorders, which may limit the generalizability of results; reliance on retrospective subject and parent reports for information, without incorporating any current, objective measures; and failure to address the impact of medication on subjects' functioning.

Finally, two related studies contributed to the literature on social/emotional functioning. First, using data from the Israeli Draft Board Registry, Reichenberg et al. (2002) explored the premorbid behavioral/personality functioning (which included measures of social/emotional functioning) of 16- and 17-year-old males (females were

excluded from this assessment) who would go on to be hospitalized in adulthood for schizophrenia (n=390), schizoaffective disorder (n=23), or nonpsychotic bipolar disorders (n=38), but exhibited no evidence of mental illness at the time of assessment. The 38 male subjects who eventually developed nonpsychotic bipolar disorders were first hospitalized at a mean age of  $21.5 \pm 2.8$  years. Each of these subjects was matched with a psychiatrically healthy control subject. Assessment of these subjects included a structured interview in which ratings were assigned in five areas of relevant functioning: social functioning, individual autonomy, organization ability, physical activity, and functioning in structured environments (included work and school). Results indicated that subjects who went on to develop nonpsychotic bipolar disorders did not exhibit any significant premorbid deficits in any of these areas of functioning when compared to healthy control subjects. Some significant limitations of this study were: inclusion of subjects with adult-onset bipolar disorders rather than child- or adolescent-onset bipolar disorders; inclusion of only male subjects; lack of diagnostic specificity among subjects with bipolar disorders; and inclusion of subjects from outside the US, which may limit the generalizability of results to subjects within the US.

### Summary

Across eight studies, it was noted that children and adolescents with bipolar disorders consistently exhibited significant impairments in psychosocial functioning. Deficits were noted in terms of global functioning, as well as in specific domains such as social skills, making friends, and family relations. It was noted that premorbid functioning was generally good for these subjects. Significant declines in psychosocial functioning were noted following the onset of illness.

### Cognitive/Neuropsychological Functioning

A few studies have explored various aspects of the cognitive and/or neuropsychological functioning of children and adolescents with bipolar disorders.

While some studies have focused on identifying specific cognitive or neuropsychological deficits associated with bipolar disorders in children and adolescents (i.e., Dickstein et al., 2007; McClure et al., 2005; Rucklidge, 2006), other studies have gone a step further to explore the relation between cognitive/neuropsychological deficits and academic performance in students with bipolar disorders (i.e., Doyle et al., 2005; Henin et al., 2007; Joseph et al., 2008; Lagace et al., 2003; Pavuluri et al., 2006; Wozniak et al., 1995). As such, this section will be divided into three parts: 1) a summary of the literature on cognitive and/or neuropsychological deficits associated with bipolar disorders without exploration of academic performance; 2) a summary of the literature that includes examination of academic performance; and 3) a summary of related studies that contribute to the relevant literature but do not specifically include subjects with bipolar disorders (i.e., McDonough-Ryan et al., 2002; Reichenberg et al., 2002).

Three studies investigated aspects of cognitive and/or neuropsychological functioning associated with bipolar disorders. First, McClure et al. (2005) investigated memory and learning in relation to bipolar disorders by administering a battery of four standardized memory tests (consisting of two measures of verbal memory and two measures of visuospatial memory) to 35 outpatient children and adolescents (mean age  $12.9 \pm 2.6$  years) who met *DSM-IV* criteria for “narrow phenotype” bipolar disorders (i.e., either Bipolar I Disorder (n=27) or Bipolar II Disorder (n=8)). For purposes of comparison, 20 control subjects (mean age  $13.5 \pm 2.2$  years) were administered the same battery of tests. (Control subjects, as well as their first-degree relatives, did not meet criteria for any *DSM-IV* diagnosis.) Results indicated that subjects with bipolar disorders scored significantly lower than control subjects on several measures of verbal learning and memory (i.e., immediate recall, both free and cued short-delay recall, both free and cued long-delay recall, and discriminability on the *California Verbal Learning Test – Children’s Version (CVLT-C)*; both immediate and delayed recall of stories on Memory for Stories subtest of the *Test of Memory and Learning (TOMAL)*). In addition, subjects

with bipolar disorders scored significantly lower than control subjects on one measure of visuospatial memory (i.e., delayed recognition - facial memory on the Facial Memory subtest of the *TOMAL*). McClure et al. noted that across measures, most scores were within the average range for both groups, so these differences were subtle. Interestingly, exploratory post-hoc analyses revealed significant memory impairments for subjects with comorbid ADHD, and also for subjects who exhibited acute mood symptoms. Significant limitations of this study included: utilization of small sample sizes; failure to include subjects with bipolar spectrum disorders other than Bipolar I Disorder or Bipolar II Disorder; and the fact that 30 of the 35 subjects with bipolar disorders were medicated during testing, which may have impacted results.

Next, Rucklidge (2006) explored the effects of ADHD on the neurocognitive performance of adolescents with bipolar disorders. Participants were 12 subjects (mean age  $16.02 \pm 1.46$ ) with bipolar disorders only, 12 subjects (mean age  $15.54 \pm 1.64$ ) with comorbid bipolar disorders and ADHD, 30 subjects (mean age  $15.15 \pm 0.97$ ) with ADHD only, and 41 healthy control subjects (mean age  $15.52 \pm 1.03$ ). All subjects with bipolar disorders either met *DSM-IV* diagnostic criteria for Bipolar I Disorder or Bipolar II Disorder, or met criteria proposed by NIMH (2001) for Bipolar Disorder Not Otherwise Specified. (NIMH criteria were based on clinical summary of the mood section of The Washington University in St. Louis Kiddie Schedule for Affective Disorders and Schizophrenia.) Subjects were administered a neuropsychological battery of tests that measured naming/processing speed, memory, and four categories of executive functioning: response inhibition, inhibitory control, planning/set-shifting, and visual scanning/cognitive flexibility. Results indicated that after controlling for covariation, subjects with ADHD (including both the ADHD-only and comorbid bipolar disorders and ADHD groups) were the most impaired, exhibiting deficits in naming/processing speed, memory, and executive functioning. In general, subjects with bipolar disorders only did not score significantly differently from healthy control subjects, except in overall

working memory. Rucklidge concluded that while adolescents with bipolar disorders exhibited slight deficits in neurocognitive functioning, the addition of comorbid ADHD significantly increased impairment. Limitations of this study included: utilization of small sample sizes; asking subjects who took stimulant medication for attentional difficulties not to take their medication on the day of testing, which could have resulted in findings that did not accurately reflect the daily functioning of subjects; and conducting this study in New Zealand, which may have affected the generalizability of results to the United States.

Finally, Dickstein et al. (2007) explored cognitive flexibility in an effort to determine whether youth who exhibited chronic irritability should be diagnosed with bipolar disorders. Subjects were 50 youth (mean age  $13.1 \pm 2.9$  years) who met “narrow phenotype” *DSM-IV* criteria for bipolar disorders (i.e., Bipolar I Disorder or Bipolar II Disorder), including full-duration criteria for mania or hypomania with abnormally expansive/elevated mood, along with at least three other Criterion B symptoms of mania; 44 youth (mean age  $12.2 \pm 2.1$  years) with severe mood dysregulation (i.e., for a period of twelve months or more exhibited anger or sadness at least half the day most of the time, manifested at least three symptoms of hyperarousal, demonstrated significant impairment in at least one setting and at least mild impairment in another setting, and exhibited increased reactivity to negative emotional stimuli); and 42 control subjects (mean age  $13.6 \pm 2.4$  years) with no personal psychiatric history, nor a psychiatric history among their first degree relatives. Subjects were administered a computerized intra-/extra-dimensional shift task, as well as a computerized change task. In general, Dickstein et al. found that subjects with bipolar disorders demonstrated deficits in cognitive flexibility, including scoring lower than both groups on a simple reversal task, and - along with subjects with severe mood dysregulation - significantly lower than control subjects on a compound reversal task. In addition, subjects with bipolar disorders were slower to adapt on a change task than subjects with severe mood dysregulation. The

authors concluded that these results suggested different underlying brain/behavior mechanisms between the two clinical groups. Two important limitations of this study were failure to include subjects with “broad phenotype” bipolar disorders (i.e., Cyclothymia or Bipolar Disorder Not Otherwise Specified), and the fact that several subjects in each clinical group were unmedicated while testing, and others were medicated.

The next set of six studies explored at least some aspect of academic performance in relation to the cognitive/neuropsychological functioning of subjects with bipolar disorders. First, as already discussed in other sections of this paper, Wozniak et al. (1995) gathered information about the academic functioning of 43 clinically-referred subjects (mean age  $7.9 \pm 2.6$  years) who met *DSM-III-R* criteria for mania, 164 subjects with ADHD but not mania (mean age  $8.8 \pm 2.2$  years), and 84 non-mania/non-ADHD control subjects (mean age  $9.0 \pm 2.1$  years). Wozniak et al. reported information concerning the performance of these subjects on standardized academic achievement tests, parent-reported rates of learning disabilities in reading and arithmetic, and parent-reported rates of grade retention, receipt of tutoring services, and placement in special classes. However, Wozniak et al. also collected information on the cognitive functioning of these subjects by administering subtests of the *WISC-R* (i.e., Block Design, Vocabulary, Digit Span, Digit Symbol, and Oral Arithmetic). Results indicated that subjects with mania scored significantly lower than non-mania/non-ADHD control subjects on estimated VIQ, estimated Performance IQ (PIQ), and estimated Full Scale IQ (FSIQ), although scores were within the average range for all three indices. Subjects with ADHD but not mania scored significantly lower than non-mania/non-ADHD controls on estimated PIQ and estimated FSIQ, but these scores were within the average range or better. Both subjects with mania and subjects with ADHD but not mania scored significantly lower than non-mania/non-ADHD controls on Freedom from Distractibility. Limitations of this study included: failure to include more diagnostic specificity among

subjects with bipolar disorders, which may limit the generalizability of results; and utilization of estimated IQ scores rather than actual IQ scores determined by administration of a full battery of subtests of the *WISC-R*, as estimated scores may not reliably predict actual scores.

In their study that explored mathematics performance among 44 adolescents (mean age  $19.4 \pm 2.9$  years) who met *DSM-III-R* criteria for Bipolar I Disorder but were in remission, Lagace et al. (2003) also explored cognitive functioning via administration of the *Test of Nonverbal Intelligence – Second Edition (TONI-2)*. Comparison groups included 30 subjects with major depressive disorder in remission (mean age  $18.5 \pm 2.8$  years), and 45 healthy control subjects (mean age  $18.2 \pm 1.6$  years). Results indicated there were no significant differences between groups on the TONI-2, and scores for all three groups fell within the average range of functioning. Limitations of this study included: inclusion of only subjects with Bipolar I Disorder, which may limit the generalizability of results; and inclusion of subjects with mean ages higher than age 18 years (i.e., adults), which may limit the ability to draw pure conclusions about the impact of bipolar disorders on cognitive functioning.

In an investigation of neuropsychological functioning in bipolar disorders among youth, Doyle et al. (2005) administered a battery of clinical tests to 57 subjects (mean age  $13.3 \pm 2.4$  years) who met *DSM-IV* criteria for either Bipolar I Disorder or Bipolar II Disorder at some point in their lifetime, and 46 healthy control subjects (mean age  $13.6 \pm 2.2$  years) without mood disorders. This clinical battery included subtests from the *Wechsler Intelligence Scale for Children – Third Edition (WISC-III)* (for subjects < 17 years old) or *Wechsler Adult Intelligence Scale – Third Edition (WAIS-III)* (for subjects  $\geq$  17 years old); *Stroop Color-Word Test*; *Rey-Osterrieth Complex Figure*; computerized *Wisconsin Card Sorting Test (WCST)*; *CVLT-C* (for subjects < 17 years old) or *California Verbal Learning Test – Second Edition* (for subjects  $\geq$  17 years old); and an auditory *Seidman Continuous Performance Test* for subjects at least 12 years old. Regarding



academic performance, as discussed previously, subjects were also administered subtests from the *WRAT-3* to assess academic achievement, and parents reported rates of grade retention, receipt of tutoring services, and placement in special classes. Results indicated that after controlling for the effects of comorbid ADHD, subjects with bipolar disorders scored significantly lower than healthy control subjects on measures of working memory, sustained attention, and processing speed. Impairments (though not statistically significant) were also noted in the areas of verbal learning, abstract problem solving, and interference control. In addition, subjects with bipolar disorders had significantly lower estimated FSIQ scores than control subjects, reportedly due to lower Vocabulary subtest scores, although both groups scored within the average range. Limitations of this study were: inclusion of only subjects with Bipolar I Disorder or Bipolar II Disorder, not other bipolar spectrum disorders, which may limit the generalizability of results; variability among subjects with bipolar disorders regarding medication status (i.e., medicated versus unmedicated) during testing, which may have impacted results; and reliance on estimated IQ scores rather than administering a full battery of subtests to obtain actual IQ scores.

In an important contribution to the literature, Pavuluri et al. (2006) studied 55 children and adolescents (mean age  $11.97 \pm 3.18$  years) with bipolar disorders (both with and without comorbid ADHD) to explore how neuropsychological deficits contribute to academic difficulties. Subjects met *DSM-IV* criteria for bipolar disorders (including full duration and symptom criteria), and also manifested “at least two of the three core symptoms of PBD (i.e., elated mood, irritability, and grandiosity)” (p. 952). A total of 28 subjects (mean age  $12.50 \pm 3.19$  years) had bipolar disorders only, while 27 subjects (mean age  $11.25 \pm 3.01$  years) had both a bipolar disorder and ADHD. Subjects were administered both a clinical battery of standardized neuropsychological tests, and a computerized battery of neurocognitive tests. The clinical battery consisted of the *Trail Making Test*; *Wechsler Abbreviated Scale of Intelligence*; *CVLT-C*; and subtests from the *Wechsler Memory Scale – Third Edition*. The computerized battery consisted of two tests

from the *University of Pennsylvania Computerized Battery* (i.e., Penn Conditional Exclusion Test, Continuous Performance Test), and two tests from the *Cogtest* (i.e., Set Shift Test, Controlled Oral Word Association Test). As discussed previously, parents provided information regarding the school performance of subjects, including rates of special education services, learning difficulties, grade retention, and grade promotion. Results indicated that a combination of neuropsychological deficits (i.e., attention, executive functioning, working memory, and verbal memory) predicted reading and/or writing difficulties, while attentional deficits alone predicted math difficulties. Additionally, Pavuluri et al. reported that a diagnosis of comorbid ADHD did not make a significant, additional contribution to academic difficulties, in comparison to a diagnosis of a bipolar disorder only. In conclusion, the authors ascertained that “it is the shared neurocognitive problems that seem to be the primary cause of reported academic difficulties, as opposed to additional behavioral difficulties that can be associated with ADHD” (p. 954). Limitations of this study included: utilization of modified diagnostic criteria, which may limit the generalizability of results; reliance on unverified parent-report only for information concerning academic difficulties; and failure to include a psychiatrically healthy control group in this study.

Henin et al. (2007) investigated whether bipolar disorders were associated with specific neuropsychological impairments. Subjects were 73 clinically-referred children (mean age  $9.7 \pm 2.5$  years) who met full *DSM-IV* criteria for Bipolar I Disorder and ADHD, 102 children (mean age  $10.7 \pm 2.8$  years) with ADHD but not a bipolar disorder, and 120 non-bipolar disorders/non-ADHD children (mean age  $11.9 \pm 2.7$  years). Subjects in the psychiatric groups were unmedicated. Similar to the clinical neuropsychological battery utilized in Doyle et al.’s (2005) study, subjects were administered subtests from the *WISC-III* (for subjects  $< 17$  years old) or *WAIS-III* (for subjects  $\geq 17$  years old); *Rey-Osterrieth Complex Figure*; *Stroop Color-Word Test*; computerized *WCST*; *CVLT-C*; and the *Seidman Continuous Performance Test*. As

discussed previously, the Reading and Arithmetic subtests of the *WRAT-3* were administered to subjects, and parents reported rates of placement in special classes, grade retention, and receipt of in-school or out-of-school tutoring services. Results indicated there were no statistically significant differences between groups for estimated FSIQ, estimated VIQ, or estimated PIQ. Regarding neuropsychological functioning, both the bipolar disorders plus ADHD group and ADHD-only group scored significantly lower than the non-bipolar disorders/non-ADHD control group on measures of interference control, verbal learning and memory, and one facet of processing speed (associated with naming). The only statistically significant difference between the bipolar disorders plus ADHD group and ADHD-only group was on one of three processing speed measures. There were no significant differences between the bipolar disorders plus ADHD and ADHD-only groups on measures of working memory, executive functioning, or verbal learning. Therefore, because there were few if any meaningful differences between these two groups in terms of their neuropsychological functioning, Henin et al. suggested that neuropsychological deficits associated with bipolar disorders may be accounted for by comorbid ADHD. Limitations of this study were: inclusion of only subjects with Bipolar I Disorder, which may limit the generalizability of results; and utilization of unmedicated subjects, therefore their performance in this study may not accurately reflect their typical daily functioning while medicated.

Finally, Joseph et al. (2008) conducted a meta-analysis of the literature on neurocognitive functioning in bipolar disorders among youth, and found ten studies that met stringent inclusion criteria (e.g., mean age of subjects was less than 18 years, study included a control group, study involved at least one neurocognitive performance task). Regarding IQ, Joseph et al. found small to medium effect sizes for FSIQ when comparing subjects with bipolar disorders to healthy controls. Qualitative analyses of the data suggested significant variability among studies, and that studies with larger Ns yielded smaller differences. When differences were found, subjects with bipolar disorders scored

within the average range generally, though lower than healthy controls. As for more specific neuropsychological functioning, the authors found differences between subjects with bipolar disorders and healthy controls in the following domains of functioning: attention, motor speed, executive functioning, working memory, verbal fluency, visual perceptual abilities, visual memory, and verbal memory. Effect sizes were large for verbal memory; medium-to-large for working memory; medium for visual perceptual abilities (though limited studies), attention, executive functioning, and visual memory; small-to-medium for verbal fluency (though limited studies); and small for motor speed. Joseph et al. reported that generally, these results were consistent with meta-analyses conducted for adults with bipolar disorders, and suggested that these results support the notion that certain neurocognitive deficits are present earlier in the course of this disorder. Some important limitations of this study included: diagnostic variability among subjects; variability in ages of subjects; variability among medication use during testing of subjects; variability in comorbidity of subjects; and other similar concerns related to the utilization of aggregate data.

Two additional related studies contributed indirectly to the literature on cognitive and/or neuropsychological functioning in bipolar disorders among youth. First, McDonough-Ryan et al. (2002) explored the academic and cognitive functioning of children at-risk for bipolar disorders (i.e., had at least one clinically-referred biological parent diagnosed with Bipolar I Disorder) to determine whether they exhibited characteristics of NLD. The *WISC-III*, *WRAT-3*, and *Grooved Pegboard Test* were administered to 28 subjects (mean age  $10.2 \pm 2.7$  years) at-risk for bipolar disorder and 24 healthy control subjects (mean age  $10.0 \pm 1.3$  years). Results indicated no significant differences between the two groups in FSIQ, VIQ, or PIQ, however there was a significantly greater frequency of a VIQ>PIQ discrepancy among the subjects at-risk for bipolar disorders. Although psychomotor deficits were also present in the group at-risk for bipolar disorders, McDonough-Ryan et al. concluded that this group did not

demonstrate a profile consistent with NLD. A significant limitation of this study was the fact that subjects were deemed at-risk for bipolar disorders but had not been diagnosed, therefore direct conclusions could not be drawn regarding any link between bipolar disorders and NLD.

In the second study, Reichenberg et al. (2002) used data from the Israeli Draft Board Registry to explore the premorbid intellectual, personality/behavior, and language functioning of 16- and 17-year-olds who exhibited no evidence of mental illness at the time of assessment, but went on to be hospitalized for psychiatric disorders later in life. Subjects went on to be hospitalized for schizophrenia (n=536), schizoaffective disorder (n=31), or nonpsychotic bipolar disorders (n=68). Of the 68 subjects who went on to develop bipolar disorders, 38 were males who were first hospitalized at a mean age of  $21.5 \pm 2.8$  years, and 30 were females who were first hospitalized at a mean age of  $20.3 \pm 1.5$  years. Each subject was matched with a psychiatrically healthy control subject. Intellectual functioning was assessed via administration of a battery of tests that included a measure of verbal intelligence (i.e., Otis-R, adapted from the US Army Alpha Instructions Test), an arithmetic test (i.e., Arithmetic-R) that was discussed in another section of this paper, a revised version of the Similarities subtest of the *Wechsler Adult Intelligence Scale (WAIS)* (i.e., measures verbal abstraction/categorization), and a revised version of Raven's Progressive Matrices (i.e., measures nonverbal/visual-spatial abstract reasoning and problem-solving). Results indicated that subjects who went on to develop nonpsychotic bipolar disorders exhibited no significant premorbid deficits in any area of intellectual functioning when compared to healthy controls. Limitations of this study were: utilization of an assessment battery whose psychometric properties are unknown; inclusion of subjects with adult-onset bipolar disorders rather than child- or adolescent-onset bipolar disorders; failure to report information on types/subtypes of bipolar disorders among subjects; and use of subjects from outside the United States, which may limit the generalizability of results to US populations.

### Summary

Eleven studies explored the cognitive/neuropsychological functioning of children and adolescents with bipolar disorders. While results were somewhat mixed across studies, deficits were noted in the areas of FSIQ, verbal memory, visuospatial memory, working memory, cognitive flexibility, sustained attention, and processing speed, in comparison to clinical and control groups. In addition, one study that explored the impact of neuropsychological functioning on academic performance found that a combination of neuropsychological deficits (i.e., attention, executive functioning, working memory, and verbal memory) predicted reading and/or writing difficulties, while math difficulties were predicted by attentional deficits alone (Pavuluri et al., 2006).

### Intervention Studies

The professional literature pertaining to effective treatment of bipolar disorders in children and adolescents is still emerging (Kowatch, 2009e; Kowatch, Fristad, et al., 2005; AACAP, 2007; Pavuluri et al., 2005). While a great deal is known about interventions for more common mood disorders in youth, such as unipolar depression (e.g., Seligman, Goza, & Ollendick, 2004), bipolar disorders have been much less well-studied (e.g., Coyle et al., 2003; Young & Fristad, 2009). The most recent treatment guidelines published by the AACAP indicated that “a comprehensive treatment plan, combining medications with psychotherapeutic interventions, is needed to address the symptomology and confounding psychosocial factors present in children and adults with bipolar disorder” (AACAP, 2007, p. 116). However, the authors noted that these treatment guidelines were derived primarily from the literature pertaining to acute mania in adults, given the limited number of studies specific to bipolar disorders in children and adolescents. Using the guidelines published by the AACAP as a starting point, this section will summarize the treatment literature on both psychopharmacological and psychotherapeutic interventions for bipolar disorders in youth.

### *Psychopharmacological Treatment*

One recent study found that more than 90 percent of children and adolescents with bipolar disorders were prescribed psychotropic medication during outpatient visits to physicians (Moreno et al., 2007). However, at this time, the vast majority of research on psychopharmacological treatments for bipolar disorders among children and adolescents has consisted of case studies, chart reviews, and open-label trials, not more rigorous double-blind placebo-controlled studies (Singh et al., 2007). The most recently published psychiatric treatment guidelines for children and adolescents with bipolar disorders (i.e., Kowatch et al., 2005) outlined two treatment algorithms for acute Bipolar I Disorder (manic or mixed), one for subjects without psychosis and the other for subjects with psychosis.

The first treatment algorithm, for subjects with acute Bipolar I Disorder (mixed or manic) without psychosis, specified that monotherapy with traditional mood stabilizers (i.e., lithium, divalproex, carbamazepine) and atypical antipsychotics (i.e., olanzapine, quetiapine, risperidone) was considered first-line treatment. Six stages of alternate monotherapies, combinations of mood stabilizers, and augmentation strategies were outlined for subjects who demonstrated only a partial response to first-line treatment. The final stage of treatment within this algorithm consisted of clozapine or electroconvulsive therapy (for adolescents) (Kowatch et al., 2005).

The second treatment algorithm, for subjects with acute Bipolar I Disorder (mixed or manic) with psychosis, specified that a traditional mood stabilizer (i.e., lithium, divalproex, carbamazepine) plus an atypical antipsychotic was considered first-line treatment. Six stages of alternate combinations of mood stabilizers and antipsychotics, as well as augmentation strategies, were outlined for subjects who demonstrated only a partial response to first line treatment. Again, the final stage of treatment within this algorithm consisted of clozapine or electroconvulsive therapy (for adolescents) (Kowatch et al., 2005).

In accordance with these guidelines, lithium is recognized as the most extensively-studied medication used to treat bipolar disorders in both youth and adults (Kowatch, 2009c; Rivas-Vazquez, Rey, Johnson, Blais, & Rivas-Vazquez, 2002; Singh et al., 2007; Smarty & Findling, 2007). While lithium has been linked to significant improvements in problematic symptoms in numerous studies (e.g., Geller, Cooper, Sun, et al., 1998), its potential side effects are also significant, including thyroid dysfunction, nausea, and weight gain (Smarty & Findling, 2007), and even cognitive impairment (e.g., Geller, Cooper, Zimmerman, et al., 1998). Further, lithium has not been proven effective for treating all subtypes of bipolar disorders among adults (Rivas-Vazquez et al., 2002). In summarizing the available research on mood stabilizers, Kowatch (2009c) reported that lithium has the strongest evidence available for effective treatment of bipolar disorders in youth, while the evidence for valproate is also somewhat strong. Other traditional and novel mood stabilizers have weaker evidence available, but remain promising treatments for bipolar disorders in children and adolescents.

In summarizing the literature on atypical antipsychotics, Kowatch (2009d) indicated that several have demonstrated effectiveness in treatment of mania in children and adolescents, including risperidone, olanzapine, quetiapine, aripiprazole, and ziprasidone. However, Kowatch warned that additional studies are needed to explore their effectiveness for treating symptoms of depression associated with bipolar disorders, as well as long-term maintenance. Atypical antipsychotics are indicated by the United States Food and Drug Administration for treating depression, mania, and/or maintenance therapy in adults with bipolar disorders (Singh et al., 2007).

Kowatch et al. (2005) also published guidelines for treating comorbid psychiatric disorders, as well as maintenance treatment. The authors recommended treating comorbid psychiatric disorders in addition to a bipolar disorder when symptoms of comorbid disorders negatively impacted a child's psychosocial or academic functioning. Regarding one of the most common comorbid psychiatric disorders, ADHD, the authors



warned that stimulants should be used carefully and only after controlling symptoms of the child's bipolar disorder with a mood stabilizer. When treating children and adolescents with bipolar disorders, stimulants can cause exacerbation of manic symptoms, therefore it is critical to first stabilize a subject's mood before adding a stimulant (Kowatch, 2009e; Kowatch et al., 2005).

Similarly, Kowatch et al. (2005) indicated that SSRIs should also be used carefully in treating comorbid psychiatric disorders, such as anxiety disorders. Specifically, the authors wrote that "caution should be used because these agents may trigger manic, mixed, or rapid cycling episodes" (p. 228). Kowatch et al. recommended that the subject's mood should be stabilized first before attempting to add an SSRI to treat comorbid symptomology. More recently, Kowatch (2009e) indicated that use of antidepressants may be associated with increased risk for suicidal ideation in children and adolescents with bipolar disorders.

Finally, Kowatch et al. (2005) indicated that based on current research, lithium, lamotrigine, and olanzapine have the most support available as maintenance treatments. However, studies supporting these medications were primarily adult-focused. The authors recommended that maintenance treatments should be studied more extensively given the high risk of relapse associated with bipolar disorders in children and adolescents.

### Summary

At this time, psychopharmacological treatment is considered the first-line treatment for children and adolescents with bipolar disorders, although more double-blind placebo-controlled studies are needed. Traditional mood stabilizers and atypical antipsychotics are the medications of choice, and lithium is the most well-studied drug for both youth and adults with bipolar disorders. However, the most recently published treatment guidelines (i.e., Kowatch et al., 2005) were primarily focused on treating

Bipolar I Disorder in children and adolescents, while Bipolar Disorder Not Otherwise Specified is the most common diagnosis among this population (Singh et al., 2007). Therefore, the applicability of these guidelines is unknown for the majority of cases of bipolar disorders among children and adolescents. Finally, stimulants and SSRIs should be used with caution when treating comorbid symptomology, as they may exacerbate bipolar symptoms. It was recommended that a subject's mood should be stabilized first before attempting to add either a stimulant or SSRI.

### *Psychotherapeutic Treatments*

At this time, psychotherapeutic treatments are considered adjunctive interventions to psychopharmacological treatments for children and adolescents with bipolar disorders, and evidence regarding their utility is still emerging, though promising (AACAP, 2007; Pavuluri et al., 2005; Young & Fristad, 2009). There is a dearth of published, rigorous, empirical data that support the effectiveness of psychological interventions for treating manic, hypomanic, and depressive symptoms associated with bipolar disorders among children and adolescents, although there is solid evidence to support the use of behavioral and cognitive interventions for treating pediatric unipolar depression alone (McClure et al., 2002; McIntosh & Trotter, 2006; Young & Fristad, 2009). In one published set of treatment guidelines, it was suggested that psychotherapy may be useful once a child "is stable on medication and is capable of learning new skills" (Kowatch, Fristad, et al., 2005, p. 231). The AACAP treatment guidelines recommended that psychotherapeutic interventions should address the following needs: psychoeducational therapy, relapse prevention, individual psychotherapy, social and family functioning, academic and occupational functioning, and community consultation (AACAP, 2007). The authors reported that these recommendations were based on the literature for adults with bipolar disorders, as well as a few preliminary studies involving children and adolescents with bipolar disorders. Regarding academic functioning in particular, the authors stressed the

importance of accounting for high rates of comorbid disruptive behavior disorders, and indicated that individual educational plans and day treatment or partial hospitalization programs may be required.

The available research on psychotherapeutic interventions for children and adolescents with bipolar disorders can be broken down into three groups of studies, although there is some overlap (e.g., skills training) between all three treatment modalities. Following is a summary of the most promising studies and published information in all three areas. First, a series of family-focused therapeutic interventions involving the application of psychoeducation yielded positive preliminary results. Next, a set of studies involving cognitive-behavioral therapy generated many positive effects among subjects. Lastly, one study explored the efficacy of dialectical behavior therapy among a small group of adolescents with bipolar disorders, and reported some promising outcomes.

#### Family-Focused Therapy (FFT)

Research on FFT as an adjunctive intervention for children and adolescents with bipolar disorders has been driven by two prominent researchers, Mary Fristad and David Miklowitz, whose findings will be reviewed in this section. This type of therapy primarily involves psychoeducational treatment for subjects with bipolar disorders and their families (e.g., Fristad, 2006; Fristad et al., 2003). Fristad et al. (2003) described the theoretical rationale for psychoeducation as a treatment strategy as having roots in the concepts of expressed emotion and caregiver concordance. The authors cited numerous studies that found high rates of expressed emotion (e.g., hostility, critical comments, emotional over-involvement) were linked to relapse of illness in adults with schizophrenia, adults with mood disorders, and children with depression. Therefore, it was logical to hypothesize that using psychoeducation as a mechanism to lower rates of expressed emotion may result in positive outcomes in terms of the course of illness.

Fristad et al. (2003) described caregiver concordance as rates of agreement/disagreement on matters related to child-rearing. Several studies were cited that suggested high rates of disagreement were associated with increased problem behaviors, decreased family problem-solving abilities, and decreased effectiveness of parents. The authors hypothesized that increased agreement among parents would result in gains in recovery from manic or depressive episodes.

In their article, Fristad et al. (2003) presented data from three pilot studies, as well as descriptions of two studies that were still in progress, on the efficacy of two versions of psychoeducational interventions for children with bipolar disorders: single session workshops for parents of children who underwent psychiatric hospitalization for a mood disorder; and six- or eight-session multi-family psychoeducation groups (MFPGs) for children with major mood disorders and their parents. Content of MFPGs was described as education for families about their children's illness as well as treatment options, and training in social problem-solving, cognitive-behavioral interventions, and communication. The interested reader is referred to Fristad, Gavazzi, and Soldano (1998) for a detailed description of the content of MFPGs.

In a study of the efficacy of a single, ninety-minute psychoeducational workshop for 25 parents of 20 children and adolescents with mood disorders (5 of whom had a bipolar disorder (mean age and standard deviation not reported)), the authors reported a significant increase in parents' knowledge of mood disorders (particularly among fathers), and decreased rates of expressed emotion at a four-month follow-up, based on the completion of rating scales (i.e., *Understanding Mood Disorders Questionnaire (UMDQ)*, *Expressed Emotion Adjective Checklist (EEAC)*). Next, the authors evaluated the efficacy of a six-session MFPG among 9 parents and children (3 of whom had a bipolar disorder (mean age and standard deviation not reported)). Results indicated significantly decreased rates of expressed emotion within these families, based on completion of the *EEAC*. In the third study, a six-session MFPG was administered to 35

families with children (ages 8 to 11 years) with mood disorders. Families were divided into two groups: immediate treatment (18 families) and six-month waitlist control (17 families). Of the immediate treatment group, 16 families completed all assessments and treatment. Of the waitlist control group, 13 families completed all assessments and treatment. No demographic information was reported regarding the number of children with bipolar disorders. In addition to the *UMDQ* and *EEAC*, the *Child and Adolescent Services Assessment* and *Social Support Scale for Children* were used to measure service utilization and perceived social support. Results indicated that the immediate treatment group scored significantly higher than the waitlist control group on measures of knowledge (both immediately following treatment and at six-month follow-up), social support from parents (with a trend toward gains from peers), and ability to obtain appropriate services. Once both groups completed treatment, gains were similar for both groups in expressed emotion scores and knowledge.

Finally, Fristad et al. (2003) described two studies still in progress at the time this article was published. In the first, families of 165 children (8-11 years old) with mood disorders were recruited to participate in a controlled, randomized study in which subjects were assigned to either a MFPG treatment group or a twelve-month waitlist control group. In the second study, families of 20 children with bipolar disorders received treatment in sixteen sessions for individual families only. Treatment content was derived from the materials of the eight-session MFPG treatment package. Overall, limitations of this series of three pilot studies and two study descriptions included mostly small sample sizes, and in particular very small samples of children and adolescents with bipolar disorders; limited dependent measures; very little demographic information was provided; and no long-term follow-up was conducted to see if gains were sustained over time.

Next, Miklowitz et al. (2004) explored the efficacy of a one-year open trial of FFT, as an adjunctive intervention to psychopharmacotherapy, for adolescents with

bipolar disorders. In this study, FFT was delivered over the course of twenty-one outpatient sessions during a span of nine months, followed by a maintenance session every three months for families who were interested. Content was divided into three modules: psychoeducation, communication enhancement training, and training in problem-solving skills. Participants were 20 adolescents (mean age  $14.8 \pm 1.6$  years), 16 of whom met *DSM-IV-TR* criteria for Bipolar I Disorder (with an acute manic, depressive, or mixed episode in the last three months), 1 for Bipolar II Disorder, and 3 for Bipolar Disorder Not Otherwise Specified. Of these participants, 17 entered the study already receiving antipsychotic or mood stabilizer medication, and the other 3 subjects began receiving mood stabilizer medication soon after entry. Outcomes were ascertained by utilizing the mania and depression scales of the *Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS)*, and the *CBCL*. Results indicated 38 percent improvement on average in symptoms of depression between baseline and a twelve-month follow-up; 46 percent improvement on average in symptoms of mania; and clinically meaningful improvements in internalizing, externalizing, and total problem behaviors on the *CBCL*. Limitations of this study were small sample size; lack of a control or comparison group; and the authors' inability to demonstrate that gains occurred as the result of FFT.

Fristad (2006) presented outcome data on one of the studies that was in progress when Fristad et al. (2003) was published. Fristad (2006) explored the efficacy of adapting MFPG for use with individual families (termed Individual Family Psychoeducation (IFP)), and expanding treatment from eight sessions to sixteen sessions. Participants were 20 families of children (ages 8-11; no mean or standard deviation reported) with bipolar disorders. Of these participants, 8 children met *DSM-IV* criteria for Bipolar I Disorder, 7 for Bipolar II Disorder, and 5 for Bipolar Disorder Not Otherwise Specified. Participants were randomly assigned by pairs into one of two groups: treatment as usual/IFP, or treatment as usual/waitlist control. The treatment as

usual/waitlist control group received treatment at twelve months after study entry. Instruments used to measure outcomes included the *Children's Depression Rating Scale – Revised* and *Young Mania Rating Scale (YMRS)*, and a Mood Severity Index was calculated based on a formula that incorporated scores from both rating scales. Results indicated improvements in children's mood and family climate, and possible gains in service utilization. The authors noted that gains began following treatment and were most pronounced at twelve-month follow-up, and explained this finding by suggesting it may take time for changes to occur when delivering psychoeducational treatment. Finally, Fristad (2006) noted that a pilot study was underway to investigate the efficacy of expanding IFP to twenty-four treatment sessions. Limitations of this study included a small sample size, limited outcome measures, and no long-term follow-up to demonstrate that gains were sustained over time.

Miklowitz et al. (2006) presented two years of data from the study that was initiated and described in Miklowitz et al. (2004) in order to investigate outcomes over a longer period of time. Following the initial nine-month acute treatment phase of FFT outlined previously, maintenance sessions were delivered over the course of fifteen months (occurring every three months) to interested families of the 20 adolescents who were originally enrolled in this study (an exact N was not provided). Results were improvements in symptoms of depression, mania, and total mood over time, as well as improvements in internalizing, externalizing, and total problem behaviors over time. The authors reported that gains were not linear, and suggested that FFT may help promote the stabilization of symptoms. Limitations of this study were the same as those of Miklowitz et al. (2004).

Finally, Young and Fristad (2007) published a summary of evidence-based psychosocial treatments for children and adolescents with bipolar disorders. In their paper, they described four treatment programs: the FFT, MFPG, and IFP programs that have been discussed already, and a cognitive-behavioral therapy program developed by

Pavuluri et al. (2004), which will be described in the next section. The authors highlight several similarities between the four programs, including: all were designed as adjuncts to psychopharmacological treatment; all have included psychoeducational components and cognitive-behavioral foundations; all included both children and their parents in the active treatment process; and all incorporated both problem-solving and skill building strategies. Lastly, the authors noted that while all four programs yielded promising results, none could be considered a “well established” treatment at this time because of the significant limitations of each study explicated throughout this section.

### Cognitive-Behavioral Therapy (CBT)

Based on the substantial empirical literature pertaining to the treatment of bipolar disorders in adults and unipolar depression in adolescents, Danielson et al. (2004) developed the first formal CBT model for adolescents with bipolar disorders. While the authors did not report any empirical outcome data in this article, they did present a promising treatment option based on sound principles, and later published preliminary outcome data to support this work (i.e., Feeny et al., 2006). Danielson et al.’s CBT treatment model consisted of the following elements: psychoeducation, medication compliance and mood monitoring, anticipating stressors and problem solving, identifying and counteracting negative thinking, sleep maintenance, and assertiveness and family communication. The authors also included four optional additional components: substance abuse, anger management, social support, and contingency management. Sessions were designed to be sixty minutes in length and occur on a weekly basis, with the exception of holding two sessions during the first week of treatment. These sessions primarily entailed individual therapy, although parents were directly involved in some aspects of the therapy. The authors also proposed a three-month maintenance phase following core treatment with sessions occurring once per month, and then follow-up “booster sessions” occurring every six months. An obvious limitation of this article was



its failure to include empirical data to support the efficacy of this treatment, although it was an important contribution to the professional literature for both theoretical and practical reasons.

Next, Pavuluri et al. (2004) published a treatment model for children with bipolar disorders, and included some promising preliminary data. Pavuluri et al.'s model combined elements of FFT and CBT, and was termed "child- and family-focused cognitive-behavioral therapy (CFF-CBT)" (p. 528). The authors indicated this treatment was designed for children between the ages of 8 and 12 years, and intended for those who were already stabilized on medication. Treatment components, to be delivered over twelve sessions, included: establishing routines, affect regulation, developing a positive view of oneself, psychoeducation and reframing negative thoughts, peer relations, developing a balanced lifestyle for parents, problem solving, and identifying social supports. Preliminary data were collected among 34 subjects (mean age  $11.33 \pm 3.06$  years), 28 of whom met *DSM-IV* criteria for Bipolar I Disorder, 3 for Bipolar II Disorder, and 3 for Bipolar Disorder Not Otherwise Specified. Of these subjects, 29 met *DSM-IV* criteria for at least one comorbid Axis I disorder. Pre/post-test data collected using the *Clinical Global Impressions Scale for Bipolar Disorder (CGI-BP)* and *Children's Global Assessment Scale (CGAS)* indicated significant reductions in aggression, symptoms of ADHD, mania, psychosis, depression, sleep disturbance, and overall severity of symptoms following treatment. Significant limitations of this study included lack of a comparison group, limited outcome data, and the use of raters who were not blind to treatment.

Feeny et al. (2006) published preliminary data regarding the treatment protocol outlined in Danielson et al.'s (2004) article. Participants were 16 subjects who met *DSM-IV* diagnostic criteria for bipolar disorders and were stabilized on medication. In order to evaluate the efficacy of treatment, a clinical group and a control group were formed. The clinical group was comprised of 8 subjects (mean age  $14 \pm 1.4$  years): 6 met criteria for

Bipolar I Disorder, while 2 met criteria for Bipolar II Disorder. The control group was also comprised of 8 subjects (mean age  $14 \pm 2.5$  years): 6 met criteria for Bipolar I Disorder, 1 for Bipolar II Disorder, and 1 for Cyclothymia. The twelve-session treatment described in Danielson et al. (2004) was manualized and delivered to subjects, with variability only in which optional sessions were delivered (based on individual needs). Three instruments were used to evaluate treatment outcomes: *YMRS*, *Inventory of Depressive Symptomatology*, and *General Behavior Inventory*. Results were somewhat mixed, as parents reported significant decreases in both manic and depressive symptoms for subjects following treatment, but neither interviewers nor the subjects themselves reported significant decreases in symptomology. Limitations of this study included small sample sizes and limited outcome measures.

Finally, West et al. (2007) followed up the CFF-CBT treatment model described in Pavuluri et al. (2004) with a study on its feasibility as a maintenance model of treatment. All of the 34 subjects included in Pavuluri et al.'s (2004) study participated in this follow-up study. Subsequent to the acute treatment phase described in Pavuluri et al. (2004), fifty-minute "booster sessions" were delivered over the course of three years, with frequency ranging from once per week to once every three months depending on families' needs and access to the treatment clinic. In addition, medication management was a focus of the maintenance phase of treatment, and subjects' psychopharmacological therapy was followed closely. Using the *CGI-BP* and *CGAS*, the authors found that the significant improvements in all of the areas identified in Pavuluri et al. (2004) (i.e., aggression, symptoms of ADHD, mania, psychosis, depression, sleep disturbance, and overall severity of symptoms following treatment) were maintained over the course of the three-year maintenance phase of treatment. Significant limitations of this study continued to be lack of a comparison group, limited outcome data, and the use of raters who were not blind to treatment.

### Dialectical Behavior Therapy (DBT)

One study explored the efficacy of DBT among adolescents with bipolar disorders. Goldstein et al. (2007) studied 10 adolescents (mean age  $15.8 \pm 1.5$  years) who had been diagnosed with bipolar disorders using *DSM-IV* criteria. Of these subjects, 7 had been diagnosed with Bipolar I Disorder, 2 with Bipolar II Disorder, and 1 with Bipolar Disorder Not Otherwise Specified. In addition, 8 of these subjects met diagnostic criteria for at least one comorbid Axis I disorder, 8 subjects had a history of one or more suicide attempt(s), and 7 subjects had a history of psychiatric hospitalization. In this study, DBT was administered over the course of one year, and consisted of both family skills training and individual therapy. This application of DBT was based on a treatment manual developed by Miller et al. (2006), and included some modifications to make treatments age-appropriate. During the first six months of this study (identified as the acute treatment period), twenty-four one-hour weekly sessions were conducted, alternating between family skills training and individual therapy. The next six months (identified as the continuation treatment period) involved twelve additional sessions, with one family skills session and one individual session delivered on a monthly basis, to focus on reviewing the application of skills and consolidating treatment gains. To evaluate the efficacy of treatment, behavior rating scales and semi-structured interviews were administered at baseline and at three-month intervals throughout the course of the study. Instruments included the *Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version*, *Modified Scale for Suicidal Ideation*, *Children's Affective Lability Scale*, *K-SADS Mania Rating Scale*, and *K-SADS Depression Rating Scale*. Results indicated that subjects demonstrated significant improvement between baseline and post-treatment in the areas of depressive symptomology, emotional dysregulation, suicidality, and nonsuicidal self-injurious behavior. There were no significant differences in interpersonal functioning or number of medications prescribed to subjects. Limitations of this study included utilization of a

small sample size; lack of a control or comparison group; and reliance on parent- and self-report, rather than objective measures, for much of the data that was collected.

### Summary

In current treatment guidelines, psychotherapeutic interventions are considered as adjuncts to psychopharmacological interventions for children and adolescents with bipolar disorders, and evidence regarding their efficacy is still emerging. Studies have been conducted on three types of psychotherapeutic interventions: family-focused therapy, cognitive-behavioral therapy, and dialectical behavior therapy. Promising preliminary results were reported for all three modalities.

### Educational Intervention Studies

To date, not a single study has been conducted regarding any educational intervention for children and/or adolescents with bipolar disorders. As such, at this time, there are no empirically-supported educational interventions for children and adolescents with bipolar disorders (e.g., Lofthouse et al., 2004; Young & Fristad, 2009). Further, the author is not aware of any previous study that explored the performance of children and/or adolescents with bipolar disorders placed in a therapeutic day school.

### Summary of Chapter II

The first section of Chapter II described the history of bipolar disorders in children and adolescents. Next, the clinical features of bipolar disorders in youth were discussed, and information was presented regarding prevalence, age at onset, symptoms, rates of comorbidity, course and outcome, and current issues. The third section of Chapter II reviewed and critiqued the available literature on bipolar disorders among youth pertaining to the educational functioning of these students. Limited data regarding educational services and accommodations were presented, and then a series of studies were reviewed that noted deficits in the areas of academic, behavioral/social-emotional,

and cognitive/neuropsychological functioning. Finally, intervention studies for this population were reviewed, including both psychopharmacological and psychotherapeutic treatments.

In conclusion, this critical review of the literature highlights just how little is known about the educational functioning of children and adolescents with bipolar disorders, as well as the fact that there are no well-established, empirically-supported psychotherapeutic interventions to employ at this time. In particular, there is a glaring gap in the literature regarding educational interventions for children and adolescents with bipolar disorders; to this author's knowledge, not a single study has been conducted in this regard. The present study will attempt to address this latter gap by looking at placement in a therapeutic day school as an educational intervention package for students with bipolar disorders, and as such, will contribute to the literature pertaining to both the educational functioning of these students, as well as the literature on psychotherapeutic interventions.

## CHAPTER III

### METHODOLOGY

#### Overview

This chapter begins by reviewing case study research in general, and then presents the research design of the current study. Next, the setting is discussed, including a description of the intervention package utilized in this setting. Following this is the participants section, and then the procedures section, which includes information pertaining to specific data collection procedures in case study research. After this, the instruments are described. Next, research questions and data analysis procedures are outlined, and a list of hypotheses is included for purposes of pattern matching. Lastly, reliability and validity issues are discussed. It is important to note that this study draws heavily from the work of Yin (2009) for conceptual and technical guidance.

#### Case Study Research

The case study as a research method has been utilized widely within the fields of education and psychology, among other professional fields (Mertens, 2005; Simons, 2009; Yin, 2009). Generally, case study research falls within the realm of qualitative research (Creswell, 2009; Marshall & Rossman, 1999), yet case studies may include quantitative data in addition to qualitative data (Yin, 2009). Case studies may involve single cases or multiple cases (Merriam, 2009; Stake, 2006). Definitions of case study research vary, but most contain some common elements. Merriam (1998) wrote: “A case study design is employed to gain an in-depth understanding of the situation and meaning for those involved. The interest is in process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation” (p. 19). Stake (2005) suggested that a case study should be designed to “optimize understanding of the case rather than to generalize beyond it” (p. 443). According to Hancock and Algozzine (2006), case studies are “intensive analyses and descriptions of a single unit or system

bounded by space and time,” which involve the study of individuals, groups, or events in an effort to “gain in-depth understanding of situations and meaning for those involved”

(pp. 9, 11). Yin (2009) proposed a two-part definition of case study research:

1. A case study is an empirical inquiry that
  - investigates a contemporary phenomenon in depth and within its real-life context, especially when
  - the boundaries between phenomenon and context are not clearly evident.
2. The case study inquiry
  - copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
  - relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
  - benefits from the prior development of theoretical propositions to guide data collection and analysis. (p. 18)

As for recognized types of case studies, one of the most commonly accepted sets of descriptions (e.g., Simons, 2009) was proposed by Stake (2005), who identified three types of case studies: intrinsic cases studies, conducted primarily to gain a better understanding of a case; instrumental case studies, used to gain insight into issues or re-examine generalizations, drawing on the case to help facilitate understanding of another, primary interest; and multiple or collective case studies, used to explore a general condition, population, or phenomenon. For the sake of comparison, Merriam (2009) also identified three types of case studies: particularistic, descriptive, and heuristic.

According to Merriam, particularistic case studies are used to study events, programs, phenomena, or situations, and the case is useful for what it represents and reveals about the object of study. Descriptive case studies seek to produce a rich, thick description of a case, often exploring many variables and their interactions over time. Heuristic case studies “can bring about the discovery of new meaning, extend the reader’s experience, or confirm what is known” (p. 44).

Like any research methodology, case study research has its own strengths and limitations. Yin (2009) suggested that case study research has a “distinct advantage” over other types of research methodologies in situations that involve the following three

elements: the investigator seeks to answer “how” or “why” questions, is studying contemporary events, and has little or no control over the events (p. 13). Simons (2009) identified six strengths of case study research. In brief, they are as follows: case study research enables the experiences and complexities of phenomena to be studied in depth and interpreted in context; can document multiple perspectives and viewpoints, and can provide explanations about how and why something happened; can explore the processes and dynamics of change, and identify and analyze critical factors; is flexible in terms of both methodology and time constraints; can be written in accessible language to facilitate understanding among audiences; and can involve participants in the research. Yin (2009) acknowledged four perceived weaknesses of case studies: they may lack methodological rigor, may not yield generalizable results, may be time-consuming or result in massive documents, and may not result in causal inferences. However, it is important to note that all four concerns can be alleviated by following proper techniques (Yin, 2009).

#### *Design of Current Study*

Yin (2009) identified five components of case study research design: 1) study questions; 2) study propositions (if any); 3) unit(s) of analysis; 4) linking data to the study propositions; and 5) criteria for interpreting findings. All five components are addressed in this chapter.

Regarding this study’s research questions, Yin (2009) suggested that “how” or “why” questions are most appropriate for case study research. This study incorporates a series of research questions that explore how the performance of children and adolescents with bipolar disorders changes over time. Next, Yin indicated that exploratory case studies may not include formal propositions, but suggested that every study should at least have a clear purpose. The purpose of this study is to explore the effects of placement in a therapeutic day school as an educational intervention package for children and adolescents with bipolar disorders. Third, the units of analysis in this study are



individual children and adolescents diagnosed with bipolar disorders. In addition, this study uses cross-case analysis to investigate common themes across cases. Fourth, a detailed description of how data are linked to this study's purpose accompanies its list of research questions. Essentially, this involves pattern matching on a within-case level, and cross-case synthesis on a between-case level (Yin, 2009). Lastly, qualitative themes using a case study format, as well as descriptive statistics when relevant, are utilized to interpret findings. Patterns and trends are identified among both qualitative and quantitative data, during both within-case and cross-case analysis. In addition, rival explanations for findings are addressed as a technique to interpret findings (Yin, 2009).

### Setting

The setting for this study is a suburban, Midwestern public therapeutic day school that serves students in grades kindergarten through eighth grade. The student population within this school consists of children and adolescents referred for placement by their home school districts due to exhibiting severe emotional and/or behavioral difficulties. Each student receives special education services and has an active Individual Education Plan (IEP). As a general practice, only students with FSIQs above 70 are referred to this setting, as this setting utilizes a cognitive-behavioral framework for delivering therapeutic services.

### Intervention Package

The intervention package utilized in this study consists of several components, all of which are implemented already within this public therapeutic day school facility. This public therapeutic day school utilizes a program-wide protocol for academic instruction, social, coping, and problem-solving skills training, integrated therapeutic services, and crisis intervention. Its general approach is classified as a "milieu and integrated services approach," and all services are delivered within the context of an overarching cognitive-behavioral framework, with attention paid to social/family issues. Within this therapeutic

day school, school psychologists and social workers not only provide therapeutic services, but also participate in standard classroom activities and field trips to achieve “in vivo” social, coping, and problem-solving skills intervention. In addition, speech therapy and occupational therapy services are delivered primarily within the context of classrooms. Descriptions of seven more specific components of this package follow.

First, all students receive full-time (i.e., 1800 minutes per week) special education services that occur within self-contained classrooms. Typical classrooms consist of ten students, a special education teacher, two paraprofessionals, and one-half of either a social worker or school psychologist’s work time.

Next, all students utilize a point- and level-based behavior modification system, adapted from a model developed at the Boys and Girls Town Residential Treatment Center (e.g., Dowd, Czyz, O’Kane, & Elofson, 1994). This system is based on both social learning theory (Bandura, 1977) and principles of operant conditioning (Skinner, 1953). Its central tenet holds that most behaviors are learned, therefore behaviors can be changed by teaching – and then reinforcing – adaptive behaviors to replace previously learned maladaptive behaviors. Key features of this system include emphases on positive reinforcement of socially appropriate behaviors, a response-cost feature for exhibiting socially inappropriate behaviors, continuous shaping of socially inappropriate behaviors toward more socially appropriate behaviors, and use of a token economy.

Within this system, students carry daily point sheets, and earn positive points for exhibiting socially appropriate behaviors, and negative points for exhibiting socially inappropriate behaviors. The sum total of a day’s behavioral points results in one of three outcomes: a “credit day” (most desirable), “positive day,” or “non-credit day” (least desirable). Students can advance levels by earning a specified number of credit days on each level, along with meeting some other criteria. There are a total of four levels (i.e., Levels 1-4) within this system. All students start at Level 1 upon entry to the program; Level 4 is the highest level. Achieving higher levels results in increased privileges within

the school, including the ability to purchase either more or higher quality items within the school's token economy system (i.e., school store).

The lower levels of this system focus on helping students develop basic work habits, and students receive continuous (i.e., several times per period) feedback regarding their behaviors while on these levels. On Levels 1 and 2, students have three general goals (i.e., on task/work completion, follow instructions, respect self and others), and three individualized goals based on that student's needs. The higher levels focus on helping students develop appropriate social and coping skills to prepare for re-integration to their home schools, and providing feedback less frequently in an effort to fade out the structure and support of the point- and level-system. On Level 3, students have two general goals (i.e., on task/work completion, follow instructions) and three individualized goals. On Level 4, students have five to seven individualized goals. The overriding objective for every student is re-integration into the student's home school, after equipping the student with the work habits and social and coping skills necessary to be successful within that setting.

Third, each student receives thirty minutes per week of formal individual therapy. Therapeutic foci vary among students but generally fall within the domains of social, coping, or problem-solving skills, and primarily are delivered from a cognitive-behavioral theoretical perspective. In some cases, students are seen along with peers in order to achieve therapeutic objectives (e.g., friendship skills, girls' issues).

Fourth, each student also receives sixty to seventy minutes per week of formal group therapy. The therapeutic foci of groups are generally social, coping, or problem-solving skills, and primarily are delivered from a cognitive-behavioral theoretical perspective.

Fifth, all students are provided with frequent phone consultation for parents or guardians, ranging generally from daily to weekly. In addition, periodic brief family therapy sessions are delivered on an as-needed basis.

Next, individualized behavioral intervention plans are developed for each student via functional behavioral assessments, team planning in response to behavioral incidents, and review of behavioral progress monitoring data. Some behavior intervention plans include specific, individualized crisis intervention plans.

Finally, all students receive crisis intervention services as needed. All staff members in this therapeutic day school are trained in the Crisis Prevention Institute's model of Nonviolent Crisis Intervention, which includes both verbal and physical intervention skills.

### Participants

This study analyzes data that were generated by 11 children and adolescents who were diagnosed with a bipolar disorder by a mental health professional (e.g., psychiatrist, clinical psychologist) external to the therapeutic day school in which this study is being conducted. These 11 students are between 8 and 15 years old, and all speak English fluently. In terms of gender, 10 students are male, and 1 is female. Regarding racial/ethnic background, 9 students are White, 1 is Black, and 1 is Latino. A total of 10 students live with at least 1 biological parent (6 students live with both their biological mother and biological father, while 4 students live with their biological mothers only), and 1 student lives with a biological grandparent. Additional demographic information for students may be found in the appendix in Table A1.

### Procedures

Approval for this study was granted by the University of Iowa Institutional Review Board (study identification number 201007773). This study was granted "Exempt" status because it involves only the analysis of existing data that were collected by school personnel during standard educational and clinical practices, and all personally identifiable information was removed from these data as an initial step in the research process. Further, the principal investigator has routine access to all data as a result of his

professional roles of school psychologist and director of the school's crisis support team, because the program orientation of this school emphasizes the utility of differential diagnosis in the provision of school-based crisis intervention services. The organization to which this therapeutic day school belongs does not have an institutional review board, therefore the principal investigator requested and received a letter of support for this study written by the school's principal. Because this study was granted "Exempt" status, parental consent was not obtained for the use of existing data that were collected by school personnel during standard educational and clinical practices, as these data are not attached to any personally identifiable information. Also, a waiver of assent for minors was granted based on the justification that the principal investigator could not identify the minors in order to obtain assent, because the data used in this study are not attached to any personally identifiable information.

In the first stage of this study, all students (approximately 100 students total) who were enrolled in this therapeutic day school during the 2009-10 academic year (i.e., August 2009 through June 2010) were considered eligible for inclusion in this research study. The principal investigator reviewed school records and identified all students who satisfied the following two criteria: 1) had been diagnosed with a bipolar disorder by a mental health professional external to this setting; and 2) had been enrolled in this school for at least two consecutive, complete academic years, in order to explore performance over time. A total of 11 students met these two criteria. Program entry dates for these students ranged from the 03-04 academic year through the 07-08 academic year. It was decided that all relevant data generated by these students during their enrollment in this school would be analyzed for this study, therefore the amount of data available for each student varies depending on how long that student has attended this school. All available data from each student's entry date through June 2010 are included in analyses.

In this study, qualitative and quantitative data come from the following sources: the school's AIMSweb (i.e., curriculum-based measurement) database, the school's

behavioral database, special education files (including health files), and main office records. The principal investigator compiled the large data set for this study, as the principal investigator has routine access to all of the data analyzed in this study due to his dual professional roles as director of the school's crisis support team and school psychologist. It should be noted also that the principal investigator is bound by a confidentiality agreement as a condition of his employment within this school.

As an initial step, personally identifiable information was removed from the data, and data were categorized for storage by randomly assigning numbers to students (e.g., Student 1). Data were stored in an electronic format on a password protected flash drive. After all data were collected, the school's principal was asked to randomly re-assign numbers to students in order to add an additional layer of protection to ensure students' privacy. After this took place, the data were stored in password protected computer files on the principal investigator's school-assigned laptop computer, and deleted from the flash drive. The principal investigator is the only user of this laptop computer, which is stored in the principal investigator's office within the school in which this study takes place. Paper copies of the data were printed for the purpose of retaining a back-up copy of the data, and they were placed in a locked filing cabinet in the principal investigator's office. These paper copies of the data do not contain any personally identifiable information.

### *Data Collection*

Yin (2009) outlined the six sources of evidence most commonly used in case study research: documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts. This study relies primarily on two sources of evidence: documentation and archival records.

Yin (2009) also identified three principles of data collection in case study research: using multiple sources of information, creating a case study database, and

maintaining a chain of evidence. This study utilizes multiple sources of information. Data were collected from the school's AIMSweb (i.e., curriculum-based measurement) database, the school's behavioral database, special education files (including health files), and main office records. The specific types of data included within each source are described later in this chapter. As noted by Yin, the purpose of using multiple sources of information relates to the concept of triangulation, or striving for a convergence of data from multiple sources.

A case study database was created using a Microsoft Excel file to catalogue the substantial amount of data collected in this study. Before any data were entered into this database, all personally identifiable information was removed from the data, and the children and adolescents who generated the data were referred to only by numbers (e.g., Student 1) rather than names or initials. The first worksheet in this database contains demographic information about the students who generated the data. The second worksheet organizes all quantitative data that were gathered from the school's AIMSweb database. The third worksheet organizes all quantitative data that were collected from the school's behavioral database. The fourth worksheet organizes all data collected from main office records. The fifth worksheet organizes all data obtained from special education files (including health office files). For the second through fifth worksheets, coding procedures were utilized to assist in organizing the data. According to Meriam (2009): "Coding is nothing more than assigning some sort of shorthand designation to various aspects of your data so that you can easily retrieve specific pieces of the data," which may entail using "single words, letters, numbers, phrases, colors, or combinations of these" (p. 173). For purposes of this study, coding procedures involve single words, letters, numbers, and colors.

Finally, this study maintains a chain of evidence. Yin (2009) suggested that linear, bi-directional links should exist from the case study report, to the case study database, to citations for specific sources of evidence in the database, to the protocol of

the case study, to the study's questions. Yin described the reason for this: "The principle is to allow an external observer – in this situation, the reader of the case study – to follow the derivation of any evidence from initial research questions to ultimate case study conclusions" (p. 122). These procedures are followed in Chapter IV. It should be noted that the case study database serves an organizing role in following the chain of evidence.

### Instruments

#### *AIMSweb Database*

*AIMSweb Progress Monitoring and RTI System* is a commercially available, web-based program that utilizes curriculum-based measurement (CBM) principles and techniques to gather, analyze, and interpret data for the purposes of monitoring student progress and facilitating intervention planning. AIMSweb is closely aligned to the recent Response to Intervention (RTI) initiative in education (Shinn & Shinn, 2002a; Burns, Scholin, Kosciolik, & Livingston, 2010). AIMSweb is available in both academic and behavioral versions; however, only the academic version is utilized in this study, as it is the only version used in the setting in which this study takes place.

AIMSweb is designed for use with students in kindergarten through eighth grade (Shinn & Shinn, 2002a). According to the AIMSweb website ([www.aimsweb.com](http://www.aimsweb.com)), accessed on May 23, 2010, measures are currently available to assess skills in several areas within the domains of reading (including early literacy), mathematics, and writing (including spelling and written expression). For purposes of this study, only three types of skills are explored, as these are the only skills tracked via AIMSweb in the setting in which this study takes place: oral reading fluency, reading comprehension, and mathematics fluency. In this setting, AIMSweb data are available from the 2005-06 academic year through the end of this study period (i.e., June 2010).

Assessment within AIMSweb involves conducting benchmarking sessions, at grade level, three times per year (i.e., Fall, Winter, Spring) for all students. Students who



exhibit skill deficits during benchmarking sessions are then progress monitored on a more frequent basis, sometimes as frequently as weekly. (Only benchmarking data are analyzed for this study, as these data are available for every student.) Assessment involves standardized administration of brief paper-and-pencil “probes” to students either individually, in small groups, or in large groups. Probes are generally one to two pages in length. Students are given between one and four minutes (depending on the task) to generate as many correct responses as possible (Shinn, 2004; Shinn & Shinn, 2002a; Shinn & Shinn, 2002b).

To assess oral reading fluency, students are asked to read aloud for one minute from passages comprised of about 250 to 350 words, and scores are tracked in terms of both number of words read correctly and errors (Shinn & Shinn, 2002a). To assess reading comprehension, students are given three minutes to read silently passages that are between 150 and 400 words in length. Within each passage, the first sentence is complete, and then for every seventh word thereafter, a set of three words is presented in parentheses and students are asked to circle the one word that best fits the story. Of the three words, one word is the correct response, while the other two options are distracters. Scores are tracked in terms of both number of correct answers and errors (Shinn & Shinn, 2002b). For mathematics fluency, students are presented with two pages of rows of written computation problems and given two to four minutes to solve as many as possible (depending on the task). Scores are tracked according to number of correct digits in responses or number of correct digits in both responses and critical processes (Shinn, 2004).

CBM has been practiced within the field of education for more than twenty years, and “has a long history in the research literature with strong empirical support” (Shapiro, Keller, Lutz, Santoro, & Hintze, 2006, p. 19). Reliability and validity data published in AIMSweb manuals suggest that CBM measures in all three skill areas are both reliable and valid. Howe and Shinn (2002) reported reliability data on the AIMSweb standard

reading assessment passages. Across all standard reading assessment passages for first grade through eighth grade, alternate-form reliability correlations ranged from .80 to .90, suggesting excellent reliability. Among the three passages per grade level used for benchmarking, mean reliability correlations ranged from .79 to .92. Regarding oral reading fluency, Shinn and Shinn (2002a) summarized validity data from twenty-one studies on CBM measures of reading fluency. Validity correlations ranged from .26 to .91, but about half were equal to or greater than .75, suggesting technically adequate validity. Criterion measures used in these studies included commercially available basal readers (e.g., *Harcourt-Brace-Jovanovich Basal Reader*) and standardized academic achievement tests (e.g., *Iowa Test of Basic Skills*). The authors also summarized five reliability studies on CBM measures of reading fluency. Reliability correlations (primarily test-retest and parallel forms reliability) ranged from .82 to .99, suggesting technically adequate reliability. Shinn (2004) summarized information from five mathematics CBM studies. Reliability correlations ranged from .83-.91, and consisted of internal consistency, interscorer agreement, test-retest, parallel forms, and alternate forms reliability.

#### *Behavioral Database*

This therapeutic day school uses a Microsoft Access database to catalog behavioral data from each student's daily point sheet. For every student every day, data from five to eight behavioral categories are input into the database. Only two categories of data are common across all students: on task/work completion, and following instructions. Data that are input represent the percentage of daily points each student earned within each category.

In addition, data regarding each student's current standing on the school's level system are input into the database each day. Data concerning episodes of physical aggression are also entered into the database, as these events occur.

It is important to note that data for on task/work completion and following instructions behavior, as well as data regarding each student's standing on the school's level system, are available only from August 2007 through the end of this study period (i.e., June 2010). This is due to the fact that significant revisions occurred to both daily point sheets and the behavioral database in August 2007. However, data for aggressive behaviors are available from each student's start date through the completion of the study.

Reliability checks of the behavioral database occur several times per academic year and are led by the school's administrator. In addition, all staff members are trained annually in utilizing the point and level system, as well as in procedures for entering data into the school's behavioral database, which contributes to the reliability and validity of this system.

#### Main Office Records

Main office records are kept for each student in a locked cabinet in the school's main office, as well as on a computer (protected by user name and password) in the main office. Files contain information concerning each student's current lunch status (i.e., free/reduced/regular) and attendance history. This information was recorded from each student's file. Other information contained in these records is outside the scope of this study. It is important to note that attendance data are available from the 2005-06 academic year through the end of this study period (i.e., June 2010).

#### Special Education Files

Special education files are kept for each student in a locked cabinet in the school's main office, while each student's health files (which are part of each student's special education file) are kept in a locked cabinet in the school nurse's office. Files are generally substantial, and contain several documents and records relevant to this study. Typical special education files contain the following information: intake notes, IEPs, case

study evaluation reports (e.g., psychological, social/developmental, health), school report cards (both academic and behavioral), state standardized achievement test results, reports from external agencies (e.g., hospitals, independent evaluations), communication regarding re-integration into home schools, files from other schools attended (as available), and other relevant files. This information was recorded from each child and adolescent's file. Health files in particular contain information regarding prescribed medications (as appropriate) and hospitalizations (as appropriate). These data were recorded from each child and adolescent's file. Other information contained in these files is outside the scope of this study.

### Research Questions and Data Analyses

This study represents a preliminary, case study analysis that answers the primary research question: How does placement in a therapeutic day school as an educational intervention package affect the school functioning of children and adolescents with bipolar disorders over time? Three sub-questions help address this primary question, each of which consists of multiple components. It is important to note that these questions are derived from the purpose of this study, the literature review conducted for this study, and the conceptual framework that guided this study. Following is a list of these questions, along with the data analysis techniques that are used to answer each question.

- 1) How does placement in a therapeutic day school affect the academic functioning of children and adolescents with bipolar disorders over time?
  - a. How does reading performance change over time among children and adolescents with bipolar disorders?

*This question is answered using both descriptive statistics and a non-parametric statistical test calculated from quantitative data stored in the AIMSweb database for measures of reading fluency and reading*

*comprehension, and qualitative themes (using a case study format) gleaned from report cards, state standardized achievement test scores (as available), and IEP goals (as appropriate).*

- b. How does mathematics performance change over time among children and adolescents with bipolar disorders?

*This question is answered using both descriptive statistics and a non-parametric statistical test calculated from quantitative data stored in the AIMSweb database for measures of mathematics computation, and qualitative themes (using a case study format) gleaned from report cards, state standardized achievement test scores (as available), and IEP goals (as appropriate).*

- c. How does writing performance change over time among children and adolescents with bipolar disorders?

*This question is answered using qualitative themes (in a case study format) gleaned from report cards, state standardized achievement test scores (as available), and IEP goals (as appropriate).*

- d. How does science performance change over time among children and adolescents with bipolar disorders?

*This question is answered using qualitative themes (in a case study format) gleaned from report cards and state standardized achievement test scores (as available).*

- e. How does social studies performance change over time among children and adolescents with bipolar disorders?

*This question is answered using qualitative themes (in a case study format) gleaned from report cards.*

2) How does placement in a therapeutic day school affect the behavioral/social-emotional functioning of children and adolescents with bipolar disorders over time?

a. How does on task/work completion behavior change over time among children and adolescents with bipolar disorders?

*This question is answered using descriptive statistics calculated from quantitative data stored in the school's behavioral database, and qualitative themes (using a case study format) gleaned from IEP goals (as appropriate).*

b. How does compliant (i.e., following instructions) behavior change over time among children and adolescents with bipolar disorders?

*This question is answered using descriptive statistics calculated from quantitative data stored in the school's behavioral database, and qualitative themes (using a case study format) gleaned from IEP goals (as appropriate).*

c. How does physically aggressive behavior change over time among children and adolescents with bipolar disorders?

*This question is answered using descriptive statistics calculated from quantitative data stored in the school's behavioral database, and qualitative themes (using a case study format) gleaned from IEP goals (as appropriate).*

d. How does general social skills behavior change over time among children and adolescents with bipolar disorders?

*This question is answered using qualitative themes (in a case study format) gleaned from report cards and IEP goals (as appropriate).*

e. How does general coping skills behavior change over time among children and adolescents with bipolar disorders?

*This question is answered using qualitative themes (in a case study format) gleaned from report cards and IEP goals (as appropriate).*

- f. For those children and adolescents with bipolar disorders receiving medical management, how do medication adjustments and hospitalizations change over time?

*This question is answered using descriptive statistics calculated from quantitative data stored in health office files, as well as qualitative themes (in a case study format) gleaned from health office files.*

- g. How does school attendance change over time among children and adolescents with bipolar disorders?

*This question is answered using descriptive statistics calculated from quantitative data stored in main office files.*

- 3) How does placement in a therapeutic day school affect the immediate educational outcomes of children and adolescents with bipolar disorders over time?

- a. How does standing within the school's level system change over time among children and adolescents with bipolar disorders?

*This question is answered using descriptive statistics calculated from quantitative data stored in the school's behavioral database.*

- b. How successful are children and adolescents with bipolar disorders at achieving either partial or full re-integration into their home schools, including high school placement (as appropriate)?

*This question is answered using qualitative themes (in a case study format) gleaned from both IEPs and communication related to the re-integration process included in special education files (as appropriate).*

The primary research question for this study is answered by integrating the information ascertained while answering the research sub-questions, including the

various components of each question. As such, both within- and cross-case comparisons are utilized. Data analysis begins by exploring individual cases. Each individual case analysis begins by examining demographic characteristics and other background information for each child and adolescent who generated the data utilized in this study. Next, academic performance is explored in five areas: reading, mathematics, writing, science, and social studies. Third, behavioral/social-emotional functioning is investigated in seven areas: on task/work completion, following instructions (i.e., compliance), physical aggression, general social skills, general coping skills, hospitalizations and medication management, and attendance. Fourth, immediate educational outcomes are examined in two areas: standing within the school's level system, and achievement of either partial or full re-integration into a child or adolescent's home school. Finally, themes are identified for each individual case.

The next stage of data analysis involves cross-case comparisons. Data in each of the aforementioned areas are examined across all 11 cases, and cross-case themes are identified within each area. Additionally, Sign Tests are used to determine whether students' performance as a group improved in the areas of reading fluency, reading comprehension, and mathematics computation. The Sign Test is a non-parametric statistical procedure, based on binomial distribution, that is useful for testing the null hypothesis that there is no difference between two continuous distributions. In this study, it is used to test the hypothesis that if treatment has not had any effect, half of the students should show improvement over time on a measure, and half of the students should not show improvement over time. In this study, the Sign Test is used to analyze AIMSweb percentile rank data in the areas of reading fluency, reading comprehension, and mathematics computation. This procedure involves comparing the mean of a student's first three percentile ranks on a measure (e.g., reading fluency) to the mean of that student's last three percentile ranks on the same measure. The null hypothesis is rejected if the probability of observed successes is 0.05 or less.



The final stage of data analysis involves summarizing results, answering the research sub-questions posed in this study, and then answering the primary research question of this study.

### *Pattern Matching*

Yin (2009) indicated that it is important for “the predicted pattern of specified variables” to be “defined prior to data collection” for purposes of pattern matching, one important tactic that helps strengthen the internal validity of a case study (p. 137). Based on the purpose of this study and the literature review that was conducted for this study, following is a list of predicted patterns of variables.

Regarding academic functioning, it is predicted that all children and adolescents will demonstrate progress over time in all academic subjects studied (i.e., reading, mathematics, writing, science, and social studies), although the degree of progress will be highly variable among individual students. In addition, it is predicted that all children and adolescents will demonstrate fluctuations in academic performance over time, rather than linear progression.

Regarding behavioral/social-emotional functioning, it is predicted that all children and adolescents will demonstrate progress over time in on task/work completion, following instructions, and physically aggressive behaviors, as well as in general social and coping skills. However, it is predicted that the degree of progress will vary widely among students. Also, it is predicted that children and adolescents will demonstrate fluctuations in these behaviors over time, rather than linear improvements. Next, it is predicted that all children and adolescents receiving medical management will experience medication adjustments over time, and that hospitalizations will occur periodically for some students, but not all. Finally, it is predicted that variability in school attendance will occur among children and adolescents, and that for some, attendance will be impacted by hospitalizations, appointments with physicians, involvement with the legal

system (e.g., attending court appointments), and other types of excused absences related to medical or legal issues.

Regarding immediate educational outcomes, it is predicted that all children and adolescents will demonstrate a wide degree of variability in terms of their standing within the school's level system. Also, it is predicted that a small number of students - but not all - will demonstrate sustained consistency in adequate school performance to the point of achieving partial or full re-integration into their home schools.

Finally, to address the primary research question of this study, it is predicted that placement in a therapeutic day school as an educational intervention package for children and adolescents with bipolar disorders will be associated with some positive gains in both academic and behavioral functioning, as well as some gains in immediate educational outcomes. However, it is predicted that there will be great variability among students in the types of gains achieved and ability to sustain those gains consistently over time, due to the severity and complexity of bipolar disorders in children and adolescents.

#### *Reliability and Validity*

According to Yin (2009), case study researchers must be concerned with addressing construct validity, internal validity, external validity, and reliability in order to generate a high quality research design. Yin suggested that construct validity may be addressed during the data collection and composition phases of research, and appropriate tactics for establishing construct validity may include establishing a chain of evidence, using multiple sources of evidence, and soliciting assistance in reviewing draft case study reports by key informants. All three tactics are incorporated in this study as a means of addressing construct validity.

Next, Yin suggested that internal validity may be addressed during the data analysis phase of research via pattern matching, addressing rival explanations, using logic models, and conducting explanation building. Two of these tactics are utilized in this

study to address internal validity: pattern matching and addressing rival explanations. Hypotheses for pattern matching are discussed in a previous section of this chapter.

External validity may be addressed during the research design phase, and may involve using theory in single-case studies or replication logic in multiple-case studies (Yin, 2009). Because this study involves multiple cases, replication logic is addressed. Yin wrote that “each case must be carefully selected so that it either (a) predicts similar results (a *literal replication*) or (b) predicts contrasting results but for anticipatable reasons (a *theoretical replication*)” (p. 54). Because this study includes all children and adolescents enrolled within a therapeutic day school who have been diagnosed with a bipolar disorder and have attended this school for at least two academic years, it is believed that incorporating a relatively large sample size as well as studying students over an extended period of time will result in future studies that predict similar results (i.e., literal replication).

Finally, Yin suggested that reliability should be addressed during the data collection phase of research, and may involve development of a case study database and using a case study protocol. Both tactics are utilized within this study.

## CHAPTER IV

### RESULTS

#### Overview

This chapter begins by providing background information about the qualitative analyses utilized in this study. Next, demographic characteristics are summarized for the participants in this study. Third, individual case summaries are presented, organized in a manner that aligns with this study's research questions. Within case analysis follows each individual case summary. Cross case analyses are presented next. The next-to-last section of this chapter addresses this study's research questions. Finally, the hypotheses that were generated for this study are tested, along with rival explanations.

It is important to note that participants in this study are referred to only by numbers (e.g., Student 1), in order to protect their privacy. Further, the order in which cases are presented in this chapter was determined by random assignment, as described in the procedures section of this paper.

#### Background Information

Therapeutic day schools are specialized schools in which children and adolescents are typically placed in order to focus on ameliorating significant individual weaknesses, which often occur in multiple areas of functioning. Therefore, for the purpose of this qualitative analysis, each student's individual strengths and weaknesses will be identified, based on all available data, in the areas of academic and behavioral/social-emotional functioning. Academic and behavioral/social-emotional profiles will be generated based on qualitative analysis of the data, using the techniques of pattern matching (i.e., looking for trends within the data) and triangulation (i.e., seeking the convergence of data from multiple sources). As such, certain types of data will be assigned increased significance when exploring strengths and weaknesses. For academic functioning, the priority hierarchy will include: 1) diagnosed learning disorders (indicative of a relative

weakness); 2) presence of IEP goals (indicative of a relative weakness); 3) percentile ranks with at least three data points; 4) grades (performance in relation to a GPA of 3.00 will be explored); and 5) percentile ranks with fewer than three data points. For behavioral/social-emotional functioning, the priority hierarchy will include: 1) presence of IEP goals (indicative of a relative weakness); 2) daily percentages of points earned, when applicable (performance in relation to earning 90 percent of daily points on average will be explored); 3) number of quarters with no physically aggressive behavior, when applicable; and 4) grades, when applicable. Finally, rationales will be provided regarding how decisions were made. Successful outcomes will be determined on the basis of at least maintaining performance in those areas identified as strengths, and improving performance in those areas identified as weaknesses.

All students in this study received both academic and behavioral/social-emotional grades while enrolled in this therapeutic day school. For academics, Grade Point Averages (GPAs) were calculated in the following manner. On primary grade report cards, letter grades were not given at this school. In order to calculate “Primary GPA,” a grade of “Outstanding” was assigned 4 points, “Satisfactory” was assigned 3 points, “Showing Improvement” was assigned 2 points, and “Needs Improvement” was assigned 1 point. Failing grades were not given to primary-aged students, although a grade of “Incomplete” at the primary grade level was assigned 0 points. In Intermediate/Middle School classrooms (i.e, in order to calculate “Standard GPA”), As were assigned 4 points, Bs were assigned 3 points, Cs were assigned 2 points, Ds were assigned 1 point, and Fs were assigned 0 points. It was recognized as a limitation in this study that these scales did not align perfectly with one another.

Behavioral/social-emotional grades were also assigned for the areas of social skills and coping skills. At this school, academic social skills were considered to include: work habits, starts on time, stays on task, completes assignments, ignores distractions, accepts criticism by making corrections, stays in seat, obtains teacher attention

appropriately, and accepts work without any complaints. Peer social skills included: cooperation, initiates activities, joins activities, plays appropriately, and plays well in groups. Adult social skills were listed as: cooperation, accepts consequences, bus and field trip behavior, shares concerns, follows instructions, uses respectful voice tone and language, and accepts a “no” answer.

Lastly, at this school, coping skills were considered to include: expresses anger appropriately, manages anxiety effectively, manages sadness/disappointment well, and problem solving skills.

### Demographic Characteristics

Information regarding the demographic characteristics for the 11 participants included in this study is located in the appendix in Table A1.

### Individual Case Summaries and Within Case Analyses

#### *Case Summary for Student 1*

Student 1 is a twelve-year-old White male. He entered this school in May 2007 as a third grade student, and recently completed sixth grade. Student 1 was referred to this school after his family moved into a new school district. He had previously attended a different therapeutic day school, and had a history of aggressive and severe anxiety-related behaviors (including obsessive-compulsive behaviors). His strengths have been described as completing his work independently, participating in class discussions, and being well-liked by peers. Student 1’s weaknesses have been identified as difficulty coping with anxiety/stress, difficulty accepting adult decisions, and a tendency to provoke peers when feeling upset.

Currently, Student 1 lives with his biological mother, his mother’s male significant other, and two younger biological sisters. His biological father is deceased.

Student 1 is eligible to receive free lunch at school, based on his family's socio-economic status.

School records indicate that Student 1 achieved developmental milestones within normal limits. In 2005, he was diagnosed with Bipolar Disorder Not Otherwise Specified. He received this same diagnosis again in 2009. Student 1 has also been diagnosed with ODD and Obsessive Compulsive Disorder (OCD). According to school records, there is not a documented family history of mood disorders or other psychiatric disorders.

In 2005, Student 1 was administered the WISC-IV in order to assess his cognitive abilities. He achieved a FSIQ of 95 on this measure, which falls within what is typically considered the average range of functioning. Additionally, he achieved the following standard scores on WISC-IV indices: Verbal Comprehension 96, Perceptual Reasoning 104, Processing Speed 78, and Working Memory 104.

### Academic Functioning

#### Reading

Student 1's reading grades ranged from As to one grade in the C range. His annual Standard GPA ranged from 3.00 to 4.00.

Table 1. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07				A	4.00
2007-08	A	A	B	NR	3.67
2008-09	B+	B	B	B	3.00
2009-10	B-	C+	A-	B-	3.00

*Note.* INC = Incomplete, NR = Not Reported

Student 1’s special education file did not contain any reports regarding performance on the Illinois Standards Achievement Test (ISAT).

On AIMSweb measures, Student 1’s percentile ranks ranged from 38 to 60 in reading fluency, and 34 to 95 in reading comprehension. In general, percentile ranks between 25 and 75 are typically considered to fall within the average range of functioning. Percentile ranks below 25 are considered to fall within the below average range, and percentile ranks above 75 are considered to fall within the above average range.

Table 2. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07			38
2007-08	52	59	60
2008-09	62	58	54
2009-10	66	60	NR

*Note.* NR stands for “Not Reported.”

Table 3. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07			34
2007-08	59	81	95
2008-09	62	61	84
2009-10	69	78	NR

*Note.* NR stands for “Not Reported.”



Student 1 did not have an IEP goal for reading.

Overall, Student 1 seemed to exhibit a relative strength in reading. His AIMSweb percentile ranks all fell within what are typically considered the average to above average ranges of performance. In terms of grades, Student 1 received nearly all As and Bs in reading with the exception of one C, and maintained a GPA of at least 3.00 throughout his enrollment. His annual Standard GPA did decline somewhat over time, although it should be recognized that his initial annual Standard GPA of 4.00 was based on his performance during only one quarter. In general, it seemed that Student 1 sustained a relatively high level of performance in reading over time, based primarily on his AIMSweb data and the fact that his annual Standard GPA never fell below 3.00.

### Mathematics

In mathematics, Student 1's grades ranged from As to one grade in the C range. His annual Standard GPA ranged from 2.75 to 4.00.

Table 4. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07				A	4.00
2007-08	A-	A	B	NR	3.67
2008-09	B	B+	B-	C+	2.75
2009-10	B	B	A-	B	3.25

*Note.* INC = Incomplete, NR = Not Reported

Student 1's special education file did not contain any ISAT reports.

On AIMSweb measures of mathematics computation, Student 1's percentile ranks ranged from 19 to 90.

Table 5. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07			NR
2007-08	54	53	90
2008-09	75	76	23
2009-10	48	19	NR

*Note.* NR stands for “Not Reported.”

Student 1 did not have an IEP goal for mathematics.

In general, Student 1 seemed to exhibit a relative weakness in mathematics. His AIMSweb percentile ranks spanned what are typically considered the below average to above average ranges of performance. Student 1’s GPA dipped below 3.00 during the 08-09 academic year. Due to variability in his AIMSweb data and grades over time, data appeared to be mixed regarding whether he demonstrated improvement in this area.

### Writing

Student 1’s writing grades ranged from As to Bs. His annual Standard GPA ranged from 3.00 to 4.00.

Table 6. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07				A	4.00
2007-08	A	A-	B	NR	3.67
2008-09	B	B	B	B	3.00
2009-10	B-	A	A+	A+	3.75

*Note.* INC = Incomplete, NR = Not Reported

Student 1's special education file did not contain any ISAT reports.

Student 1 did not have an IEP goal for writing.

Based on these data, Student 1 seemed to demonstrate a relative strength in writing. He did not receive any grades lower than the B range, and his annual GPA did not dip below 3.00. Further, he seemed to sustain a high level of performance over time, receiving his second-highest annual Standard GPA during the last year of data collection for this study, while his highest annual Standard GPA was based on his performance during only one quarter.

### Science

In the area of science, Student 1's grades ranged from As to one grade in the C range. His annual Standard GPA ranged from 2.75 to 4.00.

Table 7. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07				A	4.00
2007-08	A	A	B+	NR	3.67
2008-09	A	B	A	A-	3.75
2009-10	B-	B	C-	B	2.75

*Note.* INC = Incomplete, NR = Not Reported

Student 1's special education file did not contain any ISAT reports.

Based on the fact that Student 1's annual GPA dipped below 3.00 for a year, science was categorized as an area of relative weakness. Results seemed mixed as to whether his performance improved over time, as his initial GPA was based on only one quarter's performance, and his annual GPA was somewhat variable afterward.

### Social Studies

Student 1's grades in social studies ranged As to Bs, and his annual Standard GPA ranged from 3.25 to 4.00 over the course of his enrollment.

Table 8. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07				A	4.00
2007-08	A	A	A	NR	4.00
2008-09	A-	A	B	B-	3.50
2009-10	B-	B	A	B	3.25

*Note.* INC = Incomplete, NR = Not Reported

Overall, Student 1 received only As and Bs in social studies, and his annual Standard GPA did not fall below 3.25. Therefore, this seemed to be an area of relative strength for him. Further, he seemed to demonstrate a sustained high level of performance over time, as he earned at least one A during every year of his enrollment in this school, and his annual Standard GPA was at least 3.25 every year.

### Summary of Academic Functioning

Generally, Student 1 earned good grades, as he did not receive more than one grade in the C range in any academic subject. Further, he did not have an IEP goal in any academic area. Variability in his performance over time was noted, and seemed to be most pronounced in mathematics, where his AIMSweb scores spanned what are typically considered the below average to above average ranges of performance. Based on all data presented in this section, Student 1 seemed to demonstrate less variable performance on measures that assessed his skills over a longer period of time (i.e., grades) than more brief

measures (i.e., AIMSweb). This type of pattern of variability in day-to-day performance may indicate the presence of rapid cycling of moods, a common occurrence in children and adolescents with bipolar disorders.

Student 1's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 1 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 1. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Unclear (mixed results)
Science	Unclear (mixed results)

### Behavioral/Social-emotional Functioning

#### On Task/Work Completion

In the area of on task/work completion behavior, Student 1 earned between 74.5 and 100 percent of his daily points on average on a quarterly basis (see Table 9). Standard deviations ranged from 0.00 to 31.6. On an annual basis, he earned between 82.2 and 95.5 percent of his daily points on average.

Finally, Student 1 did not have an IEP goal for on task behavior.

Table 9. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	100 (0.00)	100 (0.00)	83.3 (25.4)	92.1 (9.76)	95.5 (12.2)
2008-09	88.4 (11.7)	86.3 (24.2)	74.6 (31.6)	78.7 (26.1)	82.2 (24.4)
2009-10	93.9 (10.3)	89.2 (15.3)	74.5 (26.5)	86.1 (14.9)	86.0 (18.9)

*Note.* Data reported are means (standard deviations in parentheses).

In summary, Student 1 exhibited a great deal of variability in his daily functioning in the area of on task/work completion behavior, as standard deviations associated with his annual percentages of daily points earned on average ranged from 12.2 to 24.4, and some quarterly standard deviations were greater than 25. However, based on the fact that he earned at least 90 percent of his daily points on average during 4 of 12 quarters, and between 85 and 90 percent of his points during an additional 4 of 12 quarters, and did not have an IEP goal in this area, this seemed to be an area of relative strength. Due to such variability in his performance, results appeared to be mixed as to whether he sustained a high level of performance over time in this area.

#### Following Instructions/Compliance

Quarterly, Student 1 earned between 67.8 and 100 percent of his daily points on average for following instructions behavior (see Table 10). Standard deviations ranged from 0.00 to 32.8. Annually, he earned between 81.2 and 92.8 percent of his daily points on average.

Student 1 did not have an IEP goal for following instructions behavior.

In the area of following instructions behavior, Student 1's pattern of performance was similar to that of his pattern in on task/work completion behavior. Based on a similar rationale to that presented for on task/work completion behavior (i.e., he earned at

least 90 percent of his daily points on average during 4 of 12 quarters, and between 85 and 90 percent of his points during an additional 3 of 12 quarters, and did not have an IEP goal in this area), this seemed to be an area of relative strength. Further, results appeared to be mixed as to whether he sustained a high level of performance over time, due to the amount of variability present in his performance.

Table 10. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	98.9 (7.54)	100 (0.00)	78.3 (28.1)	86.2 (11.9)	92.8 (15.1)
2008-09	94.2 (6.98)	85.6 (25.2)	67.8 (32.8)	74.9 (26.9)	81.2 (26.1)
2009-10	92.4 (11.7)	86.2 (16.0)	73.6 (26.1)	79.2 (18.6)	83.0 (19.9)

*Note.* Data reported are means (standard deviations in parentheses).

### Physical Aggression

Student 1 was physically aggressive toward others (e.g., pushing, kicking) between 0 and 8 times per year, for a mean of 2.75 (standard deviation: 3.77) aggressive acts per year (see Table 11). His pattern of aggression may be described as an initial period of no aggression that lasted for about two years, followed by a spike in aggression that occurred over about two quarters, and then a significant reduction in aggression afterward.

Student 1 did not have an IEP goal for physically aggressive behavior.

Based on these data, Student 1 seemed to exhibit a relative strength in refraining from physical aggression. He was not aggressive at all during 8 of 13 quarters, and not aggressive more than once during 11 of 13 quarters. However, these data do not support his sustaining a high level of performance in this area, as he was aggressive more frequently during his final six quarters of attendance than his first seven quarters.

Table 11. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2006-07				0	0
2007-08	0	0	0	0	0
2008-09	0	0	2	6	8
2009-10	0	1	1	1	3

### Social Skills

Table 12 summarizes Student 1's grades in the areas of academic-, peer-, and adult-oriented social skills.

Student 1 had IEP goals for accepting adult decisions (1/09 – 6/09), accepting adult feedback (11/09 – 6/10), and positive peer relations (6/07 – 11/07, 1/09 – 6/10). He met 100 percent of quarterly benchmark targets for all three goals.

Overall, Student 1's academic-, peer-, and adult-oriented social skills grades seemed generally lower during his last two years of enrollment versus his first two years. He went from receiving predominantly "Good/Satisfactory" and "Excellent/Outstanding" grades during his first two years of attendance to receiving primarily "Showing Improvement" and "Needs Improvement" grades during his last two years of attendance. No clear patterns were evident within these three specific areas of social skills.

Based on these data, and the presence of multiple IEP goals in this area (which suggest it had been identified previously as an area of relative weakness), social skills seemed to be an area of relative weakness for Student 1. However, results seemed to be mixed as to whether he demonstrated improvement over time, because although his grades appeared to decline, he met 100 percent of his quarterly benchmarks for all three IEP goals.



Table 12. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07				
Academic	0	100	--	0
Peer	0	100	--	0
Adult	0	100	--	0
2007-08				
Academic	67	7	--	26
Peer	7	33	--	60
Adult	33	33	--	33
2008-09				
Academic	0	11	50	39
Peer	0	0	20	80
Adult	0	4	21	75
2009-10				
Academic	0	31	19	50
Peer	5	0	95	0
Adult	0	14	18	68

*Note.* The category Showing Improvement was added in August 2008.

### Coping Skills

Table 13 summarizes Student 1's grades in the area of coping skills.

Student 1 had an IEP goal for "coping skills" from 6/07 to 6/10. He met 100 percent of quarterly benchmark targets for this goal.

Table 13. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07	0	100	--	0
2007-08	0	58	--	42
2008-09	0	0	0	100
2009-10	0	0	0	100

*Note.* The category Showing Improvement was added in August 2008.

Overall, Student 1's coping skills grades reflected a similar pattern to that of his social skills grades. During his first two years of attendance, he received primarily "Good/Satisfactory" grades, while during his last two years of attendance, his grades were all "Needs Improvement." Based on these data, including the presence of an IEP goal for coping skills (which suggests this area had been identified previously as a relative weakness), this seemed to be an area of relative weakness for Student 1. However, results seemed mixed as to whether improvement occurred over time, as Student 1 was able to meet 100 percent of his IEP benchmarks.

#### Medical Management

At the time he was enrolled in this school, Student 1 was prescribed only Risperdal. Since then, he has experienced 19 medication changes or dosage adjustments, for a mean of 4.75 (standard deviation: 3.50) per year (see Table 14). His medication regimen at the conclusion of the data collection period for this study consisted of Geodon, Cogentin, Inderal, Lamictal, and Melatonin. In all, he has taken 15 different psychotropic medications since entering this program: Geodon, Cogentin, Inderal, Lamictal, Melatonin, Risperdal, Klonopin, Lexapro, Zoloft, Celexa, Depakote, Anafranil,

Ativan, Concerta, and Luvox. No medication compliance issues were noted in his special education file.

Student 1 underwent 1 psychiatric hospitalization prior to enrolling in this program. Since then, he has undergone 6 additional psychiatric hospitalizations: February 2008, January 2009, February 2009, July 2009, January 2010, and March 2010.

### School Attendance

Student 1 missed 5.25 (standard deviation: 9.18) days per year on average since enrolling in this school. His annual absence totals ranged from 0 to 19 (see Table 15). He missed no more than one day every year except the 09-10 academic year, when he missed 19 days. Based on the dates of his psychiatric hospitalizations, it seems likely that Student 1 missed so many days of school during the 09-10 academic year because he was hospitalized. Student 1 did not have any unexcused absences.

### Summary of Behavioral/Social-emotional Functioning

Student 1's behavioral/social-emotional functioning seemed to be characterized by a tremendous amount of variability in day-to-day functioning, as indicated by large standard deviations associated with percentages of daily points earned on average. On an annual basis, standard deviations ranged from 12.2 to 24.4 for on task/work completion behavior, and 15.1 to 26.1 for following instructions behavior. This type of variability may reflect the presence of rapid cycling of moods.

One clear pattern that seemed to emerge upon examining Student 1's profile was the apparent interrelatedness of all of the categories included in this profile. During the 06-07 and 07-08 academic years, he earned his highest percentages of daily points for on task/work completion and following instructions behaviors (data available for 07-08 only), was not physically aggressive, earned his highest grades for social and coping skills on average, missed relatively few days of school, had relatively few medication changes or dosage adjustments, and underwent only one psychiatric hospitalization.

Table 14. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	Bipolar Disorder Not Otherwise Specified (2005), OCD, ODD (dates unknown)	Risperdal (at entry)
2006-07		Lexapro (A) (6/07)
2007-08		Lexapro (D), Risperdal (DC) (8/07) Risperdal (DC) (10/07) Risperdal (DC), Zoloft (A) (3/08)
2008-09	Bipolar Disorder Not Otherwise Specified (3/09)	Celexa (A), Zoloft (D), Risperdal (D), Depakote (A) (1/09) Celexa (DC), Depakote (DC) (2/09) Celexa (D), Depakote (DC), Klonopin (A) (3/09) Anafranil (A), Depakote (DC), Klonopin (D) (4/09) Depakote (DC) (4/09) Concerta (A) (4/09) Anafranil (D), Concerta (D) (4/09) Depakote (D), Geodon (A) (5/09) Anafranil (A), Cogentin (A) (6/09)
2009-10		Geodon (DC), Anafranil (DC) (8/09) Anafranil (DC), Ativan (A) (11/09) Anafranil (DC) (1/10)

Table 14. Continued

Anafranil (D), Ativan (D), Luvox (A) (1/10)

Luvox (DC) (2/10)

Inderal (A), Lamictal (A), Luvox (D)

Melatonin (A) (3/10)

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*Note.* A = Added, D = Discontinued, DC = Dosage Change

Table 15. School Attendance (Number of Absences).

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Year	Excused	Unexcused	Total
2006-07	1	0	1
2007-08	1	0	1
2008-09	0	0	0
2009-10	19	0	19

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*Note.* Reported reasons for absences were not tracked.

However, during the 08-09 and 09-10 academic years, he earned fewer points on average for on task/work completion and following instructions behaviors, was more physically aggressive, received lower grades on average for social and coping skills, missed more days of school, had a higher number of medication changes or dosage adjustments, and underwent five psychiatric hospitalizations. It should be noted that Student 1 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005), but always took these medications in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Student 1's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were

assigned in relation to whether Student 1 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 2. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
On Task/Work Completion	Unclear (mixed results)
Following Instructions	Unclear (mixed results)
Physical Aggression	No
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Social Skills	Unclear (mixed results)
Coping Skills	Unclear (mixed results)

### Immediate Educational Outcomes

#### Level System Standing

Student 1's level system standing ranged from Levels 1 to 4 over the years in which data were available for this study (see Table 16). Each year, his level status spanned at least three levels. It should be noted that the final year of data collection was the only year Student 1 did not achieve Level 4 status at some point. Also, during this same year, he spent time on Level 1 (the lowest level) in all four quarters, which was the only time this occurred.

#### Re-integration

Student 1 achieved partial re-integration into his home school (the number of class periods was not listed in his special education file) mid-year during the 07-08

school year. However, this mainstreaming was discontinued in 3/08 following a psychiatric hospitalization that occurred after a period of generally declining behavioral performance. He did not achieve re-integration again prior to the end of this study period.

Table 16. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	3,4	3,4	1,2,3	1,2	1-4
2008-09	1,2,3	2,3,4	1,2	1	1-4
2009-10	1,2,3	1	1	1	1-3

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

#### Within Case Analysis for Student 1

Overall, results seemed to indicate that placement in a therapeutic day school was an effective intervention for Student 1, until the time his re-integration was discontinued. Around the time this occurred, he began exhibiting deterioration in functioning in most areas. He was not able to fully recover by the end of this study. A relationship seemed to exist between the removal of some of the supports and structure provided by this therapeutic day school, and Student 1 exhibiting increased difficulty performing at a high level across domains of functioning. As a result, data from this study indicated that he sustained or improved his performance within all areas of academic strength, but not within areas of behavioral/social-emotional strength, where data were more mixed. Regarding academic and behavioral/social-emotional weaknesses, results were mixed as to whether he demonstrated improvement in performance within these areas.

Another striking feature of Student 1's profile was the apparent presence of variability in daily functioning, as indicated by AIMSweb scores and percentages of daily

points earned (and in particular associated standard deviations) for on task/work completion and following instructions behaviors. It is known that Student 1 was diagnosed with Bipolar Disorder Not Otherwise Specified, therefore it is hypothesized that this variability may have been associated with the occurrence of rapid cycling of moods.

Finally, it is important to note that Student 1 required a considerable amount of ongoing medical management of his psychiatric symptoms while enrolled in this school. He tried 15 different psychotropic medications during the course of his enrollment, and experienced 4.75 medication changes or dosage adjustments on average per year. Further, Student 1 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005). However, he always took these medications in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines. Student 1 underwent six psychiatric hospitalizations while attending this school. While the exact nature of the impact frequent psychiatric hospitalizations, frequent medication changes, and both stimulant and SSRI medication had on his educational performance is unknown, it seems reasonable to expect some variability in his overall functioning. Therefore, it seems likely that frequent medical management may have played a role in generating some of the mixed data reported in this study, and therefore may have muddied the effects of placement in a therapeutic day school as an educational intervention package for Student 1.

#### Case Summary for Student 2

Student 2 is an eight-year-old White female who recently completed third grade. She has attended this school since January 2008, when she was in first grade. Student 2 was referred to this school after displaying aggressive, impulsive, disruptive, and oppositional behaviors at her previous school that resulted in her spending a lot of time removed from her classroom. Student 2's previous teachers and therapists described her



strengths as being creative, loving and compassionate, and an active participant in class discussions. Her weaknesses were identified as difficulty completing work, coping with negative emotions, and accepting adult decisions.

Student 2 currently lives with her biological mother, biological father, and older half-sister. Based on her family's socio-economic status, she pays the standard (i.e., full) price for school lunch.

School records indicate no issues with achieving developmental milestones within normal limits. In 2007, Student 2 was diagnosed with "Bipolar Disorder." Her other psychiatric diagnoses include ADHD and ODD. There is not a documented family history of mood disorders or other psychiatric disorders.

Finally, it should be noted that Student 2 has never undergone cognitive testing, therefore no IQ scores are available. A previous psychological evaluation indicated that her cognitive abilities were not under question, therefore no testing was completed.

### Academic Functioning

#### Reading

Student 2 received all "Satisfactory" grades in reading, and her annual Primary GPA was 3.00 each year (see Table 17).

Due to her age, there were no ISAT performance reports in Student 2's special education file.

Student 2's AIMSweb percentile ranks ranged from 19-54 in reading fluency, and 16-44 in reading comprehension (see Tables 18 and 19).

Student 2 did not have an IEP goal for reading.

In summary, Student 2 seemed to exhibit a relative strength in reading. She achieved an annual GPA of 3.00 during every year she was enrolled in this school, indicating a sustained high level of performance over time. Her AIMSweb scores were variable over time, ranging from what are typically considered the below average to

average ranges of performance. Her lowest percentile rank was 19 in reading fluency, and 16 in reading comprehension.

Table 17. Reading Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			S	S	3.00
2008-09	S-	S-	S-	S-	3.00
2009-10	S+	S	S	S-	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 18. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		22	54
2008-09	30	19	34
2009-10	27	22	38

*Note.* NR stands for “Not Reported.”

Table 19. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		16	23
2008-09	41	28	34
2009-10	24	22	44

*Note.* NR stands for “Not Reported.”

Mathematics

In mathematics, Student 2's grades ranged from "Satisfactory" to "Needs Improvement," and her annual Primary GPA ranged from 2.00 to 3.00.

Table 20. Mathematics Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			S-	NI+	2.00
2008-09	S-	NI	SI	S-	2.25
2009-10	S	S-	S-	S-	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Due to her age, Student 2 had not taken the ISAT.

On AIMSweb measures of mathematics computation, Student 2 achieved percentile ranks that ranged from 1 to 37.

Table 21. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		28	37
2008-09	19	1	11
2009-10	3	10	6

*Note.* NR stands for "Not Reported."

Student 2 did not have an IEP goal for mathematics.

In summary, Student 2's AIMSweb percentile ranks spanned what are typically considered the below average to average ranges of performance, with her lowest

percentile rank falling at the 1<sup>st</sup> percentile. Student 2's annual GPA fell below 3.00 during her first two years of enrollment, although she demonstrated some improvement by achieving a 3.00 GPA during the final year of data collection for this study. Based on these data, mathematics seemed to be an area of relative weakness for Student 2.

### Writing

Student 2 received only grades of "Satisfactory" in writing during the course of her enrollment. Her annual Primary GPA was 3.00 every year.

Due to her age, Student 2 had not taken the ISAT, and she did not have an IEP goal in writing.

Based on these data, writing was identified as an area of relative strength for Student 2, as she sustained a 3.00 GPA over time.

Table 22. Writing Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			S	S	3.00
2008-09	S	S-	S-	S-	3.00
2009-10	S	S-	S	S-	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

### Science

In science, Student 2 received only grades of "Satisfactory." Every year, her annual Primary GPA was 3.00.

Due to her age, Student 2 had not taken the ISAT.

Based on these data, science was identified as a relative strength for Student 2, as she sustained a 3.00 GPA over time.

Table 23. Science Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			S	S	3.00
2008-09	S+	S	S+	S	3.00
2009-10	S	S	S	S-	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

### Social Studies

Student 2 received all “Satisfactory” grades in social studies. Her annual Primary GPA was 3.00 every year.

Table 24. Social Studies Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			S	S	3.00
2008-09	S+	S	S	S	3.00
2009-10	N/A	S	S	N/A	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Based on these data, Student 2 seemed to demonstrate a relative strength in social studies, as she maintained a 3.00 GPA over time.

### Summary of Academic Functioning

In general, Student 2’s academic profile is characterized by relative strengths in reading, writing, science, and social studies, and a relative weakness in mathematics. She received only grades of “Satisfactory” in reading, writing, science, and social studies

since she began attending this school. Her grades in mathematics were initially lower, but improved over time to reach this same level of “Satisfactory” performance during 09-10.

Figure 3. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Yes

On AIMSweb measures, Student 2 exhibited variability in performance over time. For measures of reading fluency, reading comprehension, and mathematics computation, her resulting percentile ranks spanned what are typically considered the below average to average ranges of performance. However, her scores on the two reading measures were generally higher than her scores on the mathematics measure. This variability in functioning seemed to be reflected more on brief assessments (i.e., AIMSweb probes) than assessments that sampled performance over a longer period of time (i.e., grades). This type of pattern suggests the presence of variability in daily functioning that could indicate rapid cycling of moods, which is a common occurrence in bipolar disorders among children and adolescents.

Figure 3 outlines Student 2’s academic strengths and weaknesses profile. Based on all of the data and rationales presented in this section, qualitative ratings were

assigned in relation to whether Student 2 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

### Behavioral/Social-emotional Functioning

#### On Task/Work Completion

Quarterly, Student 2's percentage of daily points earned for on task/work completion behavior ranged from 56.3 to 90.9. Standard deviations ranged from 9.54 to 29.3. Annually, her percentage of daily points earned ranged from 63.8 to 85.8, with standard deviations ranging from 12.1 to 24.3. Interestingly, on an annual basis, Student 2's percentages of daily points decreased in a linear manner.

Table 25. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08		78.3 (13.9)	90.9 (9.54)	81.9 (12.0)	85.8 (12.1)
2008-09	85.5 (12.4)	74.6 (19.2)	79.8 (14.1)	72.7 (23.0)	78.2 (18.1)
2009-10	75.6 (18.5)	57.2 (23.3)	64.7 (21.3)	56.3 (29.3)	63.8 (24.3)

*Note.* Data reported are means (standard deviations in parentheses).

Student 2 had an IEP goal for on task behavior from 6/08 to 4/09. She met 100 percent of her quarterly benchmark targets for this goal. Student 2 had an IEP goal for work completion from 6/09 to 6/10. She met 0 percent of her quarterly benchmark targets, failing in 6/09, 11/09, 1/10, and 6/10 (progress in 4/10 was not reported).

In general, based primarily on the presence of two IEP goals, on task/work completion behavior seemed to be an area of relative weakness for Student 2. She

appeared to exhibit declining performance over time in this area, as measured by her annual percentages of daily points earned on average. While she demonstrated improvement over time on her IEP goal for on task behavior meeting all benchmarks, she did not meet any benchmarks for her work completion IEP goal, and therefore did not demonstrate improvement. Thus, results seemed mixed as to whether she improved over time in this area.

Following Instructions/Compliance

Quarterly, Student 2 earned between 54.9 and 91.0 of her daily points on average for following instructions behavior. Standard deviations ranged from 10.4 to 29.4. Annually, she earned 66.0 to 88.0 of her daily points on average, with standard deviations ranging from 12.0 to 25.2. Overall, Student 2's annual percentages of daily points earned on average decreased in a linear manner.

Table 26. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08		76.7 (15.0)	91.0 (10.4)	87.2 (11.7)	88.0 (12.0)
2008-09	86.5 (11.9)	71.1 (16.5)	88.4 (11.6)	75.8 (22.6)	80.7 (17.6)
2009-10	81.0 (17.5)	60.4 (24.5)	66.3 (21.5)	54.9 (29.4)	66.0 (25.2)

*Note.* Data reported are means (standard deviations in parentheses).

Student 2 had an IEP goal for following instructions behavior from 6/08 to 4/09. She met 75 percent of her quarterly benchmark targets for this goal, failing only in 1/09.

Based on these data, following instructions behavior seemed to be an area of relative weakness. Student 2's pattern of performance in following instructions behavior appears similar to her pattern for on task/work completion behavior, which suggests a



decline in performance over time. However, because she met 75 percent of quarterly benchmarks for her IEP goal, the data seemed mixed as to whether there was any improvement over time.

### Physical Aggression

Student 2 was physically aggressive toward others (e.g., kicking, pushing, punching, head-butting) between 0 and 43 times per year. Her annual mean number of aggressive acts was 16.7 (standard deviation: 22.9). Student 2's pattern of aggression may be described as an initial period of about two years with relatively low levels of aggression, followed by a significant spike in aggression that occurred during the 09-10 academic year.

Student 2 did not have an IEP goal for physically aggressive behavior.

Table 27. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08		2	0	0	2
2008-09	0	3	0	2	5
2009-10	1	8	12	22	43

Overall, similar to her patterns of behavior in the areas of on task/work completion and following instructions, Student 2 seemed to demonstrate declining performance over time in this area. There was a noticeable spike in aggressive behaviors during the 09-10 academic year. Even though she did not have an IEP goal in this area, based on the occurrence of such a high number of aggressive episodes during the 09-10

school year, this seemed to be an area of relative weakness. Because there were no data available to the contrary, it seemed that no improvement occurred over time in this area.

### Social Skills

Student 2's social skills behaviors are reflected in Table 28, which summarizes her grades in the areas of academic-, peer-, and adult-oriented social skills.

Student 2 had an IEP goal for accepting adult decisions from 6/09 to 6/10. She met 25 percent of her quarterly benchmark targets, failing in 6/09, 1/10, and 6/10 (progress in 4/10 was not reported).

Table 28. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08				
Academic	0	11	--	89
Peer	0	100	--	0
Adult	0	50	--	50
2008-09				
Academic	0	14	14	72
Peer	0	10	85	5
Adult	7	18	29	46
2009-10				
Academic	0	8	17	75
Peer	0	100	0	0
Adult	0	39	4	57

*Note.* The category Showing Improvement was added in August 2008.

Overall, Student 2's academic-oriented social skills performance remained fairly steady over time, fluctuating between 8 and 14 percent "Good/Satisfactory" grades and 72 and 89 percent "Needs Improvement" grades. Her peer-oriented social skills performance was much better as she earned 100 percent "Good/Satisfactory" grades during both the 07-08 and 09-10 academic years.

Student 2's adult-oriented social skills grades fluctuated between 18 and 50 percent "Good/Satisfactory," and 46 to 57 percent "Needs Improvement." In general, results were mixed as to whether any improvement occurred over time. Even on her IEP goal, she met benchmarks during only 25 percent of quarters. Based on these data, Student 2's peer-oriented social skills seemed to be an area of relative strength, while her academic- and adult-oriented social skills were identified as areas of relative weakness.

### Coping Skills

The following table summarizes Student 2's grades in the area of coping skills.

Table 29. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08	0	0	--	100
2008-09	0	0	38	63
2009-10	0	0	6	94

*Note.* The category Showing Improvement was added in August 2008.

Student 2 had an IEP goal for "coping skills" from 6/08 to 6/10. She met 75 percent of her quarterly benchmark targets for this goal, failing in 1/10 and 6/10 (progress in 4/10 was not reported).

Overall, Student 2's coping skills grades ranged from "Showing Improvement" to "Needs Improvement." She did not earn any grades of "Excellent/Outstanding" or "Good/Satisfactory." Each year, the majority of her grades fell into the "Needs Improvement" category. However, results seemed mixed as to whether any improvement occurred over time, as she did meet 75 percent of quarterly benchmarks for her IEP goal in the area of coping skills. Based on these data, coping skills seemed to be an area of relative weakness for Student 2.

### Medical Management

When she enrolled in this school, Student 2's medication regimen consisted of only Risperdal. Since then, she has experienced 21 medication changes or dosage adjustments, for a mean of 7.00 (standard deviation: 6.08) per year (see Table 30). At the conclusion of this study period, Student 2 was prescribed Risperdal, Prozac, and Strattera. In total, she has taken the following 10 medications since entering this program: Prozac, Risperdal, Strattera, Intuniv, Abilify, Lithium, Vyvanse, Concerta, Adderall, and Ritalin. No medication compliance issues were noted in her special education file.

Finally, Student 2 has never undergone psychiatric hospitalization.

### School Attendance

Student 2 missed 1.67 (standard deviation: 2.08) days per year on average since enrolling in this school. Her annual absence totals ranged from 0 to 4. She had no unexcused absences (see Table 31).

### Summary of Behavioral/Social-emotional Functioning

After analyzing all available data, Student 2's behavioral/social-emotional relative strength seemed to be peer-oriented social skills. Her relative weaknesses seemed to be on task/work completion and following instructions behaviors, physical aggression, academic- and adult-oriented social skills, and coping skills.

Table 30. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Disorder” (2007), ADHD, ODD (dates unknown)	Risperdal (at entry)
2007-08		Adderall (A) (3/08) Risperdal (D), Adderall (D), Abilify (A), Concerta (A) (4/08) Concerta (D), Ritalin (A) (6/08)
2008-09		Ritalin (D) (8/08) Vyvanse (A) (9/08) Abilify (D), Lithium (A) (4/09)
2009-10		Lithium (D), Vyvanse (D), Abilify (A), Prozac (A) (8/09) Abilify (DC), Prozac (DC) (1/10) Prozac (D), Intuniv (A) (2/10) Intuniv (DC) (2/10) Intuniv (DC) (3/10) Intuniv (DC), Abilify (DC) (3/10) Intuniv (DC), Abilify (D) (3/10) Intuniv (DC), Prozac (A) (4/10) Prozac (DC) (4/10) Intuniv (DC), Risperdal (A) (4/10) Risperdal (DC) (4/10)

Table 30. Continued

Strattera (A), Intuniv (D) (5/10)

Strattera (DC) (5/10)

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*Note.* A = Added, D = Discontinued, DC = Dosage Change

Table 31. School Attendance (Number of Absences).

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Year	Excused	Unexcused	Total
2007-08	1	0	1
2008-09	0	0	0
2009-10	4	0	4

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*Note.* Reported reasons for absences were not tracked.

Since she began attending this school, Student 2 exhibited a decline in performance in the areas of on task/work completion and following instructions behavior, as well as an increase in physical aggression. This matter will be discussed in Student 2's case summary. Variability in daily functioning was also evident in large standard deviations (i.e., > 10) associated with her percentages of daily points earned for on task/work completion and following instructions behaviors. Such a pattern of variability may reflect the presence of rapid cycling of moods. It is important to note that Student 2 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005). Further, between 3/10 and 4/10, she took these medications without an accompanying mood stabilizer and/or atypical antipsychotic, in discordance with published guidelines for treating children and adolescents with bipolar disorders (i.e., Kowatch et al., 2005).

Student 2's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 2 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 4. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Social Skills (peer)	Unclear (mixed results)
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Unclear (mixed results)
Following Instructions	Unclear (mixed results)
Physical Aggression	No
Social Skills (academic, adult)	Unclear (mixed results)
Coping Skills	Unclear (mixed results)

#### Immediate Educational Outcomes

##### Level System Standing

Student 2's level system standing ranged from Levels 1 to 4 over the course of her enrollment in this school. Each year, her level status spanned two to four levels. It should be noted that the highest level she achieved each year declined by one level over the course of her enrollment.

Table 32. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08		1	1,2,3	2,3,4	1-4
2008-09	2,3	1,2	1,2	1	1-3
2009-10	1,2	1,2	1	1	1-2

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

At the conclusion of this study, Student 2 had not achieved any form of re-integration into her home school.

### Within Case Analysis for Student 2

At this time, it does not seem one can claim that placement in a therapeutic day school was an effective intervention for Student 2. While she sustained a high level of academic performance in general, she continued to exhibit the behaviors for which she was referred to this school, including physical aggression. It is very concerning that over the course of her enrollment, she demonstrated what appeared to be declining performance in the areas of on task/work completion and following instructions behavior, as well as increasing physical aggression. However, because of her young age and relatively short length of placement in this school (compared to some other participants in this study), it is unclear at this time whether this apparent decline truly reflects placement in this school having a negative impact on her performance, or whether this apparent worsening of symptoms is merely an early step in a process that will ultimately lead to positive outcomes (i.e., a “things must get worse before they can get better” type of pattern). Other students in this study exhibited such a pattern, although there was variability among students in the amount of time it took for this process to unfold.



Student 2 also exhibited noticeable variability in her daily performance, evidenced by AIMSweb percentile ranks that spanned more than one range of performance, and large (i.e., > 10) standard deviations that were associated with quarterly percentages of daily points earned on average for on task/work completion and following instructions behaviors. As indicated already, this pattern of day-to-day fluctuation in performance may reflect the presence of rapid cycling of moods.

Finally, it should be noted that Student 2 received ongoing medical management of her psychiatric symptoms while enrolled in this school. She tried 10 different psychotropic medications during the course of her enrollment, and experienced 7.00 medication changes or dosage adjustments per year. The impact is unknown of such frequent changes in psychotropic medications on her school-based functioning. However, it seems unreasonable to expect that frequent changes in medications would be associated with stability in behavioral/social-emotional functioning, although the nature of the relationship between these two variables is unknown. Further, she was prescribed both stimulant and SSRI medications, and took these medications without an accompanying mood stabilizer and/or atypical antipsychotic between 3/10 and 4/10. Kowatch et al. (2005) cautioned against using stimulants and SSRIs in treating children and adolescents with bipolar disorders, and clearly stated that these medications should always be used in conjunction with a mood stabilizer and/or atypical antipsychotic, after first stabilizing a subject's mood. While the impact of medication on Student 2's performance is unclear, it is important to recognize that treatment best practices were apparently not followed for at least a portion of her enrollment in this school.

### Case Summary for Student 3

Student 3 is an eleven-year-old White male who came to this school in January 2007 as a second grade student. He recently completed fifth grade. Student 3 was referred to this school due to exhibiting physical aggression at home and school, sexual

acting out behaviors, and fire-setting. His teachers and therapists have described his strengths as being very polite and helpful at times, enjoying hands-on activities such as crafts, and demonstrating compassion toward peers he perceives as lower functioning. His weaknesses have been described as significant learning difficulties, difficulty coping with frustration (including asking him to complete academic work or perform a non-preferred task), and difficulty getting along with peers.

Student 3 currently lives with his biological mother, biological father, and biological younger sister. He has an older biological brother and an older biological sister with whom he does not reside. He is eligible to receive free school lunches, based on his family's socio-economic status.

School records indicate no concerns about Student 3 meeting developmental milestones within normal limits. In 2006, he was diagnosed with "Bipolar Affective Disorder, Mixed, Severe, without Mention of Psychotic Features." In 2009, he was diagnosed with "Bipolar Disorder, Mixed Episode, Severe." His other psychiatric diagnoses include ADHD, CD, ODD, Post-traumatic Stress Disorder (PTSD), Undersocialized Conduct Disorder, enuresis, and learning disorders in reading and written language. His family history is positive for psychiatric disorders. Within first-degree relatives, there is a history of bipolar disorders (one parent, one sibling), multiple substance use disorders (one parent, one sibling), and a learning disorder (one parent). Within non first-degree relatives, there is a further history of substance use disorders (two relatives).

In 2006, Student 3 was administered the WASI, a brief measure of intellectual functioning. He achieved a FSIQ of 105, which falls within what is typically considered the average range of functioning. However, a further breakdown of how Student 3 scored on the WASI is not included in his special education file.

## Academic Functioning

### Reading

Student 3's reading grades ranged from "Satisfactory" to "Needs Improvement" at primary grade levels, and his annual Primary GPA ranged from 1.00 to 2.50. He completed one year at an intermediate grade level, and received one grade in the A range, and three in the B range, resulting in an annual Standard GPA of 3.25.

Table 33. Reading Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07			NI	NI	1.00
2007-08	NI	S-	S	S-	2.50
2008-09	SI	SI	SI	SI	2.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 34. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2009-10	B	B+	B+	A-	3.25

*Note.* INC = Incomplete

Student 3's special education file contained two ISAT reports with reading scores. The ISAT is a standardized academic achievement test produced by the state of Illinois. For each academic subject included on the ISAT, students receive one of four categorical rankings: Exceeds Standards (highest), Meets Standards (next-to-highest), Below Standards (next-to-lowest), and Academic Warning (lowest). For all academic subjects

except writing, a National Percentile Rank (NPR) is assigned also. In third grade, Student 3 received a ranking of “Academic Warning” (the lowest possible ranking) in reading, and a NPR of 23. In fourth grade, his ranking was “Below Standards” in reading, and his NPR was 18.

On AIMSweb measures, Student 3’s percentile ranks ranged from <1 to 5 in reading fluency, and 1 to 4 in reading comprehension.

Table 35. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07		5	<1
2007-08	NR	NR	2
2008-09	1	3	1
2009-10	2	2	1

*Note.* NR stands for “Not Reported.”

Table 36. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07		4	3
2007-08	NR	3	3
2008-09	4	3	1
2009-10	4	2	1

*Note.* NR stands for “Not Reported.”

Student 3 had IEP goals for reading fluency (6/07 – 6/10) and reading comprehension (6/07 – 6/10). In reading fluency, he met 25 percent of his quarterly

benchmark targets, failing in 11/07, 1/08, 4/08, 6/08, 6/09, 11/09, 1/10, 4/10, and 6/10.

In reading comprehension, he met 25 percent of his quarterly benchmark targets, failing in 11/07, 1/08, 4/08, 6/08, 6/09, 11/09, 1/10, 4/10, and 6/10.

Overall, reading seemed to be an area of relative weakness for Student 3. In addition to his diagnosed learning disorder and the presence of two IEP goals, his AIMSweb percentile ranks were all 5 or below. He performed somewhat higher on the ISAT, with percentile ranks ranging from 18 to 23, although these still fell within what is typically considered the below average range of performance. However, his grades and annual GPAs suggested that he made progress over time, and he received a Standard GPA of 3.25 during the final year of data collection for this study. Unfortunately he did not demonstrate the same type of progress by meeting most of his quarterly IEP benchmarks, as he achieved only 25 percent of benchmarks in both reading fluency and reading comprehension.

### Mathematics

In mathematics, Student 3's grades ranged from "Satisfactory" to "Needs Improvement" at the primary level, and his annual Primary GPA ranged from 1.00 to 2.50. During one year at an intermediate grade level, his grades ranged from one A to three Bs, and his annual Standard GPA was 3.25.

Table 37. Mathematics Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07			NI	NI	1.00
2007-08	NI	S-	S	S-	2.50
2008-09	SI	SI	S	S	2.50

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 38. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2009-10	B	B+	A	B+	3.25

*Note.* INC = Incomplete

Student 3's special education file contained two ISAT reports with information about his mathematics performance. In third grade, he received a ranking of "Meets Standards" in mathematics, and a NPR of 26. In fourth grade, he received a ranking of "Below Standards" in mathematics, and his NPR was 19.

Student 3's percentile ranks on AIMSweb measures of mathematics computation ranged from 2 to 30.

Table 39. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07		2	5
2007-08	NR	5	21
2008-09	21	21	30
2009-10	28	7	8

*Note.* NR stands for "Not Reported."

Student 3 had an IEP goal for mathematics computation from 6/07 to 4/09. He met 57 percent of his quarterly benchmark targets for this goal, failing in 1/08, 4/08, and 6/08.

Overall, Student 3 seemed to exhibit a relative weakness in the area of mathematics, based primarily on the presence of an IEP goal for mathematics

computation. His performance on AIMSweb mathematics measures was somewhat better than his performance on AIMSweb reading measures, although still he achieved several percentile ranks within what is typically considered the below average range of functioning. On the ISAT, his percentile ranks spanned what are typically considered the below average to average ranges of performance. However, Student 3 demonstrated improvement over time based on his grades, as he went from receiving a 1.00 Primary GPA during his first year of enrollment to a 3.25 Standard GPA during the final year of data collection for this study. His progress was somewhat mixed in terms of his IEP goal, though, as he met only 57 percent of quarterly benchmarks.

### Writing

At primary grade levels, Student 3's writing grades ranged from "Satisfactory" to "Needs Improvement," and his annual Primary GPA ranged from 2.00 to 2.50 (see Table 40). During one year at an intermediate grade level, he received two Bs and two Cs, and his annual Standard GPA was 2.50 (see Table 41).

Student 3's special education file did not contain any ISAT reports with information about his writing performance.

Student 3 did not have an IEP goal for writing.

Table 40. Writing Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07			NI	S-	2.00
2007-08	NI	S-	S	S-	2.50
2008-09	SI	SI	SI	SI	2.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 41. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2009-10	B	B	C+	C	2.50

*Note.* INC = Incomplete

In general, based primarily on his diagnosed learning disorder in this area, and the fact that his annual GPA never rose above 2.50, this seemed to be an area of relative weakness for Student 3. While it did not occur in a linear manner, he seemed to exhibit some improvement over time, as his GPA rose from 2.00 during his first year of enrollment to 2.50 in the final year of data collection for this study.

### Science

At primary grade levels, Student 3's grades ranged from "Satisfactory" to "Needs Improvement" in science. His annual Primary GPA ranged from 2.00 to 3.00. In the one year he completed at an intermediate grade level, he received three As and one B, and had an annual Standard GPA of 3.75.

Table 42. Science Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07			NI	S-	2.00
2007-08	NI	S-	S	S-	2.50
2008-09	S+	N/A	S+	N/A	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement



Table 43. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2009-10	B	A	A	A	3.75

*Note.* INC = Incomplete

Student 3's special education file contained one ISAT report with information about his performance in science. In fourth grade, he received a ranking of "Below Standards" and a NPR of 7 in science.

Overall, this seemed to be an area of relative strength for Student 3, based primarily on the fact that he achieved an annual GPA of at least 3.00 during two years, and achieved his highest annual GPA of any academic subject (3.75) in this area. It should be noted that his percentile rank on the ISAT was lower than any he received in reading and mathematics, however. Based on Student 3's grades, he seemed to demonstrate improvement over time in science.

### Social Studies

Student 3's social studies grades ranged from "Needs Improvement" to "Satisfactory" at the primary grade level, with his annual Primary GPA ranging from 2.00 to 3.00 (see Table 44). During his one year at an intermediate grade level, he received one A, two Bs, and one C. His annual Standard GPA was 3.00 (see Table 45).

Overall, social studies seemed to be an area of relative strength for Student 3, based primarily on the fact that he achieved an annual GPA of at least 3.00 during two years. He accomplished this feat in only one other subject, science. Also, his grades seemed to reflect improvement over time in the area of social studies.

Table 44. Social Studies Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07			NI	S-	2.00
2007-08	NI	S-	S	S-	2.50
2008-09	N/A	S	N/A	S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 45. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2009-10	A	B-	B	C+	3.00

*Note.* INC = Incomplete

### Summary of Academic Functioning

Student 3's academic strengths seemed to lie in the areas of science and social studies. This was consistent with his diagnosed learning disorders in reading and writing, and his IEP goals in reading, mathematics, and writing. In general, Student 3's grades improved over the course of his enrollment in a somewhat linear pattern. His performance on briefer assessments (i.e., AIMSweb, ISAT) was more variable in nature than his performance on longer assessments (i.e., grades), which suggests variability in his day-to-day school functioning. This type of pattern could reflect the presence of rapid cycling of moods, a common occurrence in children and adolescents with bipolar disorders.

Student 3's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in

relation to whether Student 3 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 5. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Reading	Yes
Mathematics	Yes
Writing	Yes

#### Behavioral/Social-emotional Functioning

##### On Task/Work Completion

On a quarterly basis, Student 3 earned between 70.7 and 95.2 percent of his daily points on average for on task/work completion behavior. Standard deviations ranged from 6.77 to 27.5. On an annual basis, he earned between 86.1 and 89.8 percent of his daily points on average, with standard deviations ranging from 12.0 to 19.4.

Table 46. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	70.7 (27.5)	90.0 (15.4)	93.5 (6.77)	86.5 (17.7)	86.1 (19.4)
2008-09	91.7 (12.9)	87.9 (13.5)	89.8 (10.6)	90.0 (10.7)	89.8 (12.0)
2009-10	83.8 (15.5)	88.6 (14.8)	90.8 (11.3)	95.2 (8.62)	89.8 (13.2)

*Note.* Data reported are means (standard deviations in parentheses).

Student 3 had an IEP goal for on task behavior from 6/07 to 4/08. He met 100 percent of quarterly benchmark targets for this goal.

Based on these data, and in particular the presence of an IEP goal for on task behavior, this seemed to be an area of relative weakness for Student 3. However, he seemed to demonstrate some improvement over time, as his total percentage of daily points earned on average either increased or stayed the same from year to year, and he met 100 percent of quarterly benchmarks for his IEP goal.

Following Instructions/Compliance

On a quarterly basis, Student 3 earned between 70.0 and 93.0 of his daily points on average for following instructions behavior. Accompanying standard deviations ranged from 7.17 to 25.5. On a yearly basis, he earned between 84.2 and 89.8 percent of his daily points on average, with standard deviations ranging from 12.9 to 19.0.

Table 47. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	70.0 (25.5)	89.9 (16.7)	93.0 (7.17)	88.3 (15.9)	86.1 (19.0)
2008-09	92.0 (12.2)	89.6 (13.5)	88.2 (12.9)	89.3 (13.5)	89.8 (12.9)
2009-10	79.8 (16.6)	82.4 (15.4)	84.8 (15.1)	89.3 (11.8)	84.2 (15.1)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 3 did not have an IEP goal for following instructions behavior.

Overall this seemed to be an area of relative strength for Student 3, based on earning at least 90 percent of his daily points on average during 2 of 12 quarters, and between 85 and 90 percent of his daily points on average during 6 of 12 quarters, along with the absence of an IEP goal. While there was notable variability within his quarterly

percentages of points earned, his annual percentages of points earned were all within a range of 5 to 6 percentage points, therefore it seemed like he sustained his relatively high level of performance over time.

### Physical Aggression

Student 3 exhibited physically aggressive behaviors (e.g., punching, kicking, biting, throwing objects and hitting people) between 5 and 44 times per year, for a mean of 18.5 (standard deviation: 17.5) acts of aggression per year. Student 3's pattern of aggression may be described as an initial period of one quarter in which there was little aggression, followed by a spike in aggressive behaviors that persisted for a year or less, and then a near-linear decline in aggression following this spike.

Table 48. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2006-07		1	17	26	44
2007-08	8	5	1	1	15
2008-09	1	2	0	2	5
2009-10	4	5	1	0	10

Student 3 did not have an IEP goal specifically written for physically aggressive behavior, although this behavior was included in his general coping skills goal, which will be discussed in another section of this individual summary.

Based on these data, and in particular the fact that he was not aggressive during only 2 of 15 quarters, with a maximum of 44 episodes of aggression in one year, engaging in physically aggressive behavior seemed to be an area of relative weakness for

Student 3. However, there seemed to be dramatic improvement in this area between his first partial year of attendance and all subsequent years.

### Social Skills

Table 49 summarizes Student 3's grades in the areas of academic-, peer-, and adult-oriented social skills.

Student 3 had IEP goals for accepting adult feedback (6/08 – 6/10) and positive peer relations (6/07 – 6/10). For accepting adult feedback, he met 88 percent of quarterly benchmark targets, failing in 6/08. In the area of positive peer relations, he met 83 percent of quarterly benchmarks, failing in 4/08 and 6/08.

Overall, Student 3's academic-oriented social skills improved from receiving 61 percent "Needs Improvement" grades during his first year of attendance to 53 percent "Needs Improvement" grades during the final year of data collection. His peer-oriented social skills grades also improved over time. He went from receiving 20 percent "Needs Improvement" grades during his first year of attendance to 0 percent "Needs Improvement" grades during the final year of data collection. Student 3's adult-oriented social skills grades improved from receiving 36 percent "Needs Improvement" grades during his first year to 32 percent "Needs Improvement" grades during the final year of data collection. Student 3 did not receive any grades of "Excellent/Outstanding" for any social skill at any time.

Based on these data, and in particular the presence of two IEP goals, social skills seemed to be an area of relative weakness for Student 3. However, he demonstrated improvement over time both in his grades and by meeting between 83 and 88 percent of his quarterly benchmarks for IEP goals.

### Coping Skills

Table 50 summarizes Student 3's grades in the area of coping skills.

Table 49. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07				
Academic	0	39	--	61
Peer	0	80	--	20
Adult	0	64	--	36
2007-08				
Academic	0	47	--	53
Peer	0	85	--	15
Adult	0	61	--	39
2008-09				
Academic	0	0	86	14
Peer	0	65	35	0
Adult	0	18	61	21
2009-10				
Academic	0	0	47	53
Peer	0	25	75	0
Adult	0	0	68	32

*Note.* The category Showing Improvement was added in August 2008.

Student 3 had an IEP goal for general “coping skills” behavior (6/07 – 6/10), with physical aggression as a component. He met 100 percent of his quarterly benchmark targets for this goal.

Overall, Student 3 demonstrated some improvement over time in his coping skills grades. During his first year of attendance, he received 100 percent “Needs

Improvement” grades. For every subsequent year, 44 to 50 percent of his grades were in a higher ranked category. Also, he met 100 percent of quarterly benchmarks for his IEP goal in this area, which is an indicator of progress. In general, though, this seemed to be an area of relative weakness for Student 3, based primarily on the presence of an IEP goal.

Table 50. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07	0	0	--	100
2007-08	0	50	--	50
2008-09	0	0	50	50
2009-10	0	0	44	56

*Note.* The category Showing Improvement was added in August 2008.

### Medical Management

When he entered this program, Student 3 was prescribed the following psychotropic medications: Lithium Carbonate, Risperdal, Depakote, and Trazodone. There have been 26 documented medication changes or dosage adjustments since that time, for a mean of 6.50 (standard deviation: 2.08) per year. At the end of the study period, Student 3 was prescribed Wellbutrin, Intuniv, Depakote, Seroquel, and DDAVP. Since enrolling in this school, he has taken the following 13 psychotropic medications: Lithium Carbonate, Risperdal, Depakote, Trazodone, Wellbutrin, Intuniv, Seroquel, DDAVP, Geodon, Strattera, Lithobid, Cogentin, and Melatonin. Medication compliance issues were noted in his special education file.



Table 51. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Affective Disorder” (2006), ADHD, CD, ODD, PTSD, Under-socialized Conduct Disorder, Enuresis, Learning Disorders (dates unknown)	Lithium Carbonate, Risperdal, Depakote, Trazodone (at entry)
2006-07		Trazodone (D) (1/07) Geodon (A) (1/07) Depakote (DC) (3/07) Lithium Carbonate (DC) (3/07) Geodon (DC) (3/07) Lithium Carbonate (DC) (4/07) Lithium Carbonate (DC), Geodon (DC), (4/07) Lithium Carbonate (D) (5/07) Depakote (DC) (6/07)
2007-08		Lithobid (A), Depakote (DC), Strattera (A), Risperdal (DC), Geodon (D) (8/07) Strattera (DC), Cogentin (A) (9/07) Lithobid (D), Cogentin (D) (2/08) Strattera (DC), Risperdal (DC), Depakote (DC) (6/08)

Table 51. Continued

2008-09		Risperdal (DC), Seroquel (A), Strattera (DC) (9/08) Strattera (DC) (9/08) Wellbutrin (A) (1/09) Wellbutrin (DC), Strattera (DC) (3/09) Wellbutrin (DC) (3/09) Risperdal (D), Strattera (DC) (5/09)
2009-10	“Bipolar Disorder, Mixed Episode, Severe” (2009)	Seroquel (DC), Wellbutrin (DC), Depakote (DC), DDAVP (A), Strattera (D) (8/09) Seroquel (DC), Melatonin (A) (9/09) Seroquel (DC) (10/09) Intuniv (A) (11/09) Intuniv (DC) (12/09) Seroquel (D) (1/10) Intuniv (DC) (2/10)

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*Note.* A = Added, D = Discontinued, DC = Dosage Change

Prior to enrollment in this school, Student 3 had undergone psychiatric hospitalization on 5 occasions. Since enrolling, he has undergone psychiatric hospitalization 4 times: August 2007, May 2008, August 2009, and November 2009.

#### School Attendance

Since he began attending this school, Student 3 missed 12.5 (standard deviation: 5.07) days per year on average. His annual absence totals ranged from 5 to 16. Student 3 missed at least 14 days of school every year except the 06-07 academic year, when he

missed 5 days of school. It is likely that some of his absences were due to psychiatric hospitalizations during the 07-08 and 09-10 school years. Student 3 did not have any unexcused absences.

Table 52. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2006-07	5	0	5
2007-08	15	0	15
2008-09	14	0	14
2009-10	16	0	16

*Note.* Reported reasons for absences were not tracked.

#### Summary of Behavioral/Social-emotional Functioning

In general, Student 3 appeared to struggle to perform at a high level in most areas of behavioral/social emotional functioning. He demonstrated a significant amount of variability in daily functioning, as indicated by relatively large standard deviations (i.e., 10 or larger) associated with annual percentages of points earned for on task/work completion and following instructions behaviors. Student 3 required intensive ongoing medical management of his psychiatric symptoms, averaging 6.50 medication changes or dosage adjustments per year, trying out 13 different psychotropic medications, and undergoing four psychiatric hospitalizations while enrolled in this school. It should be noted that Student 3 was prescribed SSRI medication, a practice cautioned against by Kowatch et al. (2005), but always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines. Remarkably, Student 3 demonstrated progress in all areas of relative weakness, and sustained performance in his area of relative strength.

Student 3's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 3 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 6. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Following Instructions	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Yes
Physical Aggression	Yes
Social Skills	Yes
Coping Skills	Yes

### Immediate Educational Outcomes

#### Level System Standing

Student 3's level system standing ranged from Levels 1 to 3 over the time period for which data were available. Each year, his status spanned two to three levels. It should be noted that in the final year in which data were collected, he spent time on Level 3 during three quarters, which tied his previous best. In addition, during the final year of data collection, he spent time on the lowest level (Level 1) in only two quarters, which was the lowest frequency of occurrence over this time span.

Table 53. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	1	1,2	1,2	2	1-2
2008-09	1,2	1,2,3	1,2,3	2,3	1-3
2009-10	1	1,2,3	2,3	2,3	1-3

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

Student 3 did not achieve any form of re-integration into his home school while enrolled in this therapeutic day school.

### Within Case Analysis for Student 3

Overall, results seemed to suggest that placement in a therapeutic day school was an effective intervention package for Student 3. While he exhibited many areas of difficulty in both academic and behavioral/social-emotional functioning, he demonstrated slow but steady progress over time in all areas of relative weakness, while sustaining performance in all areas of relative strength. Student 3's referral concerns were perhaps the most severe of any student who participated in this study, as they entailed physical aggression at home and school, fire setting, and sexual acting out. Upon entry to this school, he was frequently aggressive. At the time this study concluded, though, Student 3 was on Level 3 of the school's behavior modification level system, which is the next-to-highest level. The frequency of his aggressive episodes had decreased dramatically. Student 3's overall pattern of improvement was near-linear in nature.

One of the striking features of Student 3's case was the intensive amount of ongoing medical care that was required to manage his psychiatric symptoms. In addition to a bipolar disorder, Student 3 had been diagnosed with six other psychiatric disorders in his lifetime: ADHD, CD, ODD, PTSD, Undersocialized Conduct Disorder, and enuresis.

He tried out 13 different psychotropic medications while enrolled in this school, averaging 6.50 medication changes or dosage adjustments per year, and underwent psychiatric hospitalization on four occasions. This level of psychiatric care was among the highest of any students included in this study. Further, Student 3 was prescribed SSRI medication, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Finally, Student 3 also exhibited notable variability in his daily functioning, as evidenced by relatively large standard deviations associated with percentages of daily points earned for on task /work completion and following instructions behavior, and variability in AIMSweb measures. This pattern of functioning may be indicative of the presence of rapid cycling of moods. While school records indicated a diagnosis (“Bipolar Affective Disorder, Mixed, Severe, without Mention of Psychotic Features”) that was more descriptive than diagnoses provided for many other students in this study, it was not a full DSM diagnosis, and therefore did not provide enough information to compare his performance to others with the same categorical diagnosis.

#### *Case Summary for Student 4*

Student 4 is a twelve-year-old, White male who recently completed sixth grade. He has been a student at this school since November 2003, when he was in kindergarten. Student 4 was referred to this therapeutic day school due to repeated aggression toward staff, making verbal threats, throwing objects, slamming doors, hiding under furniture, and spending a significant amount of time removed from his classroom. Student 4’s teachers and therapists have described him as a creative, likeable child who enjoys interacting with peers and adults, participates in class discussions, completes his school work, and tries hard to please others. Student 4’s weaknesses have been identified as a tendency to “shut down” or act out in response to frustration or other negative emotions,

difficulty initiating and sustaining positive peer relationships, and struggling to accept corrective feedback from adults.

Student 4 lives with his biological mother, mother's male significant other, older biological sister, and younger biological sister. His parents are divorced. Based on his family's socio-economic status, Student 4 is eligible to receive free lunch at school.

School records indicate that Student 4 achieved developmental milestones within normal limits. He was diagnosed with "Bipolar Disorder" in 2002 or 2003. Student 4 has never received any other psychiatric diagnosis. There is not a documented family history of mood disorders or other psychiatric disorders, per school records.

As for his cognitive abilities, Student 4 was administered the WISC-IV in 2005 and achieved an FSIQ of 95, which is generally considered within the Average range of functioning. Additionally, Student 4 received a Verbal Comprehension index score of 95, a Perceptual Reasoning index score of 110, a Working Memory index score of 94, and a Processing Speed index score of 83.

### Academic Functioning

#### Reading

Student 4's grades in reading ranged from "Outstanding" to "Satisfactory" in primary grade classrooms (i.e., kindergarten through third grade), and his annual Primary GPA ranged from 3.00 to 3.75 (see Table 54). In intermediate/middle school classrooms, Student 4's reading grades ranged from As to Bs, and his annual Standard GPA ranged from 3.25 to 4.00 (see Table 55). It should be noted that during the final academic year in which data were collected for this study, Student 4 earned all As in reading.

Student 4's special education file contained two reports of his performance on the ISAT. In fourth grade, Student 4 received a ranking of "Meets Standards" in reading, and achieved a National Percentile Rank (NPR) of 73. In fifth grade, Student 4 again

received a ranking of “Meets Standards” and a NPR of 73. These were the only two ISAT reports located in Student 4’s special education file.

Table 54. Reading Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2003-04			S	S	3.00
2004-05	O	S	O	O	3.75
2005-06	S	S	S+	S+	3.00
2006-07	S	S	S	S+	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 55. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	A	B	A	B-	3.50
2008-09	B	B	A	B-	3.25
2009-10	A	A	A-	A	4.00

*Note.* INC = Incomplete

AIMSweb curriculum-based measurement was used to assess Student 4’s performance in the areas of reading fluency and reading comprehension. His percentile ranks ranged from <1 to 95 in reading fluency (see Table 56), and 2 to 86 in reading comprehension (see Table 57).

Finally, it should be noted that Student 4 did not have any IEP goals within the domain of reading.



Table 56. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	9	<1	15
2006-07	26	62	95
2007-08	51	39	45
2008-09	33	55	48
2009-10	48	45	39

*Note.* NR stands for “Not Reported.”

Table 57. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	10	2	34
2006-07	48	54	86
2007-08	70	81	70
2008-09	74	57	53
2009-10	65	54	51

*Note.* NR stands for “Not Reported.”

Based on these data, this seemed to be an area of relative strength for Student 4. His AIMSweb data for reading fluency and reading comprehension were highly variable over time and spanned what are typically considered the below average to above average ranges of functioning, but Student 4 achieved a GPA of at least 3.00 every year in reading. On the ISAT, he scored at the exact same percentile rank, near the upper limit of what is typically considered the average range of performance, for his fourth and fifth grade years. In general, there was evidence of some improvement over time based on

Student 4 improving from a 3.00 GPA during his first year of attendance to a 4.00 GPA during the final year of data collection for this study. However, his AIMSweb data remained variable over time.

### Mathematics

Student 4's grades in mathematics ranged from "Outstanding" to "Satisfactory" in primary classrooms, and his annual Primary GPA ranged from 3.00 to 3.50. His grades ranged from As to Bs in intermediate/middle school classrooms, and his annual Standard GPA ranged from 3.75 to 4.00.

Table 58. Mathematics Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2003-04			O	S	3.50
2004-05	O	S	S	S	3.25
2005-06	S	S	S+	O	3.25
2006-07	S	S	S	S+	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 59. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B	A	A	A-	3.75
2008-09	A	A	A	A-	4.00
2009-10	A-	A	A-	B	3.75

*Note.* INC = Incomplete

Next, on the ISAT, Student 4 received a ranking of “Below Standards” in fourth grade, which corresponded to a NPR of 36. In fifth grade, Student 4 was ranked as “Meets Standards,” and his NPR was 42. These were the only two ISAT reports that contained mathematics scores located in Student 4’s special education file.

On AIMSweb measures of mathematics computation, Student 4 achieved percentile ranks that ranged from 9 to 63.

Table 60. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	NR	NR	NR
2006-07	63	27	9
2007-08	38	19	47
2008-09	25	25	8
2009-10	21	35	47

*Note.* NR stands for “Not Reported.”

Finally, from June 2008 through June 2010, Student 4 had an IEP goal for mathematics computation. He met 100 percent of his quarterly benchmark targets over these two years.

In summary, based primarily on the presence of an IEP goal for two years, mathematics seemed to be an area of relative weakness for Student 4. His AIMSweb data spanned what are typically considered the below average to average ranges of functioning, although Student 4’s annual GPA was 3.00 or greater during every year of his enrollment. His ISAT percentile ranks fell within what is typically considered the average range of functioning. In general, Student 4 seemed to demonstrate some

improvement over time in this area by meeting 100 percent of quarterly benchmarks for his IEP goal, as well as maintaining a GPA of at least 3.75 during each of the final three years of data collection for this study.

### Writing

Student 4's grades in writing were all within the "Satisfactory" range while in primary classrooms, and his annual Primary GPA was 3.00 every year. His grades ranged from As to Bs in intermediate/middle school classrooms, and his annual Standard GPA ranged from 3.00 to 4.00.

Table 61. Writing Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2003-04			S	S	3.00
2004-05	S	S	S	S	3.00
2005-06	S	S	S+	S+	3.00
2006-07	S+	S+	S+	S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 62. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B+	A	A-	A	3.75
2008-09	B	B	B	B+	3.00
2009-10	A-	A-	INT	INT	4.00

*Note.* INC = Incomplete, INT = No grade due to taking class at mainstream school

Student 4's special education file contained only one ISAT report that included a writing measure. In fifth grade, his writing sample was ranked as falling "Below Standards," although a percentile rank was not reported for writing.

No AIMSweb measures were administered in the area of writing. Lastly, this student did not have an IEP goal in writing.

In summary, Student 4 was able to maintain an annual GPA of at least 3.00 during every year he was enrolled in this school, therefore this seemed to be an area of relative strength. Because his writing grades and GPAs were higher at the intermediate/middle school grade level in comparison to the primary grade level, he seemed to demonstrate improvement in this area over time. However, it should be noted that Student 4 received a ranking of "Below Standards" on one ISAT report.

### Science

On his report cards, Student 4's grades ranged from "Outstanding" to "Satisfactory" in science, while enrolled in primary classrooms. His annual Primary GPA ranged from 3.00 to 3.75. As an intermediate/middle school student, his grades ranged from As to Bs, and his annual Standard GPA was 3.75 every year.

Table 63. Science Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2003-04			O	S	3.50
2004-05	S	O	O	O	3.75
2005-06	S	S	S+	S+	3.00
2006-07	S	S+	S+	S+	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 64. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	A	B+	A	A	3.75
2008-09	B+	A-	A	A	3.75
2009-10	A	A	B+	A	3.75

*Note.* INC = Incomplete

In fourth grade, Student 4 received an ISAT ranking of “Meets Standards,” and his NPR was 70.

In summary, Student 4 achieved at least an annual 3.00 GPA during every year he was enrolled in this school, therefore this seemed to be an area of relative strength. Further, his grades in science were higher in general at the intermediate/middle school grade level in comparison to the primary grade level, therefore he seemed to demonstrate improvement in this area over time. Student 4 had only one ISAT data point available; his percentile rank was near the upper limit of what is typically considered the average range of performance.

### Social Studies

Student 4’s grades in social studies ranged from “Outstanding” to “Satisfactory” at the primary grade levels, with his annual Primary GPA ranging from 3.00 to 3.50 (see Table 65). In intermediate/middle school classrooms, his grades ranged from As to Bs, and his annual Standard GPA was 3.75 during all three academic years (see Table 66).

In general, Student 4 achieved at least a 3.00 GPA during every year he was enrolled in this school, therefore this seemed to be an area of relative strength. Further, some improvement seemed to occur over time, as he maintained an annual GPA of 3.75 during each of the last three years of data collection for this study.

Table 65. Social Studies Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2003-04			O	S	3.50
2004-05	S	S	O	O	3.50
2005-06	S	S	S+	S+	3.00
2006-07	S	S+	S+	S+	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 66. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	A	B	A	A	3.75
2008-09	A	A	A	B+	3.75
2009-10	A	A	B+	A	3.75

*Note.* INC = Incomplete

### Summary of Academic Functioning

Overall, Student 4 demonstrated solid academic abilities across subjects. Although he had an IEP goal for mathematics, his grades in all subjects were relatively high. However, on measures that assessed his performance over a shorter time span, his performance was more variable. This type of pattern suggests variability in daily functioning, which may be indicative of the presence of rapid cycling of moods, a common occurrence in children and adolescents with bipolar disorders.

Student 4's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 4 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 7. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Yes

Behavioral/Social-emotional FunctioningOn Task/Work Completion

On a quarterly basis, Student 4's performance in the area of on task/work completion behavior ranged from earning 87.7 to 100 percent of his daily points on average, with standard deviations ranging from 0.00 to 29.9. On a yearly basis, his performance ranged from earning 91.7 to 98.0 of his daily points on average, with standard deviations ranging from 10.5 to 22.5.

Table 67. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	91.9 (9.20)	95.8 (6.45)	92.7 (16.6)	95.4 (4.98)	93.9 (10.5)
2008-09	87.9 (27.5)	97.1 (5.30)	87.7 (29.9)	94.7 (16.3)	91.7 (22.5)
2009-10	95.3 (21.1)	100 (0.00)	99.1 (3.32)	97.8 (5.03)	98.0 (11.3)

*Note.* Data reported are means (standard deviations in parentheses).



It should be noted that Student 4 did not have an IEP goal for on task/work completion behavior.

Based on these data, and in particular the fact that Student 4 earned at least 90 percent of his daily points on average during 10 of 12 quarters and 3 of 3 years, this seemed to be an area of relative strength. Further, he seemed to exhibit improvement over time, as his annual percentage of points earned on average was highest during the final year data were collected for this study.

Following Instructions

Quarterly, Student 4 earned 83.8 to 99.8 percent of his daily points on average for following instructions behavior, with accompanying standard deviations ranging from 1.10 to 26.0. On a yearly basis, he earned 89.1 to 97.3 percent of his daily points on average, with standard deviations ranging from 11.5 to 17.4.

Table 68. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	90.1 (10.4)	93.1 (7.72)	83.8 (25.0)	89.6 (6.41)	89.1 (15.0)
2008-09	90.7 (19.5)	93.4 (7.46)	86.5 (26.0)	94.7 (7.16)	91.3 (17.4)
2009-10	95.1 (21.0)	99.8 (1.10)	97.8 (3.98)	96.6 (6.38)	97.3 (11.5)

*Note.* Data reported are means (standard deviations in parentheses).

Also, Student 4 had an IEP goal for “following instructions right away” from 6/04 to 1/05 and from 11/05 to 1/07. He met 75 percent of his quarterly benchmark targets for this goal, failing to meet benchmarks in 4/06 and 1/07.

Primarily due to the presence of an IEP goal, this seemed to be an area of relative weakness for Student 4. However, he appeared to demonstrate some improvement over

time based on progressively increasing annual percentages of daily points earned on average, and also by meeting 75 percent of quarterly benchmarks for his IEP goal.

Physical Aggression

Student 4 engaged in physically aggressive behaviors (e.g., kicking staff members, throwing objects and hitting staff members) 2.14 (standard deviation: 3.18) times per year on average. His annual totals of physically aggressive acts ranged from 0 to 8. Student 4 was not physically aggressive toward others during the first two years he was enrolled in this school, or his final two years of enrollment. The pattern of aggressive behavior Student 4 exhibited may be described as an initial period of no aggression that lasted about two years, then a spike in aggression that occurred over the next two years, then an almost linear decline in aggression afterward.

Table 69. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2003-04		0	0	0	0
2004-05	0	0	0	0	0
2005-06	2	2	0	1	5
2006-07	1	3	2	2	8
2007-08	0	2	0	0	2
2008-09	0	0	0	0	0
2009-10	0	0	0	0	0

Student 4 did not have an IEP goal for physically aggressive behaviors.

Based on the fact that he did not exhibit any aggressive behaviors during 19 of 27 quarters, this seemed to be an area of relative strength for Student 4. Further, he did not exhibit any aggression during the final two years of data collection for this study, therefore he seemed to at least sustain a high level of performance in this area.

### Social Skills

Student 4's social skills behaviors are reflected in Table 70. Table 70 summarizes his grades in the areas of academic-, peer-, and adult-oriented social skills.

Further, Student 4 had IEP goals written for the following social skills: raise hand and wait to be called on (4/06 – 6/09), positive peer relations (6/04 – 6/05, 11/09 – 6/10), and accept adult feedback (6/04 – 6/10). Student 4 met 79 percent of his benchmarks for raise hand and wait to be called on, failing to meet benchmarks in 4/06, 6/06, and 1/07. He met 100 percent of his benchmarks for positive peer relations. Student 4 met 92 percent of his quarterly benchmark targets for accepting adult feedback, failing to meet benchmarks in 1/05 and 1/07.

In summary, Student 4's academic social skills improved from receiving 67 percent "Needs Improvement" grades during his first year of attendance to only 6 percent "Needs Improvement" grades during the final year of data collection. Additionally, he went from receiving 0 percent "Excellent" grades during his first year of attendance to 50 percent "Excellent" grades during his final year of attendance. However, his improvement in academic social skills occurred in a non-linear manner. Student 4 was able to demonstrate enough improvement in the area of "raise hand and wait to be called on" that this goal was discontinued in 2009.

Student 4's peer-oriented social skills grades also improved in a non-linear fashion. He went from receiving 0 percent "Excellent" grades during the 03-04 school year to 80 percent "Excellent" grades during the 09-10 school year. Also, he met 100 percent of quarterly benchmark targets for his IEP goal for positive peer relations.

Table 70. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2003-04				
Academic	0	33	--	67
Peer	0	100	--	0
Adult	0	50	--	50
2004-05				
Academic	0	75	--	25
Peer	0	100	--	0
Adult	14	29	--	57
2005-06				
Academic	0	50	--	50
Peer	0	70	--	30
Adult	0	43	--	57
2006-07				
Academic	0	22	--	78
Peer	0	80	--	20
Adult	0	46	--	54
2007-08				
Academic	11	53	--	36
Peer	0	50	--	50
Adult	0	61	--	39
2008-09				
Academic	0	75	19	6
Peer	0	95	0	5

Table 70. Continued

Adult	0	75	7	18
2009-10				
Academic	50	14	31	6
Peer	80	20	0	0
Adult	29	68	4	0

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*Note.* The category Showing Improvement was added in August 2008.

Student 4's adult-oriented social skills grades improved from receiving 0 percent "Excellent" and 50 percent "Needs Improvement" grades during his first year to 29 percent "Excellent" and 0 percent "Needs Improvement" grades during the final year of data collection. This improvement was non-linear, however. Lastly, for the final three years in which data were collected, he met all quarterly benchmarks for his IEP goal for accepting adult feedback.

Based on these data, including the presence of three IEP goals, this seemed to be an area of relative weakness for Student 4. However, his grades seemed to improve over time in all three domains of social skills, and he met 79 to 100 percent of quarterly benchmarks for his IEP goals, therefore he seemed to demonstrate some improvement over time in this area.

### Coping Skills

Table 71 summarizes Student 4's grades in the area of coping skills.

In addition, Student 4 had IEP goals in the area of coping skills written for "coping skills" (6/04 – 1/07), "learn cognitive model to cope with stress/frustration" (6/08 – 6/10) and "temper tantrums" (4/07 – 6/10). Student 4 met 73 percent of his quarterly benchmark targets for "coping skills," failing to meet them in 4/06, 6/06, and

1/07. He met 89 percent of his quarterly benchmarks for “learn cognitive model to cope with stress/frustration,” failing in 4/09. Student 4 met 100 percent of his benchmarks for “temper tantrums.”

Table 71. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2003-04	0	0	--	100
2004-05	0	6	--	94
2005-06	0	0	--	100
2006-07	0	0	--	100
2007-08	0	0	--	100
2008-09	0	25	13	63
2009-10	0	81	19	0

*Note.* The category Showing Improvement was added in August 2008.

Based on these data, and in particular the presence of three IEP goals, this seemed to be an area of relative weakness for Student 4. However, Student 4 appeared to demonstrate dramatic improvement in coping skills grades over time in that during his first year of attendance, he received 100 percent “Needs Improvement” grades, and in the final year of data collection, he received 0 percent “Needs Improvement” grades. This improvement appeared to be non-linear in nature but occurred in a more organized fashion than his improvement in some other areas of functioning. Further, Student 4 met 100 percent of quarterly benchmark targets for both goals during the final year of data collection, which is also indicative of improvement over time.

Medical Management

At the time he entered this school, Student 4's psychotropic medication regimen consisted of only Risperdal. At the end of the data collection period, Student 4 was taking Risperdal and Abilify. There were 2 documented medication changes/dosage adjustments between 11/03 and 6/10, which occurred in 1/05 and 8/06. Therefore, his mean number of medication changes/dosage adjustments per year is 0.29 (standard deviation: 0.49). The only 2 psychotropic medications Student 4 has taken since enrolling in this school are Risperdal and Abilify. No medication compliance issues were noted in Student 4's special education health file.

Table 72. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	"Bipolar Disorder" (2002 or 2003)	Risperdal (at entry)
2003-04		
2004-05		Risperdal (DC), Abilify (A) (1/05)
2005-06		
2006-07		Risperdal (DC), Abilify (DC) (8/06)
2007-08		
2008-09		
2009-10		

*Note.* A = Added, D = Discontinued, DC = Dosage Change

Finally, Student 4 has never undergone psychiatric hospitalization.

### School Attendance

Student 4 missed 5.60 (standard deviation: 4.72) days per year on average. His yearly absence totals ranged from 1 to 12. He missed 6 to 12 days per year during the 05-06, 06-07, and 09-10 academic years. During the 07-08 and 08-09 school years, he missed only 1 day each year. Student 4 had no unexcused absences.

Table 73. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2005-06	6	0	6
2006-07	12	0	12
2007-08	1	0	1
2008-09	1	0	1
2009-10	8	0	8

*Note.* Reported reasons for absences were not tracked.

### Summary of Behavioral/Social-emotional Functioning

Overall, Student 4 seemed to demonstrate improvement over time in nearly all areas of behavioral/social-emotional functioning that were examined in this study. His relative strengths seemed to be in the areas of on task/work completion behavior and refraining from physically aggressive behavior. His relative weaknesses seemed to be in following instructions, social skills, and coping skills. There appeared to be a great deal of variability in his daily functioning, though, as standard deviations were greater than 10 for all annual percentages of daily points earned on average in the areas of on task/work completion and following instructions behaviors. As mentioned previously, this may be indicative of the presence of rapid cycling of moods.



Student 4's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 4 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 8. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
On Task/Work Completion	Yes
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Following Instructions	Yes
Social Skills	Yes
Coping Skills	Yes

### Immediate Educational Outcomes

#### Level System Standing

Student 4's level system standing ranged from Level 1 to Level 4 during the years for which data were available (see Table 74). Student 4's standing spanned at last three levels during each year data were available. It should be noted that during the final year of data collection, he achieved Level 4 during each quarter.

#### Re-integration

During the 2009-10 school year, Student 4 began partial re-integration (i.e., three class periods) into his home school. Correspondence included in his special education

file indicated that he was successful in the mainstream setting as well as in this therapeutic day school, therefore additional mainstreaming time was targeted for a date beyond the conclusion of this study.

Table 74. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	2,3	1,2,3	1,2,3,4	1,2,3	1-4
2008-09	2,3,4	2,3	3,4	3,4	2-4
2009-10	3,4	4	3,4	2,3,4	2-4

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

#### Within Case Analysis for Student 4

Overall, placement in a therapeutic day school seemed to be an effective intervention package for Student 4. Ultimately, he achieved the highest level of the school's behavior modification system, began re-integration into his home school, and demonstrated dramatic improvements in coping skills and refraining from physical aggression, which were the primary reasons he was referred to this school. In addition, qualitative analysis indicated that he sustained performance in all areas of relative strength, and improved performance in all areas of relative weakness while enrolled in this school. However, his overall pattern of improvement seemed to be non-linear in nature.

Over the course of his enrollment, Student 4 demonstrated significant variability in his day-to-day functioning. He achieved relatively large (i.e., >10) standard deviations associated with daily percentages of points earned, and highly variable AIMSweb scores. As mentioned previously, this type of pattern may be indicative of the presence of rapid cycling of moods.

Finally, perhaps one of the most striking features of Student 4's case is the length of time it took him to reach the point of readiness to begin re-integration into his home school. This study followed his enrollment in a therapeutic day school for seven years, and he only began the re-integration process during his seventh year. While his academic grades remained fairly high across the duration of his enrollment, it took several years to demonstrate appreciable gains in social and coping skills in particular. It is also notable that during this entire time span, medical management of his psychiatric symptoms remained remarkably consistent, as he experienced two documented medication changes or dosage adjustment during these seven years, with no psychiatric hospitalizations.

#### Case Summary for Student 5

Student 5 is a fourteen-year-old male. His racial/ethnic background is White, and he most recently completed eighth grade. Student 5 has been a student in this school since October 2006, when he was in fifth grade. He was referred to this school due to an incident in which he ran away from school and threatened to destroy the school. His teachers and therapists have described his strengths as being well-liked by peers, artistic, and able to meet both academic and behavioral classroom expectations when motivated to do so. His weaknesses have been described as frequently engaging in negative attention-seeking behaviors around peers, difficulty accepting adult feedback/decisions, and difficulty coping with frustration/stress that often leads to engaging in disruptive behaviors (e.g., making inappropriate comments in class).

Student 5 currently lives with both his biological mother and biological father. He has no biological siblings. Based on his family's socio-economic status, Student 5 pays the standard (i.e., full) price for school lunch.

School records indicate that Student 5 met developmental milestones within normal limits. He was diagnosed with "Bipolar Disorder, Mixed" in 2006. Student 5 has also been diagnosed with ADHD. There is a documented family history of a first-degree

relative (a parent) diagnosed with a bipolar disorder. No other psychiatric diagnoses are documented.

Student 5's special education file does not contain any scores obtained from cognitive testing. However, there is a reference in his file to cognitive testing that was completed at a previous school. This report indicates that Student 5 scored within the average range on measure of intellectual functioning, but it does not elaborate or provide any scores.

### Academic Functioning

#### Reading

Student 5's reading grades ranged from As to Cs, and his annual Standard GPA ranged from 2.50 to 3.00.

Table 75. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07		A-	B	C	3.00
2007-08	B	B	INT	INT	3.00
2008-09	C	C	B-	B-	2.50
2009-10	C	C	B	A	2.75

*Note.* INC = Incomplete, INT = Took class in mainstream school

Student 5 had two ISAT reports that contained reading scores in his special education file. In sixth grade, he received a ranking of "Below Standards" in reading, with a NPR of 33. In seventh grade, his ranking was "Meets Standards," and his NPR was 46.

On AIMSweb measures, Student 5's percentile ranks ranged from 47 to 77 in reading fluency, and 29 to 88 in reading comprehension.

Table 76. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07	NR	50	47
2007-08	65	NR	NR
2008-09	48	64	55
2009-10	NR	77	66

*Note.* NR stands for "Not Reported."

Table 77. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07	NR	88	82
2007-08	47	88	NR
2008-09	84	88	73
2009-10	NR	85	29

*Note.* NR stands for "Not Reported."

Student 5 did not have an IEP goal for reading.

Based on these data, Student 5 seemed to demonstrate a relative strength in reading. His AIMSweb percentile ranks spanned what are typically considered the average to above average ranges in reading fluency and reading comprehension, and he had an annual Standard GPA of 3.00 or higher during two years. His ISAT percentile ranks were within what is typically considered the average range of functioning. These

results indicated that in general, he sustained a high level of performance in this area over time, although his grades decreased slightly over time, and his AIMSweb performance was somewhat variable.

### Mathematics

In mathematics, Student 5's grades ranged from Bs to Ds, and his annual Standard GPA ranged from 2.00 to 3.00.

Table 78. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07		B+	B-	B-	3.00
2007-08	C	B	D	C	2.00
2008-09	C	B-	B	B+	2.75
2009-10	C-	D+	B	INT	2.00

*Note.* INC = Incomplete, INT = Took class in mainstream school

Student 5's special education file contained two ISAT reports with information about his performance in mathematics. In sixth grade, he received a ranking of "Below Standards" in mathematics, and a NPR of 22. In seventh grade, his ranking was also "Below Standards," and his NPR was 44.

On AIMSweb measures of mathematics computation, his percentile ranks ranged from 4 to 87 (see Table 79).

Student 5 did not have an IEP goal for mathematics.

Overall, Student 5 seemed to demonstrate a relative weakness in mathematics, and his performance seemed more inconsistent than in reading. His AIMSweb percentile ranks ranged from what is typically considered the below average range to the above

average range of functioning. In terms of grades, Student 5 achieved a GPA of at least 3.00 during only one year. His ISAT percentile ranks spanned what are typically considered the below average to average ranges of functioning. Due to inconsistency in performance, results seemed mixed as to whether he exhibited any improvement in this area over time.

Table 79. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2006-07	87	37	56
2007-08	4	NR	NR
2008-09	5	87	87
2009-10	NR	4	15

*Note.* NR stands for “Not Reported.”

### Writing

Student 5’s writing grades ranged from As to one C, and his annual Standard GPA ranged from 3.00 to 3.67.

Table 80. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07		A-	B+	A-	3.67
2007-08	B	B	A	B	3.25
2008-09	B	B	B-	A	3.25
2009-10	C	B	A	B	3.00

*Note.* INC = Incomplete

In sixth grade, Student 5 received a ranking of “Academic Warning” (the lowest possible ranking) on the ISAT. A NPR was not reported. This was the only ISAT report that contained information about writing performance located in Student 5’s special education file.

Student 5 did not have an IEP goal for writing.

Student 5 seemed to demonstrate a relative strength in the area of writing, based primarily on the fact that he achieved an annual Standard GPA of at least 3.00 during every year. However, it should be noted that he performed poorly on the ISAT in sixth grade, achieving the lowest possible ranking. Over time, Student 5 seemed to sustain a high level of performance by maintaining an annual Standard GPA of at least 3.00.

### Science

In science, Student 5’s grades ranged from A to F, and his annual Standard GPA ranged from 1.00 to 3.00.

Table 81. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07		C+	B-	C+	2.33
2007-08	INT	INT	F	C	1.00
2008-09	B	C	B-	B-	2.75
2009-10	C	B	A	INT	3.00

*Note.* INC = Incomplete, INT = Took class in mainstream school

Student 5’s special education file contained one ISAT report that included information about his performance in science. In seventh grade, he received a ranking of “Meets Standards” and a NPR of 44 in science.



Student 5 seemed to exhibit a great deal of variability in science performance, as his grades ranged from A to F. Based primarily on the fact that he achieved a GPA of at least 3.00 during only one year, this seemed to be an area of relative weakness for Student 5. It is important to note, though, that his performance on the ISAT in sixth grade was within what is typically considered the average range of functioning. There was some evidence of improvement over time, as he earned his highest annual Standard GPA during the final year of data collection for this study.

### Social Studies

Student 5's grades in social studies included Bs, Cs, and one grade in the D range. His annual Standard GPA ranged from 2.67 to 3.00.

Table 82. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07		B-	B	C	2.67
2007-08	INT	INT	INT	B+	3.00
2008-09	C+	B	B	B-	2.75
2009-10	B	D-	B	C	2.25

*Note.* INC = Incomplete, INT = Took class in mainstream school

In social studies, Student 5 seemed to exhibit a relative weakness, based primarily on the fact that he achieved a GPA of at least 3.00 during only one year. There seemed to be some improvement in this area between his first and second years of enrollment, though this improvement appeared to fade over time. Therefore, results seemed mixed in this regard.

### Summary of Academic Functioning

Overall, Student 5's academic profile seemed to be marked by relative strengths in reading and writing, and relative weaknesses in mathematics, science, and social studies. In general, his performance seemed more variable in those areas classified as weaknesses than the areas classified as strengths. For example, his performance on AIMSweb measures in mathematics spanned what are typically considered the below average to above average ranges of performance. This type of variability or inconsistency in performance may be a symptom of rapid cycling of moods, which is a common occurrence in children and adolescents with bipolar disorders.

Student 5's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 5 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 9. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Unclear (mixed results)
Science	Yes
Social Studies	Unclear (mixed results)

## Behavioral/Social-emotional Functioning

### On Task/Work Completion

In the area of on task/work completion behavior, Student 5 earned between 84.8 and 97.3 percent of his daily points on average on a quarterly basis. Standard deviations ranged from 6.21 to 18.2. On a yearly basis, he earned between 91.8 and 93.3 percent of his daily points on average, with standard deviations ranging from 9.75 to 12.7.

Table 83. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	97.3 (8.39)	95.9 (8.30)	89.9 (14.1)	84.8 (12.1)	91.8 (12.1)
2008-09	89.6 (11.7)	92.4 (10.3)	97.0 (6.21)	94.0 (8.93)	93.3 (9.75)
2009-10	90.1 (18.2)	92.6 (9.75)	91.6 (11.3)	93.1 (10.5)	91.8 (12.7)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 5 had an IEP goal for on task behavior from 4/08 to 6/10. He met 56 percent of his quarterly benchmark targets, failing in 4/08, 6/08, 11/08, and 1/09.

Based primarily on the presence of an IEP goal, this seemed to be an area of relative weakness for Student 5. He appeared to demonstrate some improvement over time, though, evidenced by earning at least 90 percent of his daily points on average during the last seven quarters of data collection. In addition, he achieved 56 percent of quarterly benchmarks for his IEP goal.

### Following Instructions/Compliance

Quarterly, Student 5 earned between 84.6 and 97.9 percent of his daily points on average for following instructions behavior. Standard deviations ranged from 7.10 to

19.3. Annually, he earned between 87.1 and 91.9 percent of his daily points on average, with standard deviations ranging from 12.3 to 14.7.

Table 84. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	97.9 (8.16)	97.4 (7.10)	88.5 (14.2)	84.6 (12.3)	91.9 (12.3)
2008-09	86.1 (11.9)	86.6 (19.3)	88.9 (9.25)	86.8 (16.4)	87.1 (14.7)
2009-10	91.4 (17.5)	90.0 (9.62)	91.8 (12.2)	93.6 (9.61)	91.6 (12.6)

*Note.* Data reported are means (standard deviations in parentheses).

Student 5 had an IEP goal for following instructions behavior from 4/10 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

Based primarily on the presence of an IEP goal in this area, following instructions behavior seemed to be an area of relative weakness for Student 5. However, he demonstrated some improvement over time by earning at least 90 percent of his daily points on average during the last four quarters of data collection. Additionally, he met 100 percent of quarterly benchmarks for his IEP goal, although this goal was in place for only one quarter.

#### Physical Aggression

Student 5 engaged in physically aggressive behaviors (e.g., fighting with peers) between 0 and 2 times per year. On average, he was physically aggressive 1.00 (standard deviation: 1.15) times per year. Student 5's pattern of aggression may be characterized by low levels of aggression (i.e., two or fewer incidents every year) across the years he was enrolled in this school.

Table 85. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2006-07	0	0	0	0	0
2007-08	0	0	0	0	0
2008-09	0	0	1	1	2
2009-10	1	0	0	1	2

Student 5 did not have an IEP goal for physically aggressive behavior.

Because Student 5 was not physically aggressive at all during 12 of 16 quarters, this seemed to be an area of relative strength for him. Further, he seemed to sustain low levels of aggression over time.

### Social Skills

Table 86 summarizes Student 5's grades in the areas of academic-, peer-, and adult-oriented social skills.

Student 5 had IEP goals for positive peer relations (1/07 – 6/10) and accepting adult feedback and decisions (4/08 – 6/10). He met 64 percent of his quarterly benchmark targets for positive peer relations, failing in 4/08, 6/08, 11/08, 1/09, and 6/09. Student 5 met 56 percent of his quarterly benchmarks for accepting adult feedback and decisions, failing in 4/08, 6/08, 11/08, and 1/09.

Overall, Student 5's academic-, peer-, and adult-oriented social skills grades seemed to decline between his first and second years of enrollment, and then appeared to be somewhat mixed afterward. During the 06-07 academic year, Student 5 received 100 percent "Good/Satisfactory" or "Outstanding/Excellent" grades. After this time, his grades were predominantly "Showing Improvement" or "Needs Improvement" in all

subsequent years, with grades in the area of peer-oriented social skills slightly higher than the other two.

Table 86. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07				
Academic	4	96	--	0
Peer	0	100	--	0
Adult	0	100	--	0
2007-08				
Academic	0	22	--	78
Peer	0	45	--	55
Adult	0	36	--	64
2008-09				
Academic	0	44	50	6
Peer	0	30	70	0
Adult	0	14	21	64
2009-10				
Academic	3	25	39	33
Peer	0	15	75	10
Adult	0	0	61	39

*Note.* The category Showing Improvement was added in August 2008.

Based on these data, and the presence of two IEP goals, this seemed to be an area of relative weakness for Student 5. Results seemed to be unclear as to whether improvement occurred over time.

### Coping Skills

The following table summarizes Student 5's grades in the area of coping skills.

Table 87. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2006-07	0	100	--	0
2007-08	0	0	--	100
2008-09	0	0	88	13
2009-10	0	0	38	63

*Note.* The category Showing Improvement was added in August 2008.

Student 5 had an IEP goal for general “coping skills” from 1/07 to 1/08. He met 100 percent of his quarterly benchmark targets for this goal.

Overall, Student 5's coping skills grades seemed to decline between his first and second years of enrollment. Initially, he received 100 percent “Good/Satisfactory” grades. After his first year, he received grades of only “Showing Improvement” or “Needs Improvement” every year. Based on these data, this seemed to be an area of relative weakness for Student 5. Regarding his performance over time, results seemed to be mixed as to whether improvement occurred. He met 100 percent of quarterly benchmarks for his IEP goal, but there was variability in his grades from year to year.

Medical Management

When he enrolled in this school, Student 5 was prescribed Adderall, Zoloft, and Zyprexa. Since that time, 6 documented medication changes or dosage adjustments have occurred, for a mean of 1.50 (standard deviation: 1.00) per year (see Table 88). At the end of the data collection period for this study, Student 5 was taking only Metadate. Since enrolling in this school, he has taken the following 7 psychotropic medications: Adderall, Zoloft, Zyprexa, Depakote, Focalin, Concerta, and Metadate. Medication compliance issues were noted in his special education file.

Finally, Student 5 underwent psychiatric hospitalization on one occasion prior to enrolling in this school. Since he had attended this school, he has not undergone additional psychiatric hospitalization.

Table 88. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Disorder, Mixed” (2006), ADHD (2006)	Adderall, Zoloft, Zyprexa (at entry)
2006-07		Zyprexa (D) (10/06)
2007-08		Adderall (D) (1/08)
2008-09		Zoloft (D), Focalin (A) (8/08)
2009-10		Focalin (D), Concerta (A) (8/09) Depakote (A) (1/10) Concerta (D), Depakote (D), Metadate (A) (4/10)

*Note.* A = Added, D = Discontinued, DC = Dosage Change



### School Attendance

Since he began attending this school, Student 5 missed 16.3 (standard deviation: 4.99) days per year on average. His yearly absence totals ranged from 9 to 20. The 2008-09 school year was the only year in which he missed fewer than 17 days. Student 5 had 1 unexcused absence during each of the 06-07 and 07-08 academic years.

Table 89. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2006-07	18	1	19
2007-08	19	1	20
2008-09	9	0	9
2009-10	17	0	17

*Note.* Reported reasons for absences were not tracked.

### Summary of Behavioral/Social-emotional Functioning

Student 5's behavioral/social emotional functioning profile seemed to be marked by a relative strength in refraining from physical aggression. His relative weaknesses seemed to be in the areas of on task/work completion and following instructions behaviors, social skills, and coping skills. Student 5 had IEP goals written for four areas of functioning within this domain, which included on task/work completion behavior, following instructions behavior, social skills, and coping skills. His social and coping skills grades declined dramatically between his first and second years of attendance, and were somewhat mixed afterward. Finally, there was a noticeable amount of variability in his daily behavior, based on large (i.e., >10) standard deviations associated with most annual percentages of daily points earned for on task/work completion and following instructions behaviors. It is important to note that Student 5 was prescribed both

stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005) in treating children and adolescents with bipolar disorders. Further, between 10/06 and 1/10, as well as 4/10 through the end of the study period, Student 5 did not take these medications in conjunction with a mood stabilizer and/or atypical antipsychotic. This practice was clearly against published guidelines for psychiatrists (i.e., Kowatch et al., 2005), although its impact on Student 5's performance is unknown.

Student 5's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 5 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 10. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Yes
Following Instructions	Yes
Social Skills	Unclear (mixed results)
Coping Skills	Unclear (mixed results)

### Immediate Educational Outcomes

#### Level System Standing

Student 5's level system standing ranged from Levels 1 to 4 over the years in which data were collected for this study. His level status spanned three to four levels

each year. It should be noted that during the final year of data collection, he was never on Level 1. This was the only year he maintained a level standing above the lowest level of the behavior modification system for the entire year. Also, he achieved Level 4 status during the fourth quarter of this same year.

Table 90. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	3,4	3,4	1,2	1,2	1-4
2008-09	1,2	1,2,3	1,2	1,2,3	1-3
2009-10	2,3	2,3	2,3	2,3,4	2-4

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

In 8/07, Student 5 achieved partial re-integration (4 class periods) into his home school. However, this mainstreaming was discontinued in 5/08 after he earned multiple write-ups for disruptive and noncompliant behaviors within his home school, and also exhibited significant work refusal behavior. Also, it was noted in 5/08 that he had been refusing to take his prescribed psychotropic medication for several months.

In 4/10, Student 5 was re-integrated again, this time for three class periods. A report in his special education file dated 5/10 indicated some difficulty with work completion in both his mainstream setting and this therapeutic day school. Student 5's special education file did not indicate the type of high school in which he would be enrolled following graduation from this therapeutic day school in 6/10.

*Within Case Analysis for Student 5*

Overall, placement in a therapeutic day school seemed to be an effective intervention package for Student 5, primarily evidenced by his achievement of Level 4 status and then partial re-integration into his home school on two separate occasions. However, while Student 5 maintained a high level of performance during his enrollment in this school in all areas of relative strength in both academic and behavioral/social-emotional functioning, results were somewhat mixed regarding whether improvement occurred in areas of relative weakness. In particular, results were mixed regarding improvement in the area of coping skills, which seemed to be related to his primary reason for referral to a therapeutic day school. Generally, Student 5 performed at a high level overall for extended periods of time prior to beginning re-integration, but then his performance began to waver in relation to removing some of the supports and structure provided by a therapeutic day school.

Issues related to medication seem to be very important in this case. Student 5 was prescribed psychotropic medication to manage his psychiatric symptoms during his entire enrollment period in this setting. However, he was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005) in treating children and adolescents with bipolar disorders. Further, between 10/06 and 1/10, as well as 4/10 through the end of the study period, Student 5 did not take stimulant and/or SSRI medications in conjunction with a mood stabilizer and/or atypical antipsychotic, a practice clearly discordant with published guidelines for psychiatrists (i.e., Kowatch et al., 2005). The impact of this practice on Student 5's performance is unknown. Additionally, ongoing medication compliance issues were noted in his special education file. As mentioned previously, around the time his re-integration was discontinued in 5/08, it was noted that Student 5 had been refusing to take his prescribed psychotropic medication for several months. While this study did not collect direct evidence of the

effects of psychotropic medication on Student 5's school-based performance, this relation seems clear.

Finally, variability in Student 5's day-to-day functioning was also noted within both academic and behavioral/social-emotional domains. He demonstrated large standard deviations (i.e., >10) associated with the daily points he earned for on task/work completion behavior and following instructions behavior. In addition, he exhibited variable scores on brief assessments of his academic functioning (e.g., AIMSweb), most notably in the area of mathematics. A general trend was noted that Student 5's performance seemed less variable within academic areas of relative strength versus areas of relative weakness. As mentioned earlier, this pattern of variability may be indicative of rapid cycling of moods. Unfortunately for purposes of classification and comparison, a complete diagnostic label was not provided regarding Student 5's specific type of bipolar disorder.

#### Case Summary for Student 6

Student 6 is a fourteen-year-old Latino male. He began attending this school in August 2007 as a sixth grade student, and most recently completed eighth grade. Student 6 was referred to this school after exhibiting aggressive behaviors at home and school, as well as significant school refusal and other anxiety-based behaviors. Student 6's teachers and therapists have described his strengths as being artistic and athletic, getting along well with both peers and adults on most occasions, and being willing to help others. His weaknesses have been described as difficulty coping with anxiety, frustration, and other negative emotions, difficulty completing work and remaining on task while working, and learning difficulties in multiple areas (to be addressed later in section).

Currently, Student 6 lives with his biological mother, biological father, biological older sister, and biological younger brother. Based on his family's socio-economic status, he pays the standard (i.e., full) price for school lunch.

School records indicate that Student 6 experienced delayed language development, but met other developmental milestones within normal limits. In 2009, he was diagnosed with “Bipolar Disorder.” Student 6 has also been diagnosed with Mood Disorder Not Otherwise Specified, ADHD, and learning disorders in reading, written language, and processing (i.e., long-term retrieval, application of basic academic skills). There is not a documented family history of mood disorders or other psychiatric disorders.

The most recent completed cognitive assessment in Student 6’s special education file is from 2001, when he was administered the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R). On this test, he achieved a FSIQ of 103, which falls within what is typically considered the average range of functioning. Additionally, he achieved a Verbal Scale IQ of 93, and a Performance Scale IQ of 115.

### Academic Functioning

#### Reading

Student 6’s reading grades ranged from Bs to Ds. His annual Standard GPA ranged from 1.75 to 2.50, and improved over time in a near-linear manner.

Table 91. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	C+	C+	D+	C-	1.75
2008-09	B	C	D	B	2.25
2009-10	B	C	C	B	2.50

*Note.* INC = Incomplete

Three ISAT reports contained information about Student 6's reading performance. In fifth grade, he received a ranking of "Meets Standards" and a NPR of 81. In sixth grade, his ranking changed to "Below Standards," with a NPR of 33. In seventh grade, he received a ranking of "Below Standards," with a NPR of 26.

Student 6's AIMSweb percentile ranks ranged from 46 to 66 in reading fluency. In reading comprehension, his percentile ranks ranged from 41 to 91.

Table 92. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	58	47	NR
2008-09	55	61	51
2009-10	NR	66	46

*Note.* NR stands for "Not Reported."

Table 93. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	47	65	NR
2008-09	73	81	65
2009-10	NR	41	91

*Note.* NR stands for "Not Reported."

Student 6 did not have an IEP goal for reading.

Overall, Student 6 demonstrated variable performance in reading. On AIMSweb measures, his percentile ranks in reading fluency were all within what is typically considered the average range of functioning, and in reading comprehension they spanned

the average to above average ranges. Student 6's performance on the ISAT was quite variable, as his percentile ranks spanned what are typically considered the average to above average ranges of functioning, and the rankings he received ranged from "Below Standards" to "Meets Standards." His grades were generally relatively low (i.e., his Standard GPA ranged from 1.75 to 2.50). In general, Student 6 seemed to perform better on brief assessments (e.g., AIMSweb measures) than assessments that sampled his performance over a longer period of time (e.g., grades), which is a different pattern of performance than that of several other participants in this study. Overall, Student 6 seemed to demonstrate a relative weakness in reading, based primarily on his diagnosed learning disorder and relatively low grades. However, he demonstrated some improvement over time as his Standard GPA increased in a near-linear manner over the course of his enrollment.

### Mathematics

Student 6's mathematics grades ranged from one A to one F, and his annual Standard GPA ranged from 1.50 to 1.75.

Table 94. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	C-	A-	D	F	1.75
2008-09	C	C-	D	D	1.50
2009-10	C-	D+	C	C	1.75

*Note.* INC = Incomplete

Three ISAT reports were located in Student 6's special education file. In fifth grade, he received a ranking of "Meets Standards" in mathematics, and a NPR of 68. In



sixth grade, his ranking changed to “Below Standards,” with a NPR of 32. In seventh grade, he again received a ranking of “Below Standards,” and his NPR was 9.

Table 95. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	NR	NR	NR
2008-09	14	60	42
2009-10	NR	2	1

*Note.* NR stands for “Not Reported.”

Student 6 did not have an IEP goal for mathematics.

Overall, Student 6’s performance in mathematics was also variable. On AIMSweb measures, his percentile ranks ranged from 1 to 60, or what are generally considered the below average to average ranges of performance. On the ISAT, his percentile ranks spanned what are typically considered the below average to average ranges of functioning, and his rankings ranged from “Below Standards” to “Meets Standards.” His grades were relatively low, as he did not achieve a Standard GPA above 1.75. Based on these data, and in particular some below average scores on AIMSweb and ISAT measures, as well as relatively low grades, mathematics seemed to be an area of relative weakness for Student 6. Further, there was mixed evidence regarding whether any improvement occurred over time in this area. Interestingly, similar to reading, Student 6 seemed to demonstrate higher levels of performance on brief samples of his mathematics skills when compared to assessments that sampled his performance over longer periods of time (e.g., grades).

Writing

Student 6's writing grades ranged from Bs to Ds. His annual standard GPA ranged from 1.50 to 2.25.

Table 96. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B	C	D	C	2.00
2008-09	C-	C	D	D	1.50
2009-10	C	D+	B-	B	2.25

*Note.* INC = Incomplete

On the ISAT in sixth grade, Student 6 received a ranking of “Below Standards” in writing. No NPR was reported. This was Student 6's only ISAT report with information about his writing performance.

Student 6 had an IEP goal for general “written expression” in 11/07 and from 1/09 to 6/09. He met 25 percent of quarterly benchmark targets in relation to this goal, failing in 1/09, 4/09, 6/09, 11/09, 4/10, and 6/10. From 1/08 to 11/08, he had two more specific goals in this same area: written expression mechanics and written expression organization. For written expression mechanics, he met 75 percent of quarterly benchmark targets, failing in 6/08. He met 100 percent of quarterly benchmarks for written expression organization.

Based on these data, including his diagnosed learning disorder in written language and IEP goals, this seemed to be an area of relative weakness. Further, Student 6 received relatively low grades in writing, as his annual Standard GPA ranged from 1.50 to 2.25, and his performance on the ISAT was ranked as “Below Standards.” However,

he did seem to demonstrate some improvement in this area, evidenced by achieving 100 percent of benchmarks on one IEP goal and 75 percent on another, although he only achieved 25 percent of benchmarks on his third IEP goal.

### Science

In science, Student 6's grades ranged from As to Ds, and his annual Standard GPA ranged from 1.75 to 3.00.

Table 97. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	A	C	D+	C-	2.25
2008-09	C+	C	C	D	1.75
2009-10	C	B	B+	A	3.00

*Note.* INC = Incomplete

Student 6's special education file contained one ISAT report that included information about his science performance. In seventh grade, he received a rating of "Meets Standards" and a NPR of 50 in science.

Based on these data, and in particular his Standard GPA of 3.00 during the 09-10 academic year (which was higher than any other annual Standard GPA he achieved in any other academic subject), this seemed to be an area of relative strength for Student 6. In addition, he seemed to demonstrate some improvement over time, evidenced by achieving his highest annual Standard GPA in science during the last year in which data were collected for this study.

### Social Studies

Student 6's social studies grades ranged from A to F, and his annual Standard GPA ranged from 1.25 to 2.50.

Table 98. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	C+	D	F	C	1.25
2008-09	B-	C	C-	D	2.00
2009-10	C	D	A	B	2.50

*Note.* INC = Incomplete

In general, Student 6's social studies grades were relatively low. His annual GPA did not exceed 2.50, but improved over time in a near-linear manner. Based on these data, social studies seemed to be an area of relative weakness for Student 6.

### Summary of Academic Functioning

Despite having average cognitive ability, Student 6 struggled to perform consistently at an average level in most academic subjects. His diagnosed learning disorders in the areas of reading, written language, and processing (i.e., long-term retrieval, application of basic academic skills) seemed to severely impact his performance in all academic subjects, with the possible exception of science. While Student 6 seemed to receive relatively low grades in general, his performance on assessments that involved only brief samples of his skills (e.g., AIMSweb, ISAT) was noticeably more variable. He even scored within what is typically considered the above average range of functioning on more than one AIMSweb probe in reading comprehension. It is noteworthy that this

pattern of performance seemed to be the opposite of that of several other students in this study, who scored lowest on brief assessments.

Student 6's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 6 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 11. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Science	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Reading	Yes
Mathematics	Unclear (mixed results)
Writing	Yes
Social Studies	Yes

### Behavioral/Social-emotional Functioning

#### On Task/Work Completion

On a quarterly basis, Student 6 earned between 79.0 and 94.5 percent of his daily points on average in the area of on task/work completion behavior (see Table 99). Standard deviations ranged from 9.50 to 19.9. On a yearly basis, he earned between 86.2 and 92.7 percent of his daily points on average, with standard deviations ranging from 13.6 to 14.8.

Finally, Student 6 had IEP goals for on task behavior (1/08 – 4/10), work completion (1/08 – 11/08), and homework completion (1/09 – 6/10). He met 40 percent

of his quarterly benchmark targets for on task behavior, failing in 1/08, 4/08, 6/08, 4/09, 11/09, and 4/10. Student 6 met 0 percent of his quarterly benchmark targets for work completion, failing in 1/08, 4/08, 6/08, and 11/08. He met 71 percent of his quarterly benchmark targets for homework completion, failing in 6/09 and 11/09.

Table 99. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	89.4 (10.8)	88.5 (11.0)	87.7 (12.3)	79.0 (17.2)	86.2 (13.6)
2008-09	92.6 (12.6)	92.9 (11.0)	86.3 (19.9)	93.5 (12.0)	91.1 (14.8)
2009-10	91.6 (16.5)	92.6 (16.1)	94.5 (9.50)	91.8 (16.4)	92.7 (14.7)

*Note.* Data reported are means (standard deviations in parentheses).

Based on these data, on task/work completion seemed to be an area of relative weakness for Student 6, in particular due to his three IEP goals. However, he demonstrated near-linear improvement over time in annual percentages of daily points earned on average, though his progress toward meeting IEP benchmarks appeared to be more mixed.

#### Following Instructions/Compliance

Student 6 earned 82.2 to 93.5 percent of his daily points on average for following instructions behavior, on a quarterly basis (see Table 100). Standard deviations ranged from 8.15 to 19.4. He earned between 88.4 and 91.6 percent of his daily points on average on an annual basis, with standard deviations ranging from 12.2 to 15.4. Student 6's annual percentages of daily points earned increased in a linear fashion over the course of his enrollment.

Student 6 did not have an IEP goal for following instructions behavior.

Based on these data, including the fact that he earned at least 90 percent of his daily points on average during 8 of 12 quarters, as well as the absence of an IEP goal, Student 6 seemed to demonstrate a relative strength in following instructions behavior. Further, his annual percentages of daily points earned on average increased over time in a near-linear fashion.

Table 100. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	90.8 (10.3)	91.8 (8.15)	88.6 (12.1)	82.2 (15.5)	88.4 (12.2)
2008-09	90.3 (12.5)	93.5 (10.5)	84.8 (19.4)	91.7 (12.9)	89.8 (14.7)
2009-10	92.2 (16.6)	92.2 (16.9)	92.8 (9.01)	88.6 (18.4)	91.6 (15.4)

*Note.* Data reported are means (standard deviations in parentheses).

### Physical Aggression

Student 6 was physically aggressive toward others (e.g., fighting with peers) between 0 and 2 times per year. His annual mean was 1.00 (standard deviation: 1.00) acts of aggression. Student 6's pattern of aggression may be described as exhibiting generally low levels (i.e., 2 incidents or fewer per year) of aggressive behavior.

Table 101. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	0	0	1	1	2
2008-09	0	0	0	0	0
2009-10	0	0	0	1	1

Student 6 did not have an IEP goal for physically aggressive behavior.

Based on these data, this seemed to be an area of relative strength for Student 6, as he was not physically aggressive during 9 of 12 quarters. Further, he seemed to sustain a high level of performance over time in this area.

### Social Skills

The following table summarizes Student 6's grades in the areas of academic-, peer-, and adult-oriented social skills.

Table 102. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08				
Academic	0	3	--	97
Peer	0	40	--	60
Adult	0	21	--	79
2008-09				
Academic	0	22	67	11
Peer	0	75	25	0
Adult	0	32	68	0
2009-10				
Academic	0	22	39	39
Peer	0	75	20	5
Adult	0	25	71	4

*Note.* The category Showing Improvement was added in August 2008.



Student 6 had an IEP goal for positive peer interactions in 11/07 and from 1/10 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

Overall, Student 6's academic-oriented social skills improved from receiving 97 percent "Needs Improvement" grades during his first year of attendance to 39 percent "Needs Improvement" grades during the final year of data collection. In addition, he went from receiving 3 percent "Good/Satisfactory" grades during his first year of attendance to 22 percent "Good/Satisfactory" grades during his final year of attendance.

Student 6's peer-oriented social skills grades also improved over time. He went from receiving 40 percent "Good/Satisfactory" and 60 percent "Needs Improvement" grades during his first year of attendance to 75 percent "Good/Satisfactory" and 5 percent "Needs Improvement" grades during the final year of data collection. In addition, he demonstrated improvement in this area by meeting 100 percent of quarterly benchmarks for his IEP goal.

Student 6's adult-oriented social skills grades improved from receiving 79 percent "Needs Improvement" grades during his first year to only 4 percent "Needs Improvement" grades during the final year of data collection.

Based on these data, including the presence of an IEP goal and the fact that he did not receive a single grade of "Excellent/Outstanding" for any social skill over the course of his enrollment, this seemed to be an area of relative weakness for Student 6. However, he demonstrated some improvement over time in all three areas of social skills.

### Coping Skills

Table 103 summarizes Student 6's grades in the area of coping skills.

Student 6 had an IEP goal for "coping skills" from 1/08 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

Overall, based on these data, coping skills seemed to be an area of relative weakness for Student 6. The majority of Student 6's grades in the area of coping skills

were “Needs Improvement” during each year he attended this school. However, he demonstrated some improvement in coping skills grades between the 07-08 and 08-09 academic years (going from 100 percent “Needs Improvement” grades in 07-08 to 56 percent “Needs Improvement” grades in 08-09), although this trend did not continue through the 09-10 school year. Also, regarding his IEP goal in the area of coping skills, he met 100 percent of his quarterly benchmark targets, which suggests progress.

Table 103. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08	0	0	--	100
2008-09	0	0	44	56
2009-10	0	0	31	69

*Note.* The category Showing Improvement was added in August 2008.

### Medical Management

At the time he enrolled in this program, Student 6 was prescribed Abilify and Concerta. There have been 7 documented medication changes or dosage adjustments since that time, for a mean of 2.33 (standard deviation: 1.53) per year (see Table 104). At the end of the study period, he was taking Abilify, Concerta, and Wellbutrin. In total, Student 6 has taken 5 psychotropic medications while enrolled in this school: Concerta, Abilify, Lexapro, Risperdal, and Wellbutrin. Ongoing medication compliance issues were noted in his special education file.

Student 6 has undergone psychiatric hospitalization on 3 occasions in his lifetime. The first was prior to his entry into this program. The other occurrences were in July 2009 and August 2009.

Table 104. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	ADHD, Mood Disorder Not Otherwise Specified, Learning Disorders (dates unknown)	Concerta, Abilify (at entry)
2007-08		Concerta (DC) (5/08)
2008-09		Risperdal (A then immediately D), Abilify (DC), Lexapro (A) (5/09) Lexapro (DC) (5/09)
2009-10	“Bipolar Disorder” (2009)	Lexapro (D), Abilify (DC) (8/09) Concerta (DC) (4/10) Abilify (DC) (5/10) Wellbutrin (A) (5/10)

*Note.* A = Added, D = Discontinued, DC = Dosage Change

### School Attendance

Student 6 missed 21.0 (standard deviation: 5.57) days per year on average since he began attending this school. His yearly absence totals ranged from 16 to 27 (see Table 105). Student 6’s attendance records indicated he had at least 2 unexcused absences every year, peaking at 7 unexcused absences during the 08-09 school year.

### Summary of Behavioral/Social-emotional Functioning

Student 6’s behavioral/social-emotional functioning was characterized by strengths in the areas of following instructions behavior and refraining from physical

aggression, and weaknesses in on task/work completion, social skills, and coping skills. Variability was noted in his day-to-day functioning, evidenced by several large (i.e., 10 or greater) standard deviations associated with quarterly percentages of daily points earned on average for both on task/work completion and following instructions behaviors. This type of variability may reflect rapid cycling of moods, which is a common occurrence in children and adolescents with bipolar disorders.

Table 105. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2007-08	18	2	20
2008-09	20	7	27
2009-10	14	2	16

*Note.* Reported reasons for absences were not tracked.

Student 6 had a fairly high number of absences, missing at least 16 days each year, at least 2 of which were unexcused. The only psychiatric hospitalizations he underwent while enrolled in this school occurred during the 09-10 school year, when he missed the fewest number of days overall. Student 6 experienced ongoing medical management of his psychiatric symptoms during his enrollment in this school, as he tried 5 different psychotropic medications, and experienced 2.33 medication changes or dosage adjustments per year on average. It should be noted that a complicating factor in Student 6's behavioral/social-emotional performance seemed to be ongoing issues with medication compliance. Also, Student 6 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005). However, he always

took these medications in conjunction with a mood stabilizer and/or atypical antipsychotic, per published treatment guidelines.

Student 6's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 6 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 12. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Following Instructions	Yes
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Yes
Coping Skills	Yes
Social Skills	Yes

### Immediate Educational Outcomes

#### Level System Standing

Student 6's level system standing ranged from Levels 1 to 4 over the course of his enrollment in this school. Each year, his level status spanned three to four levels. It should be noted that Student 6 achieved Level 4 for the first time in the final year of data collection for this study, and spent time on Level 1 during only one quarter in this same year, which was his personal best.

Table 106. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	1,2,3	2,3	1,2	1	1-3
2008-09	1,2,3	1,2,3	1,2,3	1,2,3	1-3
2009-10	1,2,3	2,3	2,3,4	2,3,4	1-4

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

Student 6 did not achieve any type of re-integration into his home school. Documentation in his special education file indicated that he was to be placed in an alternative high school following his graduation from eighth grade in 6/10.

### Within Case Analysis for Student 6

Ultimately, while Student 6 was not able to achieve re-integration into a general education school, this therapeutic day school did seem to be an effective placement for him. Based on qualitative analysis, Student 6 maintained or improved performance in all areas of relative strength (both academic and behavioral/social-emotional), and improved performance in 3 of 4 areas identified as relative weaknesses in academics, and all areas identified as relative weaknesses in behavioral/social-emotional functioning. Perhaps most importantly, he demonstrated improvement in coping skills and school attendance, which were primary reasons he was referred to this school. In general, Student 6 demonstrated a pattern of near-linear improvement over time, although there was variability in his performance.

Student 6's academic functioning was marked by the presence of multiple learning disorders, which seemed to severely impact his performance. However, he also demonstrated variability in his performance, though his pattern of variability was the opposite of several other students enrolled in this study: Student 6 seemed to perform

better on brief assessments (e.g., AIMSweb probes) than on assessments that took place over longer periods of time (e.g., grades). Variability was also present in his day-to-day behavioral functioning, as evidenced by several standard deviations greater than 10 in the two categories for which he received daily behavioral points (i.e., on task/work completion, following instructions). As mentioned already, this type of variability may reflect rapid cycling of moods. Also, Student 6 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005). However, he always took these medications in conjunction with an atypical antipsychotic, per published guidelines.

Finally, it should be noted that while Student 6 did not achieve re-integration or high school placement within a general education school, he did manage to reach the highest level of this school's behavioral modification level system at some point during each of his final two quarters. Therefore, in terms of immediate educational outcomes, he did experience some success.

#### Case Summary for Student 7

Student 7 is a thirteen-year old White male. He began attending this school in January 2008, during fifth grade, and most recently completed seventh grade. Student 7 was referred to this school due to having frequent emotional "meltdowns" at school, as well as repetitive suicidal ideation following the death of a grandparent, which resulted in psychiatric hospitalization. His strengths have been described as being creative, being an interested learner, and enjoying interactions with adults. Student 7's weaknesses have been identified as difficulty accepting adult decisions, difficulty coping with negative emotions, and frequently talking out without first raising his hand.

Student 7 lives with his biological mother, biological father, and biological younger brother. Based on his family's socio-economic status, he pays the standard (i.e., full) price for school lunch.

School records indicate nothing significant about Student 7's developmental history. In 2008, he was diagnosed with "Bipolar Disorder." Student 7 has also been diagnosed with ADHD and an unspecified anxiety disorder. His psychiatric family history is significant for ADHD in a first-degree relative (parent) as well as an extended family member, an unspecified anxiety disorder in a first-degree relative (parent) as well as an extended family member, and depression in an extended family member.

In 2007, Student 7 was administered the WISC-IV in order to assess his cognitive abilities. On this test battery, he achieved a FSIQ of 114, which is typically considered within the high average range of functioning. However, on a previous (2004) administration of the WISC-IV, he achieved a FSIQ of 129, which is considered to fall within the superior range of functioning. With his 2007 administration of the WISC-IV, Student 7 also achieved the following index scores: Verbal Comprehension 110, Perceptual Reasoning 129, Working Memory 94, and Processing Speed 100.

### Academic Functioning

#### Reading

Student 7's reading grades ranged from As to one B. His annual Standard GPA ranged from 3.75 to 4.00. Student 7 received straight As in reading during both the 07-08 and 09-10 academic years.

Table 107. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			A-	A-	4.00
2008-09	A-	B+	A-	A-	3.75
2009-10	A	A	A	A	4.00

*Note.* INC = Incomplete



Student 7's special education file contained one ISAT report, from his sixth grade year. In the area of reading, he received a ranking of "Exceeds Standards" and a NPR of 85.

In the area of reading fluency, Student 7's AIMSweb percentile ranks ranged from 63 to 90. On AIMSweb measures of reading comprehension, his percentile ranks ranged from 51 to 83.

Table 108. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		80	83
2008-09	81	94	63
2009-10	NR	67	90

*Note.* NR stands for "Not Reported."

Table 109. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		61	79
2008-09	72	83	51
2009-10	70	65	71

*Note.* NR stands for "Not Reported."

Student 7 did not have an IEP goal in the area of reading.

In summary, reading seemed to be an area of relative strength for Student 7. On AIMSweb measures, his percentile ranks spanned what are typically considered the average to above average ranges of performance for both reading fluency and reading

comprehension. Further, he maintained a GPA of at least 3.75 over the course of his enrollment. On one ISAT, he scored within what is typically considered the above average range of performance. Overall, Student 7 seemed to sustain a high level of performance over time in reading.

### Mathematics

Student 7's mathematics grade ranged from As to Cs, and his annual Standard GPA in mathematics ranged from 2.25 to 3.75.

Table 110. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			B+	C	2.50
2008-09	B-	C+	C+	C	2.25
2009-10	B	A	A	A	3.75

*Note.* INC = Incomplete

In sixth grade, Student 7 received a ranking of “Meets Standards” and a NPR of 76 in the area of mathematics on the ISAT. This was the only ISAT report located in his special education file.

On AIMSweb measures of mathematics computation, Student 7's performance was highly variable. His percentile ranks ranged from 13 to 82 (see Table 111).

Student 7 did not have an IEP goal for mathematics.

In general, mathematics seemed to be an area of relative weakness for Student 7. His AIMSweb percentile ranks spanned what are typically considered the below average to above average ranges of performance. His annual Standard GPA fell below 3.00 during two of his three years enrolled in this school. However, it is important to note that

Student 7 demonstrated improvement in his grades over time, as he achieved his highest annual GPA during the final year of data collection for this study. Finally, it should be noted that on one ISAT, Student 7 scored within what is typically considered the above average range of functioning.

Table 111. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08		20	60
2008-09	41	33	13
2009-10	66	18	82

*Note.* NR stands for “Not Reported.”

### Writing

In the area of writing, Student 7’s grades ranged from As to Bs, and his annual Standard GPA ranged from 3.50 to 4.00.

Table 112. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			A-	A	4.00
2008-09	A-	A-	B	B+	3.50
2009-10	B+	A	A	A	3.75

*Note.* INC = Incomplete

Only one ISAT report was located in Student 7's special education file. In sixth grade, he received a ranking of "Below Standards" in the area of writing. A NPR was not attached to this ranking.

Student 7 did not have an IEP goal for writing.

Overall, writing seemed to be an area of relative strength for Student 7, primarily based on his sustaining an annual GPA of at least 3.50. Because his annual GPA was between 3.50 and 4.00 every year, he seemed to maintain a high level of performance over time. However, it should be noted that on the ISAT in sixth grade, he received a ranking of "Below Standards," the next-to-lowest category out of four possible rankings.

### Science

In science, Student 7's grades ranged from As to Bs. His annual Standard GPA ranged from 3.50 to 4.00.

Table 113. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			B+	A	3.50
2008-09	B+	A-	A-	A-	3.75
2009-10	A-	A	A	A	4.00

*Note.* INC = Incomplete

In Student 7's special education file, there was no record of his performance on the ISAT in the area of science.

Student 7's science performance may be characterized as representing a sustained high level of performance over time, as his annual Standard GPA ranged from 3.50 to 4.00. It should be noted that during the final year in which data were collected for this

study, Student 7 earned straight As in science. Upon considering these data, science seemed to be an area of relative strength for Student 7.

### Social Studies

Student 7's social studies grades ranged from As to Bs, and his annual Standard GPA ranged from 3.25 to 4.00.

Table 114. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08			A-	A	4.00
2008-09	B-	B-	B-	A-	3.25
2009-10	B+	A	A	A	3.75

*Note.* INC = Incomplete

In general, Student 7 maintained a high level of performance in social studies, achieving at least a 3.25 GPA in every year he was enrolled in this school. Based on these data, social studies seemed to be an area of relative strength for Student 7.

### Summary of Academic Functioning

Based on all available data, Student 7's academic profile is characterized by a generally high level of ability. Within all five academic subjects, he achieved either a Standard GPA of 4.00 or a percentile rank above the 75<sup>th</sup> percentile at some point in time, or accomplished both of these feats. However, his academic profile was marked by variability in performance. In general, his performance seemed to be most variable on assessments that sampled his performance for only a few minutes at a time (e.g., AIMSweb probes), and least variable on assessments that occurred over an extended period of time (e.g., academic grades). Such a pattern suggests fluctuations in

performance on a day-to-day basis, with differences averaged out over a longer period of time. This type of pattern may be indicative of rapid cycling of moods, as is common in children and adolescents with bipolar disorders. Interestingly, Student 7's performance seemed to be most variable in the area of mathematics, for both AIMSweb measures and grades.

Student 7's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 7 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 13. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Yes

#### Behavioral/Social-emotional Functioning

##### On Task/Work Completion

In the area of on task/work completion behavior, Student 7's percentage of daily points earned on average ranged from 76.1 to 98.8 on a quarterly basis. Standard deviations ranged from 7.91 to 25.2. On an annual basis, his percentage of daily points

earned on average ranged from 79.2 to 95.8, with standard deviations ranging from 18.6 to 19.9.

Table 115. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			82.9 (18.3)	76.1 (18.4)	79.2 (18.6)
2008-09	81.8 (17.7)	85.4 (14.0)	79.3 (24.1)	82.3 (21.9)	82.1 (19.9)
2009-10	94.6 (21.5)	93.3 (25.2)	96.8 (16.2)	98.8 (7.91)	95.8 (19.0)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 7 had an IEP goal for on task behavior from 6/08 to 6/10. He met 100 percent of his quarterly benchmark targets. Student 7 also had an IEP goal for work completion in 4/08. He met 100 percent of his quarterly benchmark targets for this goal, also (though there was only one benchmarking period).

Based on these data, including the presence of two IEP goals, on task/work completion behavior seemed to be an area of relative weakness for Student 7. However, progressive increases in total percentages of daily points earned on average, as well as meeting 100 percent of quarterly benchmarks, seemed to indicate improvement in performance over time.

#### Following Instructions/Compliance

Quarterly, Student 7 earned 83.6 to 100 percent of his daily points on average for following instructions behavior. Standard deviations ranged from 0.00 to 22.3.

Annually, he earned 85.4 to 98.8 percent of his daily points on average, with standard deviations ranging from 8.66 to 19.3.

Table 116. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			88.4 (17.3)	86.7 (16.4)	87.5 (16.7)
2008-09	86.9 (18.9)	87.7 (12.9)	83.7 (22.3)	83.6 (21.4)	85.4 (19.3)
2009-10	97.4 (15.5)	100 (0.00)	100 (0.00)	97.6 (8.62)	98.8 (8.66)

*Note.* Data reported are means (standard deviations in parentheses).

Student 7 did not have an IEP goal for following instructions behavior.

Overall, Student 7 earned at least 90 percent of his daily points on average during 4 of 10 quarters, and between 85 and 90 percent of his daily points on average during 4 of 10 quarters. Based on these data, as well as the fact that Student 7 did not have an IEP goal in this area, following instructions behavior seemed to be an area of relative strength. Additionally, he seemed to demonstrate improvement in performance over time by earning his highest annual percentage of points during the final year of data collection for this study.

#### Physical Aggression

Since the time he began attending this school, Student 7 did not engage in any physically aggressive behaviors.

Table 117. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			0	0	0
2008-09	0	0	0	0	0
2009-10	0	0	0	0	0



Student 7 did not have an IEP goal for physically aggressive behavior.

In summary, Student 7 did not engage in physically aggressive behavior at all in this school. Therefore, this seemed to be an area of relative strength for Student 7, and he sustained a high level of performance over time.

### Social Skills

Student 7's social skills behaviors are reflected in the following table, which summarizes his grades in the areas of academic-, peer-, and adult-oriented social skills.

Table 118. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08				
Academic	0	17	--	83
Peer	0	40	--	60
Adult	0	29	--	71
2008-09				
Academic	0	19	14	67
Peer	0	35	15	50
Adult	0	39	4	57
2009-10				
Academic	78	22	0	0
Peer	25	75	0	0
Adult	50	50	0	0

*Note.* The category Showing Improvement was added in August 2008.

Student 7 had IEP goals for the following social skills behaviors: accept adult decisions (6/08 – 6/10), ask for help appropriately (11/08 – 6/10), and raise hand and wait to be called on (6/08 only). He met 100 percent of his quarterly benchmark targets for all three goals.

Overall, Student 7's academic social skills improved from receiving 83 percent "Needs Improvement" grades during his first year of attendance to 0 percent "Needs Improvement" grades during the final year of data collection. In addition, he went from receiving 0 percent "Excellent" grades during his first year of attendance to 78 percent "Excellent" grades during his final year of attendance. Student 7 also met 100 percent of his quarterly benchmarks for asking for help appropriately, as well as raising his hand and waiting to be called on.

Student 7's peer-oriented social skills grades also improved over time. He went from receiving 0 percent "Excellent" and 60 percent "Needs Improvement" grades during his first year of attendance to 25 percent "Excellent" and 0 percent "Needs Improvement" grades during the final year of data collection.

Student 7's adult-oriented social skills grades improved from receiving 0 percent "Excellent" and 71 percent "Needs Improvement" grades during his first year to 50 percent "Excellent" and 0 percent "Needs Improvement" grades during the final year of data collection. Also, he achieved 100 percent of his quarterly benchmarks for his IEP goal of accepting adult decisions.

Based on these data, including the presence of three IEP goals, social skills seemed to be an area of relative weakness for Student 7. However, he demonstrated considerable improvement in performance over time.

### Coping Skills

The following table summarizes Student 7's grades in the area of coping skills.

Table 119. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08	0	13	--	88
2008-09	0	6	0	94
2009-10	25	75	0	0

*Note.* The category Showing Improvement was added in August 2008.

Student 7 had an IEP goal for “coping skills” from 6/08 to 6/09. He met 80 percent of quarterly benchmark targets, failing only in 4/09.

Overall, Student 7 demonstrated marked improvement in coping skills grades. During his first year of attendance, he received 88 percent “Needs Improvement” grades, and in the final year of data collection, he received 0 percent “Needs Improvement” grades. Regarding his IEP goal in the area of coping skills, he met 80 percent of his quarterly benchmark targets, indicating that he made general progress. Based on these data, including the presence of an IEP goal for coping skills, this seemed to be an area of relative weakness.

### Medical Management

When he entered this program, Student 7 was prescribed Seroquel, Zoloft, and Strattera. Since then, he has experienced 13 medication changes or dosage adjustments, for a mean of 4.33 (standard deviation: 3.51) per year. At the conclusion of this study, Student 7 was taking Trileptal, Adderall, and Abilify. In all, he was prescribed 7 different psychotropic meds since he began attending this school: Seroquel, Zoloft, Strattera, Trileptal, Adderall, Abilify, and Vyvanse. No compliance issues were noted in his special education file.

Table 120. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Disorder” (2008), ADHD, unspecified anxiety disorder (dates unknown)	Seroquel, Zoloft, Strattera (at entry)
2007-08		Seroquel (DC) (2/08) Seroquel (DC) (2/08) Strattera (D) (4/08) Vyvanse (A) (6/08)
2008-09		Seroquel (D), Vyvanse (D), Trileptal (A) (8/08) Adderall (A) (9/08) Zoloft (DC) (9/08) Adderall (DC) (10/08) Trileptal (DC) (11/08) Zoloft (DC) (11/08) Zoloft (D), Trileptal (D), Adderall (D) (3/09) Trileptal (A), Adderall (A), Abilify (A) (6/09)
2009-10		Abilify (DC) (9/09)

*Note.* A = Added, D = Discontinued, DC = Dosage Change

Student 7 has undergone 1 psychiatric hospitalization in his lifetime, which occurred prior to entering this program.

### School Attendance

Student 7 missed 1.67 (standard deviation: 1.53) days per year on average since he began attending this school. His annual absence totals ranged from 0 to 3. Student 7 did not have any unexcused absences. In general, his attendance seemed to improve over time in a near-linear manner.

Table 121. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2007-08	3	0	3
2008-09	2	0	2
2009-10	0	0	0

*Note.* Reported reasons for absences were not tracked.

### Summary of Behavioral/Social-emotional Functioning

Based on all available data, Student 7's behavioral/social-emotional relative strengths seemed to lie within the areas of following instructions and refraining from engaging in physically aggressive behavior. His relative weaknesses seemed to be in on task/work completion behavior, social skills, and coping skills.

Similar to his academic profile, Student 7 also exhibited variability in performance – sometimes to a high degree – within his behavioral/social-emotional profile. In the areas of on task/work completion and following instructions behaviors, the standard deviations associated with his quarterly percentages of points earned on average exceeded 20 four times for on task/work completion behavior, and two times for

following instructions behavior. Standard deviations were greater than 10 during five additional quarters for each behavior. As mentioned previously, a significant amount of variability in daily performance may be indicative of rapid cycling of moods. It should be noted that Student 7 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005), but always took these medications in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines. He was also completely unmedicated from 3/09 to 6/09, which seemed to negatively impact his behavioral/social-emotional functioning.

Student 7's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 7 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 14. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Following Instructions	Yes
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Yes
Social Skills	Yes
Coping Skills	Yes

## Immediate Educational Outcomes

### Level System Standing

While enrolled in this school, Student 7's level system standing ranged from Levels 1 to 4. Each year, his level status spanned two to four levels. It should be noted that during the final year of data collection, Student 7 achieved Level 4 status at some point in all four quarters, and was never on Level 1 (the only time he accomplished this feat).

Table 122. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08			1	1,2	1-2
2008-09	2,3,4	1,2	1,2,3	1	1-4
2009-10	2,3,4	4	4	4	2-4

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

Student 7 achieved partial re-integration (one class period) into his home school in January 2010. After a successful start, he had a second class period added in April 2010, which continued through the end of the data collection period for this study.

### Within Case Analysis for Student 7

Qualitative analysis suggests that for Student 7, placement in a therapeutic day school was an effective educational intervention package. He at least maintained performance levels in all areas identified as relative academic or behavioral/social-emotional strengths, while improving performance levels in all areas identified as relative academic or behavioral/social-emotional weaknesses. Student 7's most dramatic gains

seemed to be in the areas of social and coping skills, which is noteworthy because he was referred to this school primary because of deficits in coping skills. Ultimately, he was able to achieve the highest level of this school's behavior modification level system, and successfully began re-integration into his home school. In general, Student 7 demonstrated a near-linear pattern of improvement over time.

An important trend that emerged while analyzing Student 7's academic and behavioral/social-emotional data was that a significant amount of variability appeared to be present in his day-to-day functioning. He exhibited some very high standard deviations associated with the daily points he earned for on task/work completion and following instructions behavior, as well as highly variable scores on brief probes of reading fluency, reading comprehension, and mathematics computation performance. When data reflected a longer period of time (e.g., by quarter or year), performance did not appear quite as variable. As mentioned previously, this pattern may be indicative of the presence of rapid cycling of moods. Further, Student 7 was prescribed both stimulant and SSRI medications, a practice cautioned against by Kowatch et al. (2005). He always took these medications in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines. However, Student 7 was completely unmedicated from 3/09 to 6/09, which seemed to negatively impact his behavioral/social-emotional functioning.

Also, it should be noted that while Student 7 demonstrated high ability both cognitively and academically, he did require ongoing medical management for his psychiatric symptoms, averaging 4.33 medication changes or dosage adjustments per year, and trying out 7 different psychotropic medications. The extent to which medication affected his performance in this school was unclear, though it likely played a significant role in his success.



Case Summary for Student 8

Student 8 is a fifteen-year-old White male who recently completed eighth grade. He began attending this school in June 2007, when he was in fifth grade. Student 8 was referred to this school after exhibiting difficulties with focusing and completing his work, as well as low frustration tolerance, and also as a way to re-introduce him to same-aged peers. He had been retained two years at earlier grade levels, and thus had spent several years in classrooms with chronologically younger students. Student 8's strengths have been identified as exhibiting solid cognitive abilities, actively participating in class, and being helpful to others. His weaknesses have been described as difficulty coping with negative emotions, difficulty engaging in positive peer interactions at times, and difficulty accepting adult decisions and feedback.

Student 8 currently lives with his biological mother, step-father, three older biological siblings (two sisters, one brother), and two extended family members. His biological parents are divorced. Based on his family's socio-economic status, Student 8 pays the standard (i.e., full) price for school lunch.

School records indicate that Student 8 exhibited delayed language development, but met other developmental milestones within normal limits. In 2006 or 2007, he was diagnosed with "Bipolar Disorder." Student 8 has also been diagnosed with ADHD and PTSD. School records indicated that his family history is significant for a first-degree relative (sibling) diagnosed with "emotional disturbance," but no specific mood or other psychiatric disorders are noted in his special education file.

In 2006, Student 8's cognitive abilities were assessed with the WISC-IV. He achieved a FSIQ of 102, which falls within what is typically considered the average range of functioning. Scores on other indices were as follows: Verbal Comprehension 102, Perceptual Reasoning 106, Working Memory 97, and Processing Speed 94.

## Academic Functioning

### Reading

Student 8's reading grades ranged from As to Cs. His annual Standard GPA ranged from 2.75 to 3.50.

Table 123. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B	B	C	A-	3.00
2008-09	B-	C	B	B	2.75
2009-10	A	A-	A-	C+	3.50

*Note.* INC = Incomplete

Student 8's special education file contained one ISAT report. In sixth grade, he received a ranking of "Meets Standards" and a NPR of 74 in reading.

Student 8's AIMSweb percentile ranks ranged from 18 to 33 in reading fluency, and 14 to 45 in reading comprehension.

Table 124. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	33	18	21
2008-09	26	26	22
2009-10	24	29	21

*Note.* NR stands for "Not Reported."

Table 125. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	20	22	19
2008-09	38	40	19
2009-10	40	14	45

*Note.* NR stands for “Not Reported.”

Student 8 had IEP goals for reading fluency (11/07 – 6/09) and reading comprehension (11/07 – 6/09). He met 63 percent of his quarterly benchmark targets for reading fluency, failing in 4/08, 4/09, and 6/09. Student 8 met 38 percent of his quarterly benchmark targets for reading comprehension, failing in 11/07, 1/08, 6/08, 4/09, and 6/09.

Overall, Student 8’s performance on AIMSweb measures of reading fluency and reading comprehension spanned what are typically considered the below average to average ranges of functioning. On the ISAT, Student 8’s percentile rank was near the upper limit of what is typically considered the average range. Regarding grades, he achieved a GPA of at least 3.00 during 2 of the 3 years he was enrolled in this school. Based on these data, and in particular the presence of IEP goals for both reading fluency and reading comprehension, this seemed to be an area of relative weakness for Student 8. While he met only 38 to 63 percent of his IEP benchmarks, there was evidence that his grades improved over time, as he achieved his highest annual GPA during the final year of data collection for this study.

### Mathematics

In mathematics, Student 8’s grades ranged from As to Cs, and his annual Standard GPA ranged from 2.25 to 3.50.

Table 126. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B	A-	A	B	3.50
2008-09	INT	C+	B	C+	2.33
2009-10	C-	C	B	C	2.25

*Note.* INC = Incomplete, INT = Took class in mainstream school

In sixth grade, Student 8 received a ranking of “Meets Standards” in mathematics on the ISAT, with a NPR of 68. This was the only ISAT report in his special education file.

On AIMSweb measures of mathematics computation, Student 8’s percentile ranks ranged from 3 to 36.

Table 127. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08	5	NR	4
2008-09	10	36	3
2009-10	16	NR	NR

*Note.* NR stands for “Not Reported.”

Student 8 had an IEP goal for mathematics computation from 11/07 to 6/10. He met 58 percent of his quarterly benchmark targets for this goal, failing in 11/07, 1/08, 4/08, 6/08, and 6/09.

In general, Student 8’s AIMSweb percentile ranks spanned what are typically considered the below average to average ranges of functioning, but on the ISAT he

scored well within what is typically considered the average range. As for his grades, Student 8 achieved an annual GPA of at least 3.00 during only 1 of 3 years. Based on these data, and in particular the presence of an IEP goal in this area, mathematics seemed to be an area of relative weakness for Student 8. Results seemed mixed as to whether he demonstrated improvement over time, as his grades declined each year, but he met 58 percent of quarterly benchmarks for an IEP goal in mathematics computation.

### Writing

Student 8's writing grades ranged from As to Bs. His annual Standard GPA ranged from 3.00 to 3.75.

Table 128. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	B	A	A	A-	3.75
2008-09	B+	A	A	A	3.75
2009-10	B-	B	B+	B	3.00

*Note.* INC = Incomplete

On the ISAT in sixth grade, Student 8 received a ranking of “Academic Warning” (the lowest possible ranking) in writing. No NPR was reported. This was the only ISAT report in his special education file.

Student 8 had an IEP goal for written expression from 11/07 to 6/08. He met 50 percent of his quarterly benchmark targets, failing in 1/08 and 6/08.

Overall, Student 8 earned all As and Bs in writing, and maintained an annual GPA of at least 3.00 during all three years he was enrolled in this school. However, he received the lowest possible ranking on the ISAT. Based on these data, and in particular

the presence of an IEP goal for written expression, this seemed to be an area of relative weakness for Student 8. Results seemed mixed as to whether he demonstrated improvement in writing over time, as his annual GPA declined each year, but he met 50 percent of benchmarks for his IEP goal.

### Science

Student 8's grades in science ranged from As to Cs, and his annual Standard GPA ranged from 2.33 to 3.50.

Table 129. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	C-	A	A	INT	3.33
2008-09	INT	C-	B	C	2.33
2009-10	A-	B	B	A	3.50

*Note.* INC = Incomplete, INT = Took class in mainstream school

Student 8's special education file did not contain an ISAT report that had information about his science performance.

Based on these data, it was somewhat difficult to determine whether science was an area of relative strength or weakness for Student 8. His grades were similar to those in other subjects, and no other data were available for purposes of triangulation. Ultimately, science was categorized as an area of relative strength for Student 8, based on the rationale that he achieved an annual GPA of at least 3.00 during 2 of 3 years enrolled in this school. He seemed to demonstrate some improvement over time in science, as his annual Standard GPA was highest during the final year of data collection, although this improvement appeared to occur in a non-linear manner.

### Social Studies

Student 8's social studies grades ranged from As to Cs, and his Standard GPA ranged from 2.50 to 4.00.

Table 130. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08	C	C+	C	A-	2.50
2008-09	INT	B	A	B+	3.33
2009-10	A	A	A	A	4.00

*Note.* INC = Incomplete, INT = Took class in mainstream school

In general, Student 8's annual social studies GPA improved in a linear manner over the course of his enrollment. During the final year of data collection for this study, he received straight As in social studies. Similar to his science data, social studies seemed to be an area of relative strength for Student 8, as he achieved a GPA of at least 3.00 during 2 of 3 years enrolled in this school.

### Summary of Academic Functioning

Due to considerable variability in his performance, it was somewhat difficult to determine all of Student 8's relative strengths and weaknesses, and also whether he made progress in some academic subjects over time. His did not receive a grade below the C range in any subject, yet some of his AIMSweb percentile ranks in reading fluency, reading comprehension, and mathematics computation fell into what is typically considered the below average range of functioning. In addition, he received the lowest possible ranking on the ISAT in the area of writing. In general, it seemed like he performed better on measures that sampled his performance over a longer period of time

(i.e., grades) when compared to more brief measures (e.g., AIMSweb). This type of pattern may reflect variability in day-to-day functioning that could be associated with rapid cycling of moods, a common occurrence in children and adolescents with bipolar disorders.

Student 8's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 8 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 15. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Reading	Yes
Mathematics	Unclear (mixed results)
Writing	Unclear (mixed results)

### Behavioral/Social-emotional Functioning

#### On Task/Work Completion

In the area of on task/work completion behavior, Student 8 earned between 90.7 and 99.4 percent of his daily points on average on a quarterly basis. Standard deviations ranged from 1.99 to 11.2. On an annual basis, he earned between 95.2 and 98.5 percent of his daily points on average, with standard deviations ranging from 3.95 to 8.55.



Table 131. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	93.7 (8.79)	97.5 (4.31)	98.9 (3.21)	98.0 (5.11)	97.1 (5.90)
2008-09	96.9 (7.95)	90.7 (11.2)	96.1 (6.42)	96.8 (6.91)	95.2 (8.55)
2009-10	99.2 (2.16)	99.4 (1.99)	98.1 (4.23)	97.1 (5.77)	98.5 (3.95)

*Note.* Data reported are means (standard deviations in parentheses).

Student 8 did not have an IEP goal for on task/work completion behavior.

Based on these data, and in particular the fact that he earned at least 90 percent of his daily points on average during 12 of 12 quarters, this seemed to be an area of relative strength. Further, he demonstrated some improvement over time based on comparing his final year annual percentage of daily points earned on average to those of the previous two years.

#### Following Instructions/Compliance

On a quarterly basis, Student 8 earned 89.4 to 99.3 percent of his daily points on average for following instructions behavior (see Table 132). Standard deviations ranged from 2.12 to 12.0. On an annual basis, he earned 94.9 to 98.4 percent of his daily points on average, with standard deviations ranging from 4.37 to 9.11. Student 8's personal best annual performance occurred during the final year of data collection for this study.

Student 8 did not have an IEP goal for following instructions behavior.

Based on these data, and in particular the fact that he earned at least 90 percent of his daily points on average during 11 of 12 quarters, this seemed to be an area of relative strength. Further, he demonstrated some improvement over time based on comparing his annual percentage of daily points earned on average during the 09-10 academic year to those of the previous two years.

Table 132. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	93.1 (10.4)	97.0 (6.01)	97.5 (6.15)	97.7 (4.60)	96.4 (7.19)
2008-09	97.2 (8.34)	89.4 (12.0)	96.1 (7.07)	96.9 (6.31)	94.9 (9.11)
2009-10	99.2 (2.93)	99.3 (2.12)	98.3 (4.03)	96.6 (6.59)	98.4 (4.37)

*Note.* Data reported are means (standard deviations in parentheses).

### Physical Aggression

Student 8 engaged in physically aggressive behaviors (e.g., pushing peers, throwing objects and hitting others) between 0 and 1 time per year, for a mean of 0.67 (standard deviation: 0.58) aggressive acts per year. His pattern of aggression may be characterized by low levels (i.e., two or fewer acts per year) of aggressive behaviors across the years in which he was enrolled in this school.

Table 133. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	1	0	0	0	1
2008-09	0	0	1	0	1
2009-10	0	0	0	0	0

Student 8 did not have an IEP goal for physically aggressive behavior.

Based on these data, this seemed to be an area of relative strength for Student 8, as he was not aggressive during 10 of 12 quarters. Also, he seemed to sustain a high level of performance over time in this area.

Social Skills

The following table summarizes Student 8's grades in the areas of academic-, peer-, and adult-oriented social skills.

Table 134. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08				
Academic	6	94	--	0
Peer	0	100	--	0
Adult	7	93	--	0
2008-09				
Academic	0	8	19	72
Peer	0	0	25	75
Adult	0	14	36	50
2009-10				
Academic	0	31	44	25
Peer	0	0	60	40
Adult	0	14	82	4

*Note.* The category Showing Improvement was added in August 2008.

Student 8 had IEP goals for accepting adult feedback and decisions (11/07 – 6/10), adult relations (11/07 – 6/08), and positive peer interactions. He met 100 percent of his quarterly benchmark targets for accepting adult feedback and decisions, as well as

for adult relations. Student 8 met 92 percent of his quarterly benchmarks for positive peer interactions, failing only in 6/10.

In general, Student 8 received very high grades initially for his academic-, peer-, and adult-oriented social skills. During the 07-08 academic year, he received 100 percent “Excellent/Outstanding” or “Good/Satisfactory” grades in all three areas. However, there was a dramatic decrease in grades the following year, as he received 50 to 75 percent “Needs Improvement” grades in all three areas. Some improvement occurred during his third year of enrollment, as he received more “Showing Improvement” grades than any other grades in all three areas. No clear pattern of higher performance in any specific area was evident upon analyzing the data.

Interestingly, Student 8 seemed to demonstrate improvement over time on his IEP goals in this area. He met 100 percent of benchmarks for two goals, and 92 percent of benchmarks for his third goal.

Based on these data, including the presence of three IEP goals, social skills seemed to be an area of relative weakness for Student 8. Results seemed mixed as to whether he demonstrated improvement in his performance over time.

### Coping Skills

Table 135 summarizes Student 8’s grades in the area of coping skills.

Student 8 had an IEP goal for “coping skills” from 11/07 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

In general, Student 8’s grades for coping skills declined dramatically between the 07-08 and 08-09 academic years, going from 0 percent “Needs Improvement” to 94 percent “Needs Improvement.” However, they seemed to improve somewhat between the 08-09 and 09-10 academic years. While Student 8 received his highest grades overall in coping skills during his first year at this school, he seemed to demonstrate some improvement over time on his IEP goal by meeting 100 percent of quarterly benchmarks.

Based on these data, including the presence of an IEP goal, this seemed to be an area of relative weakness for Student 8. Results seemed mixed as to whether improvement occurred over time.

Table 135. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08	0	100	--	0
2008-09	0	0	6	94
2009-10	0	0	50	50

*Note.* The category Showing Improvement was added in August 2008.

### Medical Management

When he enrolled in this program, Student 8 was taking the following psychotropic medications: Concerta, Risperdal, and Trileptal. Since then, there have been 3 documented medication changes or dosage adjustments, for a mean of 1.00 (standard deviation: 1.73) per year (see Table 136). At the end of the study period, Student 8 was still taking Concerta, Risperdal, and Trileptal. Since enrolling in this school, he has taken 3 psychotropic medications in total: Concerta, Risperdal, and Trileptal. No medication compliance issues were noted in his special education file.

Lastly, Student 8 underwent 1 psychiatric hospitalization prior to entering this program. He has not undergone psychiatric hospitalization since.

### School Attendance

Since he enrolled in this school, Student 8 missed 11.67 (standard deviation: 8.96) days per year on average. His yearly absence totals ranged from 6 to 22. Student 8

missed no more than 7 days during his first two years attending this school, but then missed 22 days in his final year of attendance. Student 8 did not have any unexcused absences.

Table 136. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Disorder” (2006 or 2007), ADHD, PTSD (dates unknown)	Concerta, Risperdal, Trileptal (at entry)
2007-08		
2008-09		Concerta (DC), Risperdal (DC), Trileptal (DC) (8/08) Concerta (DC), Risperdal (DC), Trileptal (DC) (9/08) Risperdal (DC) (6/09)
2009-10		

*Note.* A = Added, D = Discontinued, DC = Dosage Change

Table 137. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2007-08	7	0	7
2008-09	6	0	6
2009-10	22	0	22

*Note.* Reported reasons for absences were not tracked.

### Summary of Behavioral/Social-emotional Functioning

Student 8's behavioral/social-emotional strengths seemed to lie in the areas of on task/work completion and following instructions behaviors, and refraining from physical aggression. His relative weaknesses seemed to be in the areas of social skills and coping skills (see Figure 16). While Student 8 appeared to demonstrate variability in his day-to-day academic functioning, this same pattern seemed less evident in his day-to-day behavioral functioning, based on standard deviations that were mostly less than 10 associated with his daily points earned for on task/work completion and following instructions behaviors.

Figure 16. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
On Task/Work Completion	Yes
Following Instructions	Yes
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Social Skills	Unclear (mixed results)
Coping Skills	Unclear (mixed results)

It should be noted that Student 8 required ongoing medical management of his psychiatric symptoms, experiencing 1.00 medication changes or dosage adjustments per year on average, and trying out 3 different psychotropic medications. Also, Student 8 was prescribed stimulant medication, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Student 8's behavioral/social-emotional strengths and weaknesses profile is outlined in Figure 16. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 8 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

### Immediate Educational Outcomes

#### Level System Standing

Over the years in which data were collected for this study, Student 8's level system standing ranged from Levels 1 to 4. Each year, his level status spanned two to four levels. During the 07-08 academic year, he spent some time on Level 4 in all four quarters. During the 08-09 school year, he achieved Level 4 during only one quarter. In 09-10, he did not achieve Level 4 at all, but was never on Level 1, either.

Table 138. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	2,3,4	2,3,4	4	3,4	2-4
2008-09	2,3,4	1,2	1,2,3	2,3	1-4
2009-10	2,3	2,3	2,3	2,3	2-3

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

#### Re-integration

Student 8 achieved re-integration into his home school during the 07-08 school year, which continued into the 08-09 academic year. At one point, he was attending as many as five class periods in a mainstream setting. However, near the beginning of the 08-09 school year, both his academic and behavioral performance began to decline, and



after multiple intervention attempts (including reducing the number of class periods within a mainstream setting) were unsuccessful and his performance continued to decline, re-integration was discontinued in 11/08. As such, Student 8 resumed attending this therapeutic day school full time.

Finally, it should be noted that records in Student 8's special education file indicated he would attend an alternative high school, rather than a mainstream school, following his graduation from this therapeutic day school at the end of the 09-10 school year.

#### *Within Case Analysis for Student 8*

Overall, results seemed to indicate that placement in a therapeutic day school was an effective intervention for Student 8, until the time his re-integration was discontinued. After this occurred early in the 08-09 school year, he exhibited deterioration in most areas of functioning, and did not fully recover by the end of this study. It seemed that when the supports and structure of a therapeutic day school were removed due to the nature of the re-integration process, he struggled to perform at a high level across domains of functioning. As a result, data from this study indicated that he sustained or improved his performance within all identified academic and behavioral/social-emotional areas of relative strength, but results were largely mixed as to whether he demonstrated improvement in performance within identified areas of relative weakness. Ultimately, he was placed into an alternative high school upon graduating from eighth grade.

Student 8's overall profile seemed to be marked by inconsistency in performance. He demonstrated some variability in day-to-day functioning, but not as clear a pattern as many others in this study. Instead, Student 8's data in many areas were somewhat contradictory in nature. For example, his grades in social and coping skills seemed to decline dramatically after the first year he was enrolled in this school, yet he still managed to meet between 92 and 100 percent of quarterly benchmarks for all IEP goals

in these areas. His AIMSweb percentile ranks in mathematics computation ranged from 3 to 36 (i.e., what is typically considered below average to the low end of the average range), yet he achieved a percentile rank of 68 in mathematics on the ISAT (i.e., what is typically considered the high end of the average range). This type of qualitative difference may suggest that Student 8 was afflicted with a different phenotype of bipolar disorder than most other students included in this study. It is important to note that Student 8 was prescribed stimulant medication, a practice cautioned against by Kowatch et al. (2005), although he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

On the whole, Student 8 appeared to perform at a relatively high level in on task/work completion behavior, which was one of the areas of concern for which he was referred to a therapeutic day school. Also, he was re-introduced successfully to same-aged peers, which was another referral concern. Although there seemed to be deterioration in Student 8's functioning following the discontinuation of the re-integration process, it is important to note that placement in a therapeutic day school appeared to continue to be effective afterward in addressing at least two of his reasons for referral.

#### Case Summary for Student 9

Student 9 is a twelve-year-old male. His racial/ethnic background is White, and he most recently completed sixth grade. Student 9 has been enrolled in this school since February 2005, his first grade year. Student 9 was referred to this school due to engaging in lengthy emotional outbursts (e.g., screaming, crying) at school, which often included self-injurious behaviors (e.g., head-banging) and/or destruction of property. His teachers and therapists have described his strengths as being "bright," readily volunteering to participate in class discussions, and making friends easily. Student 9's weaknesses have been identified as needing to learn and use prosocial coping skills when faced with stress

or frustration instead of engaging in temper displays, accepting adult decisions, and completing his work independently and with a positive attitude.

Regarding his current living status, Student 9 resides with his biological parents, biological younger brother, and biological younger sister. Based on his family's socio-economic status, he pays the standard rate for school lunches.

School records indicate that Student 9 met developmental milestones within normal limits. He was diagnosed with "Bipolar Disorder" in 2007. Student 9 has also been diagnosed with ADHD, ODD, and Intermittent Explosive Disorder. There is not a documented family history of mood disorders. However, there is a family history of schizophrenia, but not within a first-degree relative.

In 2007, Student 9 was administered the WISC-IV in order to assess his cognitive abilities. Student 9 achieved a FSIQ of 91, which falls within what is usually considered the Average range of functioning. Additionally, Student 9 achieved the following standard scores: Verbal Comprehension 106, Perceptual Reasoning 98, Working Memory 80, and Processing Speed 80.

### Academic Functioning

#### Reading

Student 9's reading grades ranged from "Satisfactory" to "Needs Improvement" at the primary grade level, and his annual Primary GPA was 2.50 for both years (see Table 139). At the intermediate/middle school grade level, his grades ranged from As to one grade in the D range, and his annual Standard GPA ranged from 2.75 to 3.75 (see Table 140).

Student 9's special education file contained two ISAT reports that included information about his reading performance. In fourth grade, he received a ranking of "Exceeds Standards" in reading, and a NPR of 91. In fifth grade, his ranking was "Meets Standards," and his NPR was 83.

Table 139. Reading Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2004-05			S	SI	2.50
2005-06	S	S	S	NI	2.50

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 140. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07	B	C	A	A	3.25
2007-08	A	A	A-	B+	3.75
2008-09	A	A	C	D	2.75
2009-10	C+	B	A	A	3.25

*Note.* INC = Incomplete

On AIMSweb measures, Student 9's percentile ranks ranged from 39 to 67 in reading fluency, and 10 to 92 in reading comprehension (see Tables 141 and 142).

Student 9 did not have an IEP goal for reading.

Based on these data, reading seemed to be an area of relative strength for Student 9. In particular, his AIMSweb percentile ranks were all within what is typically considered the average range for reading fluency, and mostly spanned what are typically considered the average to above average ranges for reading comprehension, although one percentile rank was in the below average range. Student 9's annual GPA was at least 3.00 during 3 of 6 academic years. On the ISAT, his two percentile ranks both fell within what is typically considered the above average range of functioning. Primarily based on

his AIMSweb data and a GPA of at least 3.00 during 3 of his last 4 years of enrollment, Student 9 seemed to sustain a high level of performance over time.

Table 141. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	54	67	60
2006-07	33	41	47
2007-08	54	48	51
2008-09	45	58	39
2009-10	60	62	NR

*Note.* NR stands for “Not Reported.”

Table 142. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	10	83	91
2006-07	30	54	84
2007-08	87	90	92
2008-09	80	65	61
2009-10	52	62	55

*Note.* NR stands for “Not Reported.”

### Mathematics

In mathematics, Student 9’s grades ranged from “Satisfactory” to “Showing Improvement” at the primary grade level, and his annual Primary GPA ranged from 2.50

to 3.00. At the intermediate/middle school grade level, his grades ranged from As to one grade in the D range, and his annual Standard GPA ranged from 2.50 to 4.00.

Table 143. Mathematics Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2004-05			S	SI	2.50
2005-06	S	S	S+	S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 144. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07	B-	C+	C	B	2.50
2007-08	B	B	D+	B	2.50
2008-09	B	B-	B	C	2.75
2009-10	A	A	A	A	4.00

*Note.* INC = Incomplete

Two ISAT reports with mathematics scores were located in Student 9's special education file. In fourth grade, he received a ranking of "Below Standards" in mathematics, and a NPR of 33. In fifth grade, his ranking was again "Below Standards," and his NPR was 48.

On AIMSweb measures, Student 9's percentile ranks ranged from <1 to 35 in mathematics computation.

Table 145. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06	NR	NR	NR
2006-07	25	24	21
2007-08	6	3	14
2008-09	7	10	9
2009-10	<1	35	NR

*Note.* NR stands for “Not Reported.”

Student 9 had an IEP goal for mathematics computation from 1/09 to 6/10. He achieved 60 percent of his quarterly benchmark targets for this goal, failing in 11/09 and 4/10.

Based on these data, and in particular the presence of an IEP goal and a GPA of at least 3.00 during only 2 of 6 years of enrollment, mathematics seemed to be an area of relative weakness for Student 9. Regarding whether he improved in this area over time, AIMSweb data seemed to be mixed, yet there seemed to be some improvement in his grades over time. Student 9 achieved straight As during the final year of data collection for this study.

### Writing

In writing, Student 9’s grades were all “Satisfactory” at the primary grade level, with his annual Primary GPA was 3.00 during both years. At the intermediate/middle school grade level, his grades ranged from As to one grade in the C range, with his annual Standard GPA ranging from 2.75 to 3.75.

Table 146. Writing Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2004-05			S	S	3.00
2005-06	S	S	S-	S-	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 147. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07	B	A+	A	B+	3.50
2007-08	B	A-	A-	A	3.75
2008-09	B	B	B	C	2.75
2009-10	B-	B	B-	B	3.00

*Note.* INC = Incomplete

Student 9's special education file contained one ISAT report with information regarding his writing performance. In fifth grade, he received a ranking of "Academic Warning," and a NPR was not reported.

Student 9 did not have an IEP goal for writing.

Based on these data, this seemed to be an area of relative strength for Student 9, as his annual GPA was at least 3.00 in 5 of 6 academic years. However, it should be noted that he did appear to perform poorly in writing on the ISAT in fifth grade. Overall, Student 9 seemed to sustain a high level of performance in this area over time by maintaining a GPA of at least 3.00 during most years.



Science

In science, Student 9's grades ranged from "Outstanding" to "Satisfactory" at the primary grade level, with his annual Primary GPA ranging from 3.00 to 3.50. At the intermediate/middle school grade level, his grades ranged from As to one grade in the C range, with his annual Standard GPA ranging from 3.25 to 3.75.

Table 148. Science Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2004-05			S	O	3.50
2005-06	S	S	S+	S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 149. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07	B	C-	A	A	3.25
2007-08	A-	B	B+	A-	3.50
2008-09	A	A	B	A	3.75
2009-10	B+	B	B+	A	3.25

*Note.* INC = Incomplete

On the ISAT in fourth grade, Student 9 received a ranking of "Meets Standards" and a NPR of 93 in science. This was the only ISAT report with science scores located in his special education file.

Overall, Student 9 seemed to exhibit a relative strength in science. He received a GPA of at least 3.00 during every year of his enrollment at both the primary and

intermediate/middle school grade levels. On the ISAT, he achieved a percentile rank in what is typically considered the above average range of performance. Based on these data, he seemed to sustain a high level of performance over time in this area.

### Social Studies

Student 9's social studies grades ranged from "Outstanding" to "Satisfactory" at the primary grade level, with his annual Primary GPA ranging from 3.00 to 3.50. At the intermediate/middle school grade level, his grades ranged from As to Bs, with his annual Standard GPA ranging from 3.50 to 3.75.

Table 150. Social Studies Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2004-05			S	O	3.50
2005-06	S	S	S+	S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 151. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2006-07	B	A	A	A	3.75
2007-08	A-	A	B+	B	3.50
2008-09	B+	A	A	B	3.50
2009-10	B	B	A	A	3.50

*Note.* INC = Incomplete

In general, Student 9 seemed to demonstrate a relative strength in social studies. His GPA remained at least 3.00 during every year of his enrollment at both the primary and intermediate/middle school grade levels. Based on these data, he seemed to sustain a high level of performance over time in this area.

#### Summary of Academic Functioning

Overall, Student 9 seemed to demonstrate solid academic skills but variable performance over time in most areas of functioning. However, his grades appeared to be less variable over time than his AIMSweb data. This type of pattern seemed to reflect variability in daily functioning that may be indicative of rapid cycling of moods, which is a common occurrence in children and adolescents with bipolar disorders.

Student 9's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 9 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 17. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Yes

Behavioral/Social-emotional Functioning

On Task/Work Completion

In the area of on task/work completion behavior, Student 9's quarterly percentages of daily points earned on average ranged from 69.1 to 90.1, with standard deviations ranging from 11.4 to 25.1. On a yearly basis, his daily percentages of points earned on average ranged from 79.0 to 87.3, with standard deviations ranging from 13.0 to 22.4

Table 152. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	80.8 (24.3)	88.4 (13.6)	81.8 (22.1)	70.4 (25.1)	80.6 (22.4)
2008-09	86.4 (15.2)	84.3 (14.8)	76.8 (19.5)	69.1 (23.1)	79.0 (19.6)
2009-10	84.0 (14.9)	90.1 (12.9)	87.0 (11.4)	87.9 (12.5)	87.3 (13.0)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 9 did not have an IEP goal for on task behavior.

Based on these data, this seemed to be an area of relative strength for Student 9. He earned at least 90 percent of his daily points on average during 1 of 12 quarters, between 85 and 90 percent of his daily points on average during 4 of 12 quarters, and did not have an IEP goal in this area. Further, he seemed to sustain or improve his performance in this area over time, evidenced by earning his highest annual percentage of daily points on average during the final year of data collection for this study.

Following Instructions/Compliance

On a quarterly basis, Student 9 earned between 67.6 and 90.3 percent of his daily points on average for following instructions behavior. Standard deviations ranged from 11.5 to 25.1. On an annual basis, Student 9's percentage of daily points earned on average ranged from 76.4 to 86.6, with standard deviations ranging from 13.3 to 23.0.

Table 153. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	79.8 (24.4)	84.1 (17.5)	81.1 (23.6)	71.7 (25.1)	79.4 (23.0)
2008-09	83.8 (14.9)	82.3 (15.4)	72.3 (22.6)	67.6 (22.7)	76.4 (20.3)
2009-10	85.0 (15.0)	90.3 (13.0)	86.2 (11.5)	84.5 (13.4)	86.6 (13.3)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 9 did not have an IEP goal for following instructions behavior.

In general, this seemed to be an area of relative strength for Student 9. He earned at least 90 percent of his daily points on average during 1 of 12 quarters, between 85 and 90 percent of his daily points on average during 2 of 12 quarters, and did not have an IEP goal in this area. Further, he seemed to sustain or improve his performance in this area over time, evidenced by earning his highest annual percentage of daily points on average during the final year of data collection for this study.

Physical Aggression

Over the course of his enrollment, Student 9 was physically aggressive toward others (e.g., throwing objects and hitting others, pushing, punching) 16.2 (standard deviation: 17.4) times per year on average. His annual totals of aggressive acts ranged from 2 to 50. The pattern of aggressive behavior Student 9 exhibited may be described as

an initial period of few aggressive incidents that lasted about two quarters, followed by a significant spike in aggression that lasted for just over a year, and then a nearly linear decline in aggression each year afterward.

Table 154. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2004-05			1	1	2
2005-06	16	12	11	11	50
2006-07	10	4	0	2	16
2007-08	7	2	1	2	12
2008-09	3	3	0	7	13
2009-10	0	1	1	2	4

Finally, Student 9 did not have an IEP goal for physically aggressive behavior.

Based on these data, and in particular the occurrence of physical aggression during 19 of 22 quarters with a maximum of 50 aggressive incidents during a single academic year, this seemed to be an area of relative weakness for Student 9. However, he seemed to demonstrate significant improvement over time in this area, going from 50 aggressive episodes during the 05-06 year to only 4 episodes during the 09-10 school year.

### Social Skills

The following table summarizes Student 9's grades in the areas of academic-, peer-, and adult-oriented social skills.

Table 155. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2004-05				
Academic	0	50	--	50
Peer	0	100	--	0
Adult	14	21	--	64
2005-06				
Academic	0	33	--	67
Peer	0	90	--	10
Adult	0	21	--	79
2006-07				
Academic	0	11	--	89
Peer	0	50	--	50
Adult	0	25	--	75
2007-08				
Academic	0	14	--	86
Peer	0	30	--	70
Adult	0	29	--	71
2008-09				
Academic	0	19	22	58
Peer	0	5	45	50
Adult	0	46	18	36
2009-10				
Academic	17	83	0	0
Peer	0	80	0	20

Table 155. Continued

Adult	32	68	0	0
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*Note.* The category Showing Improvement was added in August 2008.

Student 9 had IEP goals for “accept adult decisions” (4/08 – 6/10), “start assignments and accept help with assignments” (4/05 – 1/06), “work independently” (4/07 – 1/08), “produce high quality work (at least 80 percent correct)” (4/08 – 1/10), and “work production with a positive attitude” (4/10 – 6/10). He met 100 percent of his quarterly benchmark targets for all five goals.

In general, Student 9’s performance in all three areas of social skills seemed to improve over time. He went from receiving high percentages of “Needs Improvement” grades early during his enrollment to receiving mostly grades of “Excellent/Outstanding” or “Good/Satisfactory” during the final year of data collection for this study. Earlier in his enrollment, he seemed to receive the highest grades for peer-oriented social skills, but by the end of the study period, his highest grades seemed to be for adult-oriented social skills. While this seemed to be an area of relative weakness, Student 9 also demonstrated improvement over time by meeting 100 percent of quarterly benchmarks for all five of his IEP goals.

### Coping Skills

Table 156 summarizes Student 9’s grades in the area of coping skills.

Student 9 had IEP goals for “accept help from adults in calming down” (4/06 – 1/07) “coping skills” (4/05 – 1/07, 4/10 – 6/10), “learn cognitive coping strategies” (4/07 – 6/10), “recognize and label emotions” (4/05 – 1/06), and “no temper tantrums” (4/05 – 1/06, 4/07 – 1/10). He met 67 percent of his quarterly benchmark targets for “accept help from adults in calming down,” failing in 4/06. Student 9 met 89 percent of his quarterly



benchmarks for “coping skills,” failing in 4/06. He met 100 percent of his quarterly benchmark targets for all other goals in this area.

Overall, Student 9 seemed to demonstrate marked improvement over time in coping skills grades. During his first three years of attendance, he received 100 percent “Needs Improvement” grades. In the final year of data collection, he received 75 percent “Good/Satisfactory,” 25 percent “Showing Improvement,” and 0 percent “Needs Improvement” grades. While this seemed to be an area of relative weakness, he demonstrated improvement over time also by meeting 67 to 100 percent of quarterly benchmarks for his five IEP goals.

Table 156. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2004-05	0	0	--	100
2005-06	0	0	--	100
2006-07	0	0	--	100
2007-08	0	13	--	88
2008-09	0	38	0	63
2009-10	0	75	25	0

*Note.* The category Showing Improvement was added in August 2008.

### Medical Management

Upon entry to this therapeutic day school, Student 9 was prescribed two psychotropic medications: Risperdal and Depakote. Since then, he has experienced 13 documented medication changes or dosage adjustments, for a mean of 2.17 (standard deviation: 1.94) per year (see Table 157).

Table 157. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	“Bipolar Disorder” (2007), ADHD, ODD, Intermittent Explosive Disorder (dates unknown)	Risperdal, Depakote (at entry)
2004-05		
2005-06		Risperdal (DC) (2/06)
2006-07		Risperdal (D), Tenex (A), Depakote (DC), Zoloft (A), Adderall (A) (1/07) Adderall (DC) (1/07)
2007-08		Depakote (DC), Tenex (DC), Adderall (DC) (8/07) Adderall (D), Tenex (D), D-amphetamine Salt Combo (A) (9/07) D-amphetamine Salt Combo (DC) (10/07) D-amphetamine Salt Combo (D), Adderall (A) (10/07) Depakote (D), Abilify (A) (4/08)
2008-09		Tenex (A) (9/08)

Table 157. Continued

	Adderall (DC) (9/08)
	Abilify (DC) (12/08)
	Adderall (DC) (2/09)
2009-10	Adderall (D), Zoloft (DC), Tenex (DC), Abilify (DC) (9/09)

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*Note.* A = Added, D = Discontinued, DC = Dosage Change

At the end of the data collection period for this study, Student 9 was taking Tenex, Zoloft, and Abilify. The total number of different psychotropic medications he has been prescribed since enrolling in this school is 7: D-amphetamine Salt Combo, Depakote, Risperdal, Tenex, Adderall, Zoloft, and Abilify. Occasional medication compliance issues were noted in his special education file.

Student 9 has undergone psychiatric hospitalization on 2 occasions. One was prior to his entry into this program, and the other occurred in January 2007.

#### School Attendance

Student 9 missed 3.40 (standard deviation: 5.98) school days per year on average. His absence totals ranged from 0 to 14 each year (see Table 158). During the first year of data collection, Student 9 had perfect attendance. The following year, he missed 14 days of school, which coincided with a psychiatric hospitalization. For the final three years of data collection, he missed two or fewer days per year. Student 9 did not have any unexcused absences.

#### Summary of Behavioral/Social-emotional Functioning

Overall, Student 9's behavioral/social-emotional relative strengths seemed to be in the areas of on task/work completion and following instructions behaviors. His

relative weaknesses seemed to be in engaging in physically aggressive behaviors, social skills, and coping skills. In general, Student 9 sustained or improved performance in his areas of relative strength over time, and improved performance in his areas of relative weakness. A significant amount of variability was noted in his daily functioning, though, as standard deviations associated with annual percentages of daily points earned were all greater than 10 for both on task/work completion and following instructions behaviors. It should be noted that Student 9 was prescribed both stimulant and SSRI medication, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Table 158. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2005-06	0	0	0
2006-07	14	0	14
2007-08	1	0	1
2008-09	0	0	0
2009-10	2	0	2

*Note.* Reported reasons for absences were not tracked.

Student 9's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 9 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 18. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
On Task/Work Completion	Yes
Following Instructions	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Physical Aggression	Yes
Social Skills	Yes
Coping Skills	Yes

### Immediate Educational Outcomes

#### Level System Standing

Student 9's level system standing ranged from Level 1 to Level 3 across years for which data were available. Each year, his standing spanned two to three levels. It is important to note that during the final year of data collection, Student 9 achieved a level higher than Level 1 at some point during each quarter, which was the only year he accomplished this feat.

Table 159. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	1,2,3	1,2	1	1	1-3
2008-09	1	1,2	1	1	1-2
2009-10	1,2	1,2	1,2	1,2	1-2

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

Student 9 did not achieve any form of re-integration into his home school prior to the conclusion of this study.

### Within Case Analysis for Student 9

In summary, it seemed that placement in a therapeutic day school was an effective intervention package for Student 9. Although he had not achieved re-integration into his home school by the conclusion of this study, and there was no evidence he had reached the highest level of the school's behavior management level system at any time, Student 9 was able to demonstrate improvement in many areas of functioning. For all areas identified as relative weaknesses in the academic and behavioral/social-emotional domains, Student 9 demonstrated improvement over time. Additionally, he sustained a high level of performance in all areas identified as relative strengths. One of Student 9's most notable gains was in the area of coping skills, which was a primary reason for his referral to this school. In general, Student 9's pattern of performance appeared to be non-linear in nature.

Student 9 also exhibited a great amount of variability in his daily functioning, as noted within his AIMSweb data for academics, and percentages of points earned on average for behavioral/social-emotional functioning. As indicated previously, such variability in daily performance may be indicative of the presence of rapid cycling of moods, which is a common occurrence in children and adolescents with bipolar disorders. Unfortunately, a complete DSM diagnosis was not included in Student 9's school records, therefore his performance in this regard could not be compared to that of other students with the same type of bipolar disorder. Finally, it should be noted that Student 9 was prescribed both stimulant and SSRI medication, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Case Summary for Student 10

Student 10 is an eleven-year-old male who recently completed fifth grade. His racial/ethnic background is White. Student 10 began attending this school in March 2008, while in third grade. He was referred to this school after exhibiting physically aggressive behaviors at home and school, threatening staff and peers, and displaying low frustration tolerance. His strengths have been described as readily contributing to class discussions, working well both independently and with peers, and getting along with adults. His weaknesses have been described as difficulties coping with negative emotions, accepting adult decisions/feedback, and staying on task and working to completion.

Student 10 lives with his biological mother, step-father, and biological younger sister. His biological parents are divorced. Based on his family's socio-economic status, he pays the standard (i.e., "full") price for school lunch.

According to school records, Student 10 met developmental milestones within normal limits, although he had some difficulty with development of fine motor skills. In 2009, he was diagnosed with Bipolar Disorder Not Otherwise Specified. His other psychiatric diagnoses include ADHD, ODD, Mood Disorder Not Otherwise Specified, enuresis (nocturnal), and a learning disorder in mathematics. In Student 10's school records, there is not a documented family history of mood disorders or other psychiatric disorders.

In 2008, Student 10 was administered the WISC-IV to assess his cognitive abilities. He achieved a FSIQ of 99, which is typically considered to fall within the average range of functioning. His index scores were as follows: Verbal Comprehension 110, Perceptual Reasoning 112, Working Memory 86, and Processing Speed 78.

## Academic Functioning

### Reading

In reading, Student 10 received one grade of “Satisfactory” at the primary grade level, resulting in an annual Primary GPA of 3.00. At the intermediate/middle school grade level, he received As and Bs, and his annual Standard GPA ranged from 3.00 to 4.00. During the final year of data collection for this study, Student 10 achieved straight As in reading.

Table 160. Reading Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08				S+	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 161. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2008-09	B	B	B	B	3.00
2009-10	A	A	A	A+	4.00

*Note.* INC = Incomplete

Student 10’s special education file contained one ISAT report, from his fourth grade year. On the ISAT, he received a ranking of “Exceeds Standards” and a NPR of 98 in reading.



On measures of reading fluency, Student 10’s AIMSweb percentile ranks ranged from 46 to 88. His percentile ranks for AIMSweb measures of reading comprehension ranged from 26 to 95.

Table 162. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08			98
2008-09	77	88	NR
2009-10	81	46	74

*Note.* NR stands for “Not Reported.”

Table 163. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08			91
2008-09	75	75	NR
2009-10	95	26	84

*Note.* NR stands for “Not Reported.”

Finally, Student 10 did not have an IEP goal in the area of reading.

Student 10’s reading profile may be characterized by a high level of ability mixed with variable performance. On AIMSweb measures, his percentile ranks spanned what are typically considered the average to above average ranges of functioning. However, it should be noted that beginning in the first quarter of 09-10, and lasting into the second quarter, he experienced a “medication wash” (i.e., he was completely taken off of psychotropic medication) due to his participation in a research study. This was the only

time period he did not take psychotropic medication while enrolled in this school, and winter AIMSweb testing occurred during this time. Regarding grades, Student 10 maintained an annual GPA of at least 3.00 throughout his enrollment in this school, and his grades improved in a near-linear fashion over time to the point of achieving straight As during the 09-10 academic year. His performance in reading on the ISAT in fourth grade (i.e., national percentile rank of 98) was within what is typically considered the above average range of performance.

Upon considering all of these data, and in particular his performance on AIMSweb measures and his grades, reading seemed to be an area of relative strength for Student 10. Further, he seemed to demonstrate some improvement over time in this area, evidenced in particular by receiving straight As during the final year of data collection for this study.

### Mathematics

In mathematics, Student 10 received one grade of “Satisfactory” at the primary grade level, for an annual Primary GPA of 3.00. At the intermediate/middle school grade level, he received As, Bs, and one D, and his annual Standard GPA ranged from 3.00 to 3.25.

Table 164. Mathematics Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08				S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 165. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2008-09	B	B	B	B	3.00
2009-10	A	D	A	A	3.25

*Note.* INC = Incomplete

On the ISAT in fourth grade, Student 10 received a ranking of “Exceeds Standards” and a NPR of 93 in the area of mathematics. This was the only ISAT report located in his special education file.

Student 10’s performance on AIMSweb measures of mathematics computation was highly variable, with percentile ranks ranging from 12 to 56.

Table 166. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2007-08			13
2008-09	56	12	NR
2009-10	17	25	47

*Note.* NR stands for “Not Reported.”

Student 10 did not have an IEP goal in the area of mathematics.

Overall, Student 10 had a diagnosed learning disorder in mathematics, and his AIMSweb scores spanned what are typically considered the below average to average ranges of performance. Based on these data, mathematics seemed to be an area of relative weakness for Student 10. While his annual GPA ranged from 3.00 to 3.25, he achieved his highest GPA during the final year of data collection for this study, which

suggests that some improvement occurred over time. Finally, it should be noted that on one ISAT measure, he received a percentile rank in what is typically considered the above average range of performance.

### Writing

Within the domain of writing, Student 10 received one grade of “Satisfactory” at the primary grade level, for an annual Primary GPA of 3.00. At the intermediate/middle school grade level, he received As and Bs, and his annual Standard GPA ranged from 3.00 to 3.25.

Table 167. Writing Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08				S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 168. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2008-09	B	B	B	B	3.00
2009-10	B	B-	B	A	3.25

*Note.* INC = Incomplete

Student 10’s special education file did not contain any ISAT reports with information about his writing performance. He did not have an IEP goal in the area of writing.

In general, Student 10 maintained an annual GPA of at least 3.00 in writing, therefore it seemed to be an area of relative strength. Further, he demonstrated some improvement over time by achieving his highest GPA during the final year of data collection for this study.

### Science

In science, Student 10 received one grade of “Satisfactory” at the primary grade level for an annual Primary GPA of 3.00. At the intermediate/middle school grade level, he received As and Bs, and his annual Standard GPA ranged from 3.00 to 4.00. During the 09-10 academic year, he achieved all As in science.

Table 169. Science Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08				S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 170. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2008-09	B	B	B	B	3.00
2009-10	A+	A	A+	A+	4.00

*Note.* INC = Incomplete

Student 10’s special education file contained only one ISAT report. In fourth grade, he received a ranking of “Exceeds Standards” and a NPR of 98 in science.

In summary, Student 10 maintained an annual GPA of at least 3.00 in science, therefore this seemed to be an area of relative strength. Further, he demonstrated some improvement over time by receiving straight As in the final year of data collection for this study. It should be noted that on one ISAT, Student 10 achieved a percentile rank that fell within what is typically considered the above average range.

### Social Studies

In social studies, Student 10 received one grade of “Satisfactory” at the primary grade level, for an annual Primary GPA of 3.00. At the intermediate/middle school grade level, his grades were As, Bs, and one C. Student 10’s annual Standard GPA ranged from 3.00 to 3.50.

Table 171. Social Studies Grades, Primary Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2007-08				S	3.00

*Note.* O = Outstanding, S = Satisfactory, SI = Showing Improvement, NI = Needs Improvement

Table 172. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2008-09	B	B	B	B	3.00
2009-10	A+	C+	A	A	3.50

*Note.* INC = Incomplete

In general, Student 10 maintained an annual GPA of at least 3.00 in social studies over the course of his enrollment, therefore this seemed to be an area of relative strength.

Further, he demonstrated some improvement over time by receiving his highest GPA during the final year of data collection for this study.

### Summary of Academic Functioning

Student 10's academic performance is characterized by high levels of ability and variability. In particular, his performance on AIMSweb measures was highly variable, with percentile ranks spanning what are typically considered the average to above average ranges in reading fluency and reading comprehension, and below average to average ranges in mathematics. In fact, it may be important to note that Student 10's academic performance appeared to be most variable on assessments that lasted only a few minutes (e.g., AIMSweb probes) in comparison to assessments that spanned a longer time period (e.g., grades). This type of pattern could be indicative of the presence of rapid cycling of moods, a common occurrence in bipolar disorders among children and adolescents.

Finally, it should be noted that Student 10 demonstrated near-linear improvement in grades over time in all five academic subjects. He seemed to be significantly impacted by a "medication wash" that began in the first quarter and lasted into the second quarter of the 09-10 academic year. Interestingly, certain academic subjects seemed to be affected more than others. There were noticeable dips in his math and social studies grades, and on AIMSweb reading measures, during this time frame.

Student 10's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 10 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 19. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Yes
Writing	Yes
Science	Yes
Social Studies	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Mathematics	Yes

Behavioral/Social-emotional FunctioningOn Task/Work Completion

Quarterly, Student 10's percentage of daily points earned on average for on task/work completion behavior ranged from 70.8 to 100. Standard deviations ranged from 0.00 to 16.0. Annually, Student 10's percentage of daily points earned on average ranged from 89.4 to 94.0, while standard deviations ranged from 9.39 to 22.5.

Table 173. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			100 (0.00)	90.2 (16.0)	91.3 (15.4)
2008-09	93.5 (9.29)	95.1 (10.4)	95.1 (10.0)	92.1 (7.49)	94.0 (9.39)
2009-10	91.6 (26.0)	70.8 (26.0)	96.2 (4.91)	97.1 (16.9)	89.4 (22.5)

*Note.* Data reported are means (standard deviations in parentheses).



Finally, Student 10 had an IEP goal for on task behavior from 11/08 to 6/10. He met 100 percent of his quarterly benchmark targets.

Based on these data, on task/work completion behavior seemed to be an area of relative weakness for Student 10, primarily due to the presence of an IEP goal. His performance in this area may be described as excellent initial performance that lasted for about a quarter, followed by a dip in on task/work completion behavior during the next quarter, followed by mostly near-linear improvement over time. The exception to this trend occurred during the second quarter of the 09-10 academic year, when he earned only 70.8 percent of his daily points on average during the time he was experiencing a “medication wash.” Student 10’s achievement of meeting 100 percent of his quarterly benchmark targets in this area for his IEP goal was also indicative of improvement over time.

*Following Instructions/Compliance*

In the area of following instructions behavior, Student 10 earned between 68.1 and 100 percent of his daily points on average, on a quarterly basis. Standard deviations ranged from 0.00 to 29.9. Annually, he earned between 86.5 and 94.3 percent of his daily points on average, with standard deviations ranging from 9.55 to 22.7.

Table 174. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			100 (0.00)	89.8 (16.6)	90.9 (16.0)
2008-09	94.0 (10.2)	95.0 (10.6)	95.2 (10.1)	92.9 (7.12)	94.3 (9.55)
2009-10	88.4 (29.9)	68.1 (25.3)	90.2 (7.51)	98.6 (4.30)	86.5 (22.7)

*Note.* Data reported are means (standard deviations in parentheses).

Finally, Student 10 did not have an IEP goal in the area of following instructions.

Overall, following instructions behavior seemed to be an area of relative strength for Student 10, as he earned at least 90 percent of his daily points on average during 7 of 10 quarters, and nearly 90 percent of his points during 2 additional quarters. Initially, he demonstrated a very high level of performance that lasted for about a quarter, then experienced a dip in performance the following quarter, and then demonstrated near-linear improvement over time. The only exception to this trend occurred during some of the first and second quarters of 09-10, during the time period he was experiencing a “medication wash.”

### Physical Aggression

Student 10 engaged in physically aggressive behaviors (e.g., kicking, throwing objects and hitting people) between 1 and 6 times per year. His annual mean number of aggressive acts was 3.67 (standard deviation: 2.51).

Table 175. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08			0	6	6
2008-09	1	0	0	0	1
2009-10	0	4	0	0	4

Student 10 did not have an IEP goal in the area of aggression.

Student 10’s pattern of aggression may be described as an initial period of one quarter in which he was not aggressive, followed by a significant spike in aggression that lasted for a quarter. After this, there was a near-linear decline in aggression, with the

exception of the second quarter of the 09-10 academic year, when he was experiencing a “medication wash.” Because Student 10 was not physically aggressive during 7 of 10 quarters, and did not have an IEP goal for physically aggressive behavior, this was identified as an area of relative strength. He seemed to sustain a high level of performance over time, with the time frame in which he was experiencing a “medication wash” as the only exception to this trend.

### Social Skills

Student 10’s grades for academic-, peer-, and adult-oriented social skills ranged from “Good/Satisfactory” to “Needs Improvement” in all three areas (see Table 176). He did not earn any grades of “Excellent/Outstanding.”

Student 10 had an IEP goal for accepting adult feedback from 11/08 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

Based on these data, including the fact that he had an IEP goal in this area, social skills was identified as an area of relative weakness for Student 10. Overall, his pattern of social skills performance (as measured by grades) may be described as steady improvement over time in both academic- and adult-oriented social skills, evidenced by increases each year in the percentage of “Good/Satisfactory” grades, as well as significant decreases in the percentage of “Needs Improvement” grades between the 07-08 and 09-10 academic years. Further, Student 10 met 100 percent of his quarterly benchmark targets for accepting adult feedback. Regarding peer-oriented social skills, results were mixed, although it is important to note that initial (i.e., 07-08) grades in this area were much higher than initial grades in the other two areas.

### Coping Skills

Student 10’s grades in the area of coping skills ranged from “Good/Satisfactory” to “Needs Improvement” (see Table 177). He did not receive any grades of “Excellent/Outstanding” in coping skills.

Table 176. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08				
Academic	0	11	--	89
Peer	0	100	--	0
Adult	0	14	--	86
2008-09				
Academic	0	31	39	31
Peer	0	55	45	0
Adult	0	21	64	14
2009-10				
Academic	0	56	19	25
Peer	0	80	0	20
Adult	0	54	32	14

*Note.* The category Showing Improvement was added in August 2008.

Table 177. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2007-08	0	0	--	100
2008-09	0	0	63	38
2009-10	0	75	0	25

*Note.* The category Showing Improvement was added in August 2008.

Student 10 had an IEP goal for “coping skills” from 11/08 to 6/10. He met 100 percent of his quarterly benchmark targets for this goal.

Based on these data, including the presence of an IEP goal in this area, coping skills was identified as an area of relative weakness for Student 10. In general, Student 10 demonstrated steady, near-linear improvement in coping skills grades over time. He went from receiving 100 percent “Needs Improvement” grades in this area during the 07-08 year, to receiving 75 percent “Good/Satisfactory” and only 25 percent “Needs Improvement” grades in the 09-10 academic year. Additionally, the fact that he met 100 percent of his quarterly IEP benchmark targets in this area is indicative of steady improvement over time.

#### Medical Management

When he entered this program, Student 10 was prescribed Focalin and Abilify. He experienced 12 medication changes or dosage adjustments since that time, for a mean of 4.00 (standard deviation: 1.73) per year (see Table 178). As mentioned previously, Student 10 underwent a “medication wash” that began during the first quarter of the 09-10 academic year, and continued through the second quarter. At the end of the data collection period for this study, Student 10 was taking Lithium Carbonate, Clonidine, Vyvanse, and Seroquel. In total, he was prescribed the following 7 psychotropic medications while enrolled in this school: Focalin, Abilify, Lithium Carbonate, Clonidine, Vyvanse, Seroquel, and Lamictal. No medication compliance issues were noted in his special education file.

Student 10 has undergone 2 psychiatric hospitalizations in his lifetime. Both were prior to his enrollment in this school.

Table 178. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	Mood Disorder Not Otherwise Specified, ADHD, ODD, enuresis (nocturnal) (dates unknown)	Focalin, Abilify (at entry)
2007-08	Learning Disorder (6/08)	Focalin (DC), Abilify (D) (4/08) Abilify (A) (5/08)
2008-09		Focalin (DC), Abilify (DC) (9/08) Focalin (DC) (10/08) Focalin (D), Vyvanse (A) (5/09) Abilify (DC), Vyvanse (DC), Lamictal (A) (6/09) Vyvanse (DC) (6/09)
2009-10	Bipolar Disorder Not Otherwise Specified (10/09)	Abilify (D), Seroquel (A), Lamictal (DC), Vyvanse (DC) (10/09) Seroquel (D), Lamictal (D), Vyvanse (D) (10/09) Lithium Carbonate (A) (11/09) Clonidine (A) (11/09) Vyvanse (A), Seroquel (A) (4/10)

*Note.* A = Added, D = Discontinued, DC = Dosage Change

### School Attendance

Since he began attending this school, Student 10 missed 3.00 (standard deviation: 3.46) days per year on average. His yearly absence totals ranged from 1 to 7 (see Table 179). He had no unexcused absences. A spike in absences was noted during the 09-10 academic year, when Student 10 was participating in a research study (as mentioned previously), although the reasons for his absences were unknown.

Table 179. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2007-08	1	0	1
2008-09	1	0	1
2009-10	7	0	7

*Note.* Reported reasons for absences were not tracked.

### Summary of Behavioral/Social-emotional Functioning

In general, Student 10's relative strengths in behavioral/social-emotional functioning seemed to be in following instructions behavior and refraining from physical aggression. His relative weaknesses seemed to be in the areas of on task/work completion, social skills, and coping skills. Overall, Student 10 appeared to exhibit a trend of near-linear improvement over time within this domain, with the only exception occurring during the period of time he was experiencing a "medication wash." Also, it should be noted that Student 10 was prescribed stimulant medication after he was diagnosed with a bipolar disorder, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

It should be mentioned that Student 10 demonstrated variability in his daily functioning. Analysis of the percentages of daily points he earned on average for on task/work completion and following instructions behaviors revealed standard deviations greater than or equal to 10 during 6 of 10 quarters for each behavior. Such variability may be indicative of the occurrence of rapid cycling of moods.

Student 10's social skills grades steadily improved over time for academic- and adult-oriented social skills, while results for peer-oriented social skills were mixed. However, he received initially higher grades for peer-oriented social skills than the other two areas. Coping skills grades also steadily improved over time.

Student 10's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 10 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 20. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Following Instructions	Yes
Physical Aggression	Yes
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
On Task/Work Completion	Yes
Social Skills	Yes
Coping Skills	Yes



## Immediate Educational Outcomes

### Level System Standing

During the time he was enrolled in this school, Student 10's level system standing ranged from Levels 1 to 4. Each year, his level status spanned two to four levels. It should be noted that during the final year of data collection, he achieved Level 4 status for the first time, reaching this level in three out of four quarters.

Table 180. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08			1	1,2	1-2
2008-09	2,3	2,3	2,3	2,3	2-3
2009-10	3,4	1,2	2,3,4	4	1-4

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

### Re-integration

An IEP in Student 10's special education file dated 4/10 indicated that he would begin partial re-integration into his home school starting in the fall of the following school year, immediately after the conclusion of this study.

### Within Case Analysis for Student 10

Qualitative analysis suggests that for Student 10, placement in a therapeutic day school was an effective educational intervention package. He maintained or improved performance in all areas identified as relative academic and behavioral/social-emotional strengths. Student 10 improved performance in all areas identified as relative academic and behavioral/social-emotional weaknesses. Student 10's most dramatic gains seemed to be in the areas of social and coping skills, which is notable because he was referred to

this school primarily due to deficits in both areas. Ultimately, Student 10 was able to reach the highest level of this school's behavior modification level system, and also achieve re-integration into his home school. His overall pattern of performance may be characterized as near-linear improvement over time in both academic and behavioral/social-emotional functioning. The only exception to this trend occurred during the time he was experiencing a "medication wash."

Closer examination of Student 10's academic and behavioral/social-emotional data revealed the presence of a significant amount of variability in his day-to-day functioning. His performance on AIMSweb probes of reading fluency, reading comprehension, and mathematics computation spanned multiple ranges of performance. In addition, he achieved several large standard deviations (i.e., greater than or equal to 10) associated with percentages of daily points earned on a quarterly basis. In general, Student 10's data seemed less variable when they reflected longer time spans (e.g., a quarter or year) in comparison to shorter time spans (e.g., a few minutes). This type of pattern may indicate the occurrence of rapid cycling of moods, as mentioned previously.

Finally, one of the most interesting findings from this study may be related to Student 10's participation in a research study that resulted in his undergoing a "medication wash," beginning in the first quarter and lasting into the second quarter of the 09-10 academic year. During this period of time, his mathematics and social studies grades dropped dramatically, while his reading, writing, and science grades remained about the same. However, his AIMSweb performance on measures of reading fluency and reading comprehension experienced a noticeable decline, while his AIMSweb mathematics computation performance remained similar. Regarding behavioral/social-emotional functioning, he exhibited noticeable decreases in on task/work completion and following instructions behavior, and an increase in physical aggression. Such noticeable differences in academic and behavioral/social-emotional functioning may reflect the significant impact of psychotropic medication on his school performance. It is worth

noting that during his enrollment in this school, Student 10 required ongoing medical management for his psychiatric symptoms, averaging 4.00 medication changes or dosage adjustments per year, and trying out 7 different psychotropic medications. Further, Student 10 was prescribed stimulant medication after he was diagnosed with a bipolar disorder, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

#### Case Summary for Student 11

Student 11 is a thirteen-year-old Black male who recently completed seventh grade. He came to this school in January 2006 as a third grade student. Student 11 was referred to this school following an incident at his previous school in which he ran out of a classroom and threatened to jump over the railing of an elevated structure. Student 11's teachers and therapists have described his strengths as being a hard worker, desiring to do well and please adults, and being artistic. Weaknesses have been identified in the areas of peer relations, coping in socially appropriate ways with feelings of anger or frustration, and accepting adult feedback.

Student 11 currently lives with a biological relative other than one of his biological parents. This relative has adopted him and thus is his legal guardian. Student 11 also lives with two biological brothers, one younger and one older. Student 11 has another older biological brother with whom he does not reside. Based on his family's socio-economic status, he is eligible to receive free school lunch.

Student 11's developmental history is significant for being born one month premature and addicted to a narcotic substance. However, school records indicate that he met developmental milestones at least within normal limits, possibly sooner. Student 11 was diagnosed with "Bipolar Disorder" in 2008. Prior to 2008 (exact date unknown), he was diagnosed with ADHD. There is not a documented family history of mood

disorders, but there is a documented history of a narcotic substance use disorder within a first-degree relative (a parent).

In 2005, an examiner attempted to administer the WISC-IV to Student 11 in order to assess his cognitive abilities. However, Student 11 refused to comply with testing, therefore no scores were obtained. School records indicate that Student 11 did comply with cognitive testing previously, and scored within the average range of functioning, but these reports are not included in his school records and therefore are not available for verification.

### Academic Functioning

#### Reading

Student 11's reading grades ranged from one A to one D (i.e., mostly Bs and Cs), and his annual Standard GPA ranged from 2.25 to 3.50.

Table 181. Reading Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2005-06			A-	B	3.50
2006-07	B	B-	B	B-	3.00
2007-08	B	B	B	B-	3.00
2008-09	C+	B+	D-	B	2.25
2009-10	C-	B	B	C-	2.50

*Note.* INC = Incomplete

Student 11's special education file contained three ISAT reports with reading scores. In fourth grade, he received a ranking of "Meets Standards" in reading, with a

NPR of 81. In fifth grade, his ranking was also “Meets Standards,” and his NPR was 73. In sixth grade, Student 11 received a ranking of “Meets Standards” in reading, and an NPR of 52.

On AIMSweb measures, his percentile ranks ranged from 29 to 88 in reading fluency, and 26 to 98 in reading comprehension.

Table 182. AIMSweb Reading Fluency Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06		60	88
2006-07	45	67	73
2007-08	47	58	72
2008-09	NR	29	NR
2009-10	39	41	48

*Note.* NR stands for “Not Reported.”

Table 183. AIMSweb Reading Comprehension Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06		48	98
2006-07	97	97	93
2007-08	77	88	69
2008-09	NR	26	NR
2009-10	63	62	68

*Note.* NR stands for “Not Reported.”

Student 11 did not have an IEP goal for reading.

Overall, this seemed to be an area of relative strength for Student 11, as his percentile ranks on AIMSweb measures and the ISAT spanned what are typically considered the average to above average ranges, and he achieved an annual Standard GPA of at least 3.00 during three academic years. However, results seemed to be somewhat mixed as to whether he sustained a high level of performance over time, as his grades and ISAT performance declined in general, while his AIMSweb performance was variable.

### Mathematics

In mathematics, Student 11's grades ranged from two As to one F, but were mostly Bs and Cs. His annual Standard GPA ranged from 2.00 to 3.50.

Table 184. Mathematics Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2005-06			A	B-	3.50
2006-07	B-	B+	B+	C+	2.75
2007-08	B+	B	A	B+	3.25
2008-09	B+	B	B	B+	3.00
2009-10	F	C-	B-	B-	2.00

*Note.* INC = Incomplete

On the ISAT, Student 11 received a ranking of “Meets Standards” and a NPR of 84 in mathematics while enrolled in fourth grade. As a fifth grade student, his ranking was also “Meets Standards,” and his NPR was 68. In sixth grade, he received a ranking of “Meets Standards” and a NPR of 53.

On AIMSweb measures, Student 11's percentile ranks ranged from 2 to 97.

Table 185. AIMSweb Mathematics Computation Scores (Percentile Ranks).

Year	Fall	Winter	Spring
2005-06		NR	NR
2006-07	97	77	75
2007-08	2	3	88
2008-09	NR	58	NR
2009-10	14	87	47

*Note.* NR stands for “Not Reported.”

Student 11 did not have an IEP goal for mathematics.

In general, Student 11’s grades were highly variable and ranged from A to F. His AIMSweb percentile ranks were also highly variable and ranged from 2 to 97, spanning what are typically considered the below average to above average ranges. On the ISAT, his performance was also variable but to a lesser degree, as his percentile ranks spanned what are typically considered the average to above average ranges. On the basis of his AIMSweb and ISAT performance, as well as the fact that he achieved an annual Standard GPA of at least 3.00 during three academic years, this seemed to be an area of relative strength for Student 11. However, his performance was very inconsistent, and results seemed to be mixed regarding whether he sustained a high level of performance over time due to such inconsistency.

### Writing

Student 11’s writing grades ranged from As to Cs. His annual Standard GPA ranged from 2.50 to 4.00.

Table 186. Writing Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2005-06			A	A	4.00
2006-07	B+	A-	A	A-	3.75
2007-08	B	B	A	A	3.50
2008-09	C+	B+	C	B	2.50
2009-10	B	B	C	C+	2.50

*Note.* INC = Incomplete

Student 11's special education file contained two ISAT reports with information regarding his writing performance. In both fifth and sixth grade, he received a ranking of "Academic Warning" (the lowest possible ranking) for writing, and NPRs were not reported.

Student 11 did not have an IEP goal for writing.

In general, Student 11 received relatively high grades in writing, as his annual Standard GPA was at least 3.00 during three academic years. The lowest grade he earned in this subject was a C. On this basis, writing was classified as a relative strength for Student 11. However, his performance on two ISATs was ranked in the lowest possible category. Further, there did not appear to be evidence of improvement over time, as his annual Standard GPA declined over time in a near-linear fashion from 4.00 initially to 2.50 during the final year of data collection for this study, and his ISAT performance did not seem to improve.

### Science

In science, Student 11's grades ranged from one A to Cs (i.e., mostly Bs and Cs). His annual Standard GPA ranged from 2.25 to 3.00.



Table 187. Science Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2005-06			C-	B	2.50
2006-07	B-	B-	C	B	2.75
2007-08	B	B	B	B-	3.00
2008-09	A	B-	C	C-	2.75
2009-10	C	C-	C-	B	2.25

*Note.* INC = Incomplete

Student 11's special education file contained one ISAT report with information about his performance in science. In fourth grade, he received a ranking of "Meets Standards" and an NPR of 78 in science.

Overall, Student 11 achieved an annual Standard GPA of 3.00 or higher during only one academic year, therefore science seemed to be an area of relative weakness. However, it should be noted that on the only ISAT he was administered that included science, he achieved a percentile rank in what is typically considered the above average range of functioning. Results seemed to be mixed as to whether any improvement occurred over time, because his grades improved initially, but then declined afterward.

### Social Studies

Student 11's social studies grades ranged from Bs to Ds, and his annual Standard GPA ranged from 2.25 to 3.00 (see Table 188).

Because Student 11 achieved an annual Standard GPA of 3.00 or higher during only one academic year, social studies seemed to be an area of relative weakness. Evidence seemed to be mixed as to whether any improvement occurred over time, as his

annual Standard GPA increased during his second and third years of enrollment, but then decreased afterward.

Table 188. Social Studies Grades, Intermediate/Middle School Grade Report Cards.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	GPA
2005-06			C+	B	2.50
2006-07	C+	B	B	B+	2.75
2007-08	B	B	B	NR	3.00
2008-09	C+	B	D	B-	2.25
2009-10	D-	B+	B	B	2.50

*Note.* INC = Incomplete

#### Summary of Academic Functioning

Student 11's academic profile seemed to be marked by high levels of ability and variability. Perhaps this was most evident in mathematics, where his grades ranged from A to F, and his AIMSweb percentile ranks ranged from 2 to 97. Such variability may indicate the presence of rapid cycling of moods, a common occurrence in children and adolescents with bipolar disorders. Also, a general decline in his academic performance was noted over the last two to three years of data collection for this study. Factors that may have influenced this apparent decline will be discussed in Student 11's within case analysis.

Student 11's academic strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 11 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 21. Academic Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
Reading	Unclear (mixed results)
Mathematics	Unclear (mixed results)
Writing	No
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Science	Unclear (mixed results)
Social Studies	Unclear (mixed results)

Behavioral/Social-emotional FunctioningOn Task/Work Completion

Student 11 earned between 71.0 and 98.8 of his daily points on average for on task/work completion behavior on a quarterly basis. Accompanying standard deviations ranged from 2.91 to 24.3. Regarding annual performance, he earned between 77.9 and 96.8 percent of his daily points on average, with standard deviations ranging from 6.89 to 19.1.

Table 189. On Task/Work Completion (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	98.8 (2.91)	97.1 (5.48)	96.3 (7.84)	94.9 (9.27)	96.8 (6.89)
2008-09	86.1 (10.9)	79.8 (24.3)	76.8 (18.1)	71.0 (18.6)	77.9 (19.1)
2009-10	88.1 (17.2)	92.9 (13.0)	93.6 (12.4)	97.1 (6.15)	92.9 (13.2)

*Note.* Data reported are means (standard deviations in parentheses).

Student 11's performance in the area of on task/work completion behavior seemed to be highly variable. Based primarily on his earning at least 90 percent of his daily points on average during 7 of 12 quarters and 2 of 3 years, as well as the absence of an IEP goal, this seemed to be an area of relative strength. However, data appeared to be mixed regarding whether Student 11 was able to sustain a high level of performance in this area due to such variability.

Following Instructions/Compliance

Student 11 earned between 57.9 and 98.5 percent of his daily points on average for following instructions behavior, on a quarterly basis. Standard deviations ranged from 3.01 to 24.6. He earned between 68.8 and 92.2 percent of his daily points on average on a yearly basis, with standard deviations ranging from 7.30 to 21.3.

Table 190. Following Instructions (Percentage of Daily Behavioral Points Earned).

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2007-08	98.5 (3.01)	96.9 (6.27)	94.7 (8.11)	93.2 (9.29)	95.8 (7.30)
2008-09	81.8 (12.1)	75.7 (24.6)	64.9 (19.9)	57.9 (19.4)	68.8 (21.3)
2009-10	85.7 (18.4)	91.6 (14.6)	93.6 (13.3)	98.2 (3.71)	92.2 (14.3)

*Note.* Data reported are means (standard deviations in parentheses).

Overall, Student 11's following instructions behavior seemed to be highly variable. Based primarily on his earning at least 90 percent of his daily points on average during 7 of 12 quarters and 2 of 3 years, as well as the absence of an IEP goal, this seemed to be an area of relative strength. However, data appeared to be mixed in relation to whether Student 11 was able to sustain a high level of performance in this area, because of such variability in his performance.

Physical Aggression

Student 11 engaged in physically aggressive behaviors (e.g., pushing, punching) between 0 and 15 times per year. His annual mean number of aggressive acts was 3.80 (standard deviation: 6.30). Student 11's pattern of aggression may be described as an initial period with few aggressive acts that lasted about three years, followed by a spike in aggressive behavior that lasted for about a year, and then a significant decline in aggression.

Table 191. Episodes of Physical Aggression toward Others.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total
2005-06		1	0	1	2
2006-07	0	1	0	0	1
2007-08	0	0	0	0	0
2008-09	4	0	7	4	15
2009-10	0	0	1	0	1

Student 11 did not have an IEP goal for physically aggressive behavior.

Based primarily on Student 11 not engaging in physically aggressive behavior at all during 12 of 19 quarters, this seemed to be an area of relative strength. However, during the 08-09 academic year there was a dramatic increase in his aggressive behavior, and as a result data seemed mixed regarding whether he sustained a high level of performance over time in this area.

### Social Skills

Table 192 summarizes Student 11's grades in the areas of academic-, peer-, and adult-oriented social skills.

Student 11 had IEP goals for positive peer relations (11/06 – 6/10) and accepting adult feedback (6/08 – 6/10). He met 69 percent of his quarterly benchmark targets for positive peer relations, failing in 11/08, 1/09, 4/09, 6/09, and 4/10. Student 11 met 44 percent of his quarterly benchmarks for accepting adult feedback, failing in 11/08, 1/09, 4/09, 6/09, and 4/10.

Overall, Student 11 went from receiving predominantly “Excellent/Outstanding” and “Good/Satisfactory” grades in all three areas of social skills during his first three years of attendance, to receiving predominantly “Showing Improvement” and “Needs Improvement” grades during his last two years of attendance. There did not seem to be any clear pattern of performance that indicated his functioning in one of these three areas was higher than his functioning in the other areas.

Based on these data, and the presence of two IEP goals, social skills seemed to be an area of relative weakness for Student 11. Even though his grades seemed to decline over time, Student 11 was able to meet 44 to 69 percent of quarterly benchmarks for his IEP goals, therefore data seemed to be mixed as to whether any improvement occurred over time.

### Coping Skills

Table 193 summarizes Student 11's grades in the area of coping skills.

Student 11 had an IEP goal for “coping skills” from 4/06 to 6/10. He met 72 percent of his quarterly benchmark targets for this goal, failing in 11/08, 1/09, 4/09, 6/09, and 4/10.

Table 192. Social Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2005-06				
Academic	17	83	--	0
Peer	0	100	--	0
Adult	0	86	--	14
2006-07				
Academic	0	97	--	3
Peer	0	100	--	0
Adult	0	64	--	36
2007-08				
Academic	0	94	--	6
Peer	0	100	--	0
Adult	0	96	--	4
2008-09				
Academic	0	0	8	92
Peer	0	0	0	100
Adult	0	0	29	71
2009-10				
Academic	0	6	94	0
Peer	0	15	75	10
Adult	0	14	64	21

*Note.* The category Showing Improvement was added in August 2008.

Overall, Student 11's grades for coping skills seemed to drop sharply between his first and second years of enrollment, and then fluctuated afterward. Based on these data, including the presence of an IEP goal, this seemed to be an area of relative weakness for Student 11. Despite this general decline in grades, he was able to meet 72 percent of his quarterly benchmarks for his IEP goal, therefore data seemed mixed as to whether any improvement occurred over time.

Table 193. Coping Skills Grades, Report Cards (Percentages).

Year/ Area	Excellent/ Outstanding	Good/ Satisfactory	Showing Improvement	Needs Improvement
2005-06	0	100	--	0
2006-07	0	6	--	94
2007-08	0	38	--	63
2008-09	0	0	0	100
2009-10	0	0	75	25

*Note.* The category Showing Improvement was added in August 2008.

### Medical Management

When he entered this program, Student 11 was prescribed Concerta. Since that time, 8 medication changes or dosage adjustments have been documented, for a mean of 1.60 (standard deviation: 2.51) per year. At the end of the data collection period for this study, Student 11 was taking Concerta and Risperdal. While he has attended this school, he has been prescribed the following 5 psychotropic medications: Concerta, Clonidine, Risperdal, Seroquel, and Abilify. Medication compliance issues were noted in his special education file.



Table 194. Diagnosis and Medication Changes.

Year	Diagnosis Changes	Medication Changes
Prior to Entry	ADHD (date unknown)	Concerta (at entry)
2005-06		Concerta (DC) (1/06)
2006-07		
2007-08		
2008-09	“Bipolar Disorder,” ADHD (12/08)	Concerta (DC) (9/08) Clonidine (A) (10/08) Seroquel (A), Clonidine (D) (12/08) Seroquel (DC) (1/09) Abilify (A) (2/09) Abilify (D), Seroquel (DC) (3/09)
2009-10		Seroquel (D), Risperdal (A) (11/09)

*Note.* A = Added, D = Discontinued, DC = Dosage Change

Lastly, Student 11 has undergone psychiatric hospitalization on two occasions: once prior to his enrollment in this school, and once in December 2008.

#### School Attendance

Since he began attending this school, Student 11 missed 8.80 (standard deviation: 5.26) days per year on average. His annual absence totals ranged from 5 to 18. During the 08-09 school year, when he underwent a psychiatric hospitalization, he missed 18 days. In all other school years, he missed 5 to 8 days. Student 11 had 1 unexcused absence during the 08-09 year.

Table 195. School Attendance (Number of Absences).

Year	Excused	Unexcused	Total
2005-06	6	0	6
2006-07	5	0	5
2007-08	8	0	8
2008-09	17	1	18
2009-10	7	0	7

*Note.* Reported reasons for absences were not tracked.

#### Summary of Behavioral/Social-emotional Functioning

Similar to his academic profile, Student 11's behavioral/social-emotional profile may be characterized by high levels of ability and variability. Between the 07-08 and 08-09 academic years in particular, there seemed to be a significant decline in performance in all areas of behavioral/social-emotional functioning examined in this study, which included a psychiatric hospitalization in December 2008. This type of profile seems to represent an "all or nothing" pattern: Student 11 seemed to either be performing at a relatively high level or relatively low level across domains, without a clear middle level of functioning. Also, it should be noted that Student 11 was prescribed stimulant medication after he was diagnosed with a bipolar disorder, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

Student 11's behavioral/social-emotional strengths and weaknesses profile follows. Based on all of the data and rationales presented in this section, qualitative ratings were assigned in relation to whether Student 11 successfully maintained (or improved) performance in areas of strength, and improved performance over time in areas of relative weakness.

Figure 22. Behavioral/Social-emotional Strengths and Weaknesses Profile.

<u>Relative Strengths</u>	<u>Sustained Performance?</u>
On Task/Work Completion	Unclear (mixed results)
Following Instructions	Unclear (mixed results)
Physical Aggression	Unclear (mixed results)
<u>Relative Weaknesses</u>	<u>Improved Performance?</u>
Social Skills	Unclear (mixed results)
Coping Skills	Unclear (mixed results)

### Immediate Educational Outcomes

#### Level System Standing

During the years for which data were available, Student 11's level system standing ranged from Levels 1 to 4 (see Table 196). Each year, his standing spanned three to four levels. It may be important to point out that Student 11 achieved either Level 3 or 4 for five consecutive quarters over the 07-08 and 08-09 academic years, then spent four consecutive quarters on Level 1 only, and then re-achieved Level 3 at some point during three consecutive quarters.

#### Re-integration

Student 11 began partial re-integration into his home school in 10/07 for one class period. He exhibited some behavioral difficulties within this mainstream school, including some disruptive behaviors within the classroom setting and physical aggression toward peers, but it was noted that 75 percent of school days were successful. For the following school year (beginning 8/08), his mainstreaming time was increased to two class periods, but he was moved into a self-contained special education program that was housed within a different school building. Between 8/08 and 10/08, Student 11 exhibited

numerous behavioral difficulties in this mainstream school, including defiance, noncompliance, staff disrespect, destruction of property, and work refusal. As a result, the re-integration process was discontinued in 10/08.

Table 196. Levels Achieved within Behavior Modification Level System.

Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Range
2007-08	3,4	3,4	2,3,4	1,2,3	1-4
2008-09	1,2,3,4	1	1	1	1-4
2009-10	1	1,2,3	1,2,3	1,2,3	1-3

*Note.* System contains four levels (Level 1 is the lowest, Level 4 is the highest).

#### *Within Case Analysis for Student 11*

Overall, Student 11's placement in a therapeutic day school was marked by a tremendous amount of variability, both in his academic and behavioral/social-emotional functioning. While Student 11 achieved the two greatest immediate educational outcomes possible, reaching Level 4 status in the school's behavior modification level system and beginning the re-integration process into his home school, his re-integration was discontinued after about one year. It appeared that placement in a therapeutic day school was effective in helping him achieve both academic and behavioral/social-emotional success for an extended period of time. However, there seemed to be a relationship between the removal of the structure and supports provided by a therapeutic day school due to the nature of the re-integration process, and Student 11 beginning to struggle to consistently maintain a high level of performance. When his re-integration placement was changed after he had struggled for a period of time, this seemed to result in an escalation of maladaptive behaviors that ultimately resulted in the discontinuation of his re-integration.

As mentioned earlier, his performance seemed to represent an “all or nothing” profile in many ways. When he was performing at a high level in general, he was receiving his highest grades and test scores, earning his highest daily point totals, moving up the level system, and exhibiting higher quality social and coping skills. When he was struggling, this also extended into all of the aforementioned areas. Seemingly as a result, across most areas of functioning Student 11’s data were mixed and in some cases discrepant, producing unclear results as to whether Student 11 maintained his relative strengths and improved his relative weaknesses. In particular, results were mixed as to whether he demonstrated improvement in the area of coping skills, which seemed to be related to his reason for referral to this school.

A complicating factor among these results may be the ongoing medication compliance issues that were noted in Student 11’s special education file. Because he required ongoing medical care for his psychiatric symptoms, refusing to take his medication at times may have contributed to his difficulties sustaining a high level of performance. Additionally, it is important to note that Student 11 was prescribed stimulant medication after he was diagnosed with a bipolar disorder, a practice cautioned against by Kowatch et al. (2005). However, he always took this medication in conjunction with a mood stabilizer and/or atypical antipsychotic, per published guidelines.

### Cross Case Analyses

#### *Theme #1: Demographic Characteristics/Referral*

##### *Concerns*

A number of patterns emerged upon examining data regarding demographic characteristics and reasons for referral to a therapeutic day school. Findings are reported for racial/ethnic background and gender, socio-economic status, grade level at referral,

reason for referral, type of diagnosed bipolar disorder, comorbid psychiatric disorders, family history of psychiatric disorders, and measured intellectual ability.

Regarding racial/ethnic background and gender, the majority of students in this study were White males. In all, 10 students were male, 9 students were White, and 8 students were White males. Based on this study, no general claims can be made about the proportion of either males or Whites who were diagnosed with a bipolar disorder or referred to a therapeutic day school. However, this finding was interesting because the school in which this study was conducted was located within a suburb of a major metropolitan region, with a catchment area that was diverse in terms of the racial/ethnic backgrounds of residents.

As for socio-economic status, a total of 4 of 11 students were eligible to receive free lunch at school based on their family's income, which is an indicator of low socio-economic status. Interestingly, these 4 students were among the 6 students with the longest tenure at this school. Such a finding may speak to the added impact of low socio-economic status on overall functioning.

Many students in this study were referred to a therapeutic day school relatively early in their school careers. In fact, 7 of 11 students were placed in this school no later than third grade. Additionally, 10 of 11 students were placed in this school no later than fifth grade. Therefore, in this study, a majority of students with bipolar disorders were referred to a therapeutic day school no later than third grade.

Physically aggressive and self-injurious/suicidal behavior seemed to play a prominent role in referral to a therapeutic day school. In this study, 6 of 11 students were referred to this school at least in part due to exhibiting physically aggressive behavior. Of the remaining students, 3 of 5 were referred to this school at least in part due to gestures or behaviors related to self-harm, or suicidal ideation.

For 9 of the 11 students in this study, school records provided a non-DSM standardized diagnostic classification of a bipolar disorder (e.g., a vague diagnosis of

“Bipolar Disorder”). For the 2 of 11 students who had a DSM diagnosis on file, both were diagnosed with Bipolar Disorder Not Otherwise Specified.

Regarding comorbid disorders, 9 of 11 students had been diagnosed with ADHD in addition to a bipolar disorder. Additionally, 5 of 11 students had been diagnosed with ODD, and other comorbid psychiatric disorders (e.g., PTSD, enuresis) were diagnosed among 2 or fewer students. Only 1 of the 11 students in this study did not have a comorbid psychiatric diagnosis. Comorbid learning disorders will be discussed in the section of Chapter IV that discusses themes in academic functioning.

As for family history, only 2 of 11 students had a documented family history of bipolar disorders, and both of these students had a parent with a bipolar disorder. Only 1 of 11 students had a documented family history of another mood disorder (depression), which was present in an extended family member. Substance use disorders were documented in the family history of 2 of 11 students.

Of the 10 students who had been administered a test of cognitive ability, 9 scored within the average range of functioning (summary data may be found in Table A2). The other student scored within the high average to superior range of functioning (scores varied between two administrations of the test). Reportedly, a test of cognitive ability was not administered to the eleventh student in this study because no concerns were present about that student’s cognitive functioning.

*Theme #2: Academic Functioning – Strengths and Weaknesses*

Altogether, based on within case qualitative analyses, 8 of 11 students in this study exhibited relative strengths in reading, writing, science, and social studies. Only 1 of 11 students exhibited a relative strength in mathematics. Conversely, 10 of 11 students exhibited a relative weakness in mathematics, while only 3 of 11 students demonstrated

relative weaknesses in reading, writing, science, and social studies. Summary data may be found in Table A3.

Regarding diagnosed learning disorders, 2 of 11 students had a learning disorder in reading, 2 of 11 students had a learning disorder in written language, and 1 of 11 students had a learning disorder in mathematics.

As for IEP goals, 4 of 11 students had at least one IEP goal for mathematics, 2 of 11 students had at least one IEP goal for reading, and 1 of 11 students had at least one IEP goal for written language.

*Theme #3: Academic Functioning – Patterns of  
Performance*

Of the 10 of 11 students who had been administered a test of intellectual functioning, scores within the average range or higher were reported for all 10 students. Reportedly, a test of intellectual functioning was not administered to the remaining student because there was not a concern about her intellectual functioning. Therefore, as expected, the majority of students in this study demonstrated high levels of academic ability overall. Only Student 3 and Student 6 did not demonstrate high levels of academic ability in general, and both of these students had been diagnosed with multiple learning disorders.

However, despite generally high levels of cognitive and academic abilities, all 11 student profiles were marked by variability in daily functioning. In particular, this variability was most evident on AIMSweb measures, where all 11 students scored in at least two different ranges of functioning (i.e., below average, average, above average), as measured by percentile ranks, on measures of reading fluency, reading comprehension, and/or mathematics computation.

An interesting pattern emerged upon examining academic performance as measured by AIMSweb probes, grades, and ISAT scores. A majority of students (i.e., at



least 9 of 11 students) demonstrated less variability over time in grades than in AIMSweb and/or ISAT scores. It was hypothesized that this increased variability on assessments that sampled performance over a brief period of time (i.e., AIMSweb, ISAT) versus a longer period of time (i.e., grades) may have been due to the presence of rapid cycling of moods. As discussed in the literature review, rapid cycling of moods is a common occurrence in children and adolescents with bipolar disorders. This symptom of bipolar disorders in children and adolescents may account for marked levels of variability in daily academic functioning. Comorbid psychiatric disorders, such as ADHD, may have played a role also in this variability in daily functioning.

Finally, as determined by within case qualitative analyses, 10 of 11 students sustained a high level of performance over time in all areas of relative academic strength. As for relative academic weaknesses, 6 of 11 students demonstrated improvement in all areas, 1 of 11 students demonstrated improvement in a majority of areas, and 4 of 11 students exhibited mostly mixed results. Therefore, a majority of students with bipolar disorders sustained a high level of performance in areas of academic strength and improved performance in most or all areas of academic weakness while enrolled in a therapeutic day school.

*Theme #4: Behavioral/Social-emotional Functioning –  
Strengths and Weaknesses*

Overall, based on within case qualitative analyses, 8 of 11 students in this study exhibited relative strengths in following instructions behavior and refraining from engaging in physically aggressive behavior. Further, 5 of 11 students demonstrated a relative strength in on task/work completion behavior. No students (i.e., 0 of 11) exhibited a relative strength in either social skills or coping skills. Conversely, all students (i.e., 11 of 11) demonstrated relative weaknesses in social skills and coping skills. A total of 6 of 11 students exhibited a relative weakness in on task/work

completion behavior, and 3 of 11 students demonstrated relative weaknesses in following instructions behavior and refraining from engaging in physically aggressive behavior.

Summary data may be found in Table A4.

Regarding IEP goals, all students (i.e., 11 of 11 students) had at least one IEP goal for both social skills and coping skills. Additionally, 6 of 11 students had at least one IEP goal for on task/work completion behavior, 3 of 11 students had at least one IEP goal for following instructions behavior, and no student (i.e., 0 of 11) had an IEP goal specific to physically aggressive behavior, although this was included within a general coping skills IEP goal for one student.

*Theme #5: Behavioral/Social-emotional Functioning –  
Patterns of Performance*

Similar to academic functioning, a majority of students (i.e., at least 10 of 11 students) exhibited variability in daily behavioral/social-emotional functioning. Primarily, this statement is based on large (i.e., at least 10) standard deviations associated with a majority of quarterly and/or annual percentages of daily points earned on average in the areas of on task/work completion and following instructions behaviors. Once again, it was hypothesized that such variability in daily functioning may reflect the occurrence of rapid cycling of moods. Again, comorbid psychiatric disorders may have played a role in this variability also.

Another interesting pattern that emerged upon examining the data in this area was the presence of two distinct profiles of physically aggressive behavior. Among the 8 of 11 students who had attended this therapeutic day school for at least three complete years, all 8 students fit one of two profiles: 1) a “spike” pattern that was characterized by initially low levels of aggression that persisted for somewhere between one quarter and three years, followed by a dramatic spike in aggression that lasted for up to two years, followed by a nearly linear decline in aggressive behavior afterward; and 2) a “low

levels” pattern that was characterized by never engaging in more than 2 acts of aggression in any year. The remaining 3 of 11 students who had attended this therapeutic day school less than three complete years also exhibited emerging profiles that were fairly consistent with those of the other 8 students. One student (Student 2) exhibited an emerging spike pattern, one student (Student 7) exhibited an emerging low levels pattern, and one student (Student 10) began exhibiting an emerging spike pattern that was complicated by undergoing a complete “medication wash” to participate in a research study in the second quarter of the 09-10 academic year.

Next, all students experienced ongoing medical management of psychiatric symptoms while enrolled in this school. All students (i.e., 11 of 11 students) were prescribed psychotropic medication during their enrollment in this school, and these students experienced between 0.29 and 7.00 medication changes or dosage adjustments per year on average. Despite treatment guidelines that cautioned against the use of stimulants and SSRIs in treatment of children and adolescents with bipolar disorders (i.e., Kowatch et al., 2005), 9 of 11 students were prescribed stimulant medication sometime during the course of their enrollment in this school, and 7 of 11 were prescribed SSRIs. Further, for some period of time, 2 of 11 students were prescribed a stimulant and/or a SSRI without an accompanying mood stabilizer or atypical antipsychotic, a practice that was clearly discordant with published treatment guidelines (i.e., Kowatch et al., 2005). Another student (Student 7) was completely unmedicated for a period of three months. The impact of these questionable psychiatric practices on students’ performance was unclear. Medication compliance issues were noted for 5 of 11 students. Further, 9 of 11 students underwent psychiatric hospitalization in their lifetime, and 5 of these 9 students underwent psychiatric hospitalization while enrolled in this school. No clear patterns were evident regarding either medication changes/dosage adjustments or psychiatric hospitalizations.

School attendance was also variable, as the average number of school absences per year ranged from 1.67 to 21.0. Reasons for absences were not tracked, but psychiatric hospitalizations seemed to account for some extended periods of absence, based on the dates of hospitalization.

Finally, based on within case qualitative analyses, 8 of 11 students sustained a high level of performance over time in all areas of relative behavioral/social-emotional strength. Regarding relative weaknesses, 6 of 11 students demonstrated improvement in all areas, and 5 of 11 students exhibited mostly mixed results. Therefore, a majority of students with bipolar disorders sustained a high level of performance in areas of relative behavioral/social-emotional strength, and improved performance in most or all areas of relative behavioral/social-emotional weakness, while enrolled in a therapeutic day school.

#### *Theme #6: Immediate Educational Outcomes*

Regarding standing within the school's behavioral modification level system, a majority of students (i.e., 9 of 11 students) achieved the highest level at some point. All students (i.e., 11 of 11 students) achieved at least the next-to-highest level at some point. However, variability in level system standing over time was noted for all (i.e., 11 of 11) students, as each student's level system standing spanned two to four levels during each academic year. In particular, it appeared to be difficult for students to achieve and then sustain a high level of performance over an extended period of time.

As for re-integration, 7 of 11 students achieved partial re-integration into their home schools. However, the re-integration process was discontinued for 4 of these 7 students, chiefly due to exhibiting behavioral difficulties in a mainstream setting. For these students, it was hypothesized that their performance seemed to decline in relation to removing some of the supports and structure provided by this therapeutic day school due to the nature of the re-integration process.

Finally, among the 3 of 11 graduating students, 2 of 3 were placed in an alternative high school. No information was available regarding high school placement for the remaining student.

### Summary/Answers to Research Questions

In this section, the research questions of this study will be presented and addressed in reverse order (i.e., components of sub-questions, then sub-questions, then primary research question) as a way to integrate results and build toward answering the primary research question of this study.

*Component #1, Sub-question #1: How does reading performance change over time among children and adolescents with bipolar disorders?*

Based on within case qualitative analyses, reading was identified as an area of relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11 students. Among the students who exhibited a relative strength in reading, 7 of 8 students sustained a high level of performance over time, while results were mixed for 1 of 8 students, based on AIMSweb data, ISAT performance, grades, and meeting IEP quarterly benchmarks. Among those students who demonstrated a relative weakness in reading, all students (i.e., 3 of 3) improved performance over time, based on AIMSweb data, ISAT performance, grades, and meeting IEP quarterly benchmarks.

In addition to qualitative analyses, Sign Tests were conducted using AIMSweb data in order to explore whether students' performance as a group improved over time in the areas of reading fluency and reading comprehension. A Sign Test is a non-parametric statistical procedure. Based on AIMSweb percentile ranks in reading fluency, a frequency of 5 of 11 positive sign differences was observed, resulting in a one-tail  $p$  value of 0.50. Therefore, results from this test were not statistically significant at the  $p \leq .05$  level, indicating that students' performance (as measured by percentile ranks) on AIMSweb measures of reading fluency did not significantly improve over time.

A Sign Test was also conducted using AIMSweb data for reading comprehension. A frequency of 5 of 11 positive sign differences was observed, resulting in a one-tail  $p$  value of 0.50. Therefore, results from this test were not statistically significant at the  $p \leq .05$  level, indicating that students' performance (as measured by percentile ranks) on AIMSweb measures of reading comprehension did not significantly improve over time.

*Component #2, Sub-question #1: How does mathematics performance change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that mathematics was an area of relative strength for only 1 of 11 students, and an area of relative weakness for 10 of 11 students. For the student who demonstrated a relative strength in mathematics, results were mixed regarding whether that student sustained a high level of performance over time, based on AIMSweb data, ISAT performance, grades, and meeting IEP quarterly benchmarks. Among those students who exhibited a relative weakness in mathematics, 6 of 10 students improved performance over time, while results were mixed for 4 of 10 students, based on AIMSweb data, ISAT performance, grades, and meeting IEP quarterly benchmarks.

In addition to qualitative analyses, a Sign Test was conducted using AIMSweb data to explore whether students' performance as a group improved over time in the area of mathematics computation. A frequency of 5 of 11 positive sign differences was observed, resulting in a one-tail  $p$  value of 0.50. Therefore, results from this test were not statistically significant at the  $p \leq .05$  level, indicating that students' performance (as measured by percentile ranks) on AIMSweb measures of mathematics computation did not significantly improve over time.

*Component #3, Sub-question #1: How does writing performance change over time among children and adolescents with bipolar disorders?*

According to within case qualitative analyses, writing was identified as an area of relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11

students. For those students who demonstrated a relative strength in writing, 7 of 8 students sustained a high level of performance over time, while results indicated that 1 of 8 students did not sustain a high level of performance over time, based on grades, ISAT performance, and meeting IEP quarterly benchmarks. For those students who exhibited a relative weakness in writing, 2 of 3 students improved performance over time, while results were mixed for 1 of 3 students, based on grades, ISAT performance, and meeting IEP quarterly benchmarks.

*Component #4, Sub-question #1: How does science performance change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that science was an area of relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11 students. Among those students who demonstrated a relative strength in science, all students (i.e., 8 of 8) maintained a high level of performance over time, based on grades and ISAT performance. Among those students who exhibited a relative weakness in science, 1 of 3 students improved performance over time, while results were mixed for 2 of 3 students, based on grades and ISAT performance.

*Component #5, Sub-question #1: How does social studies performance change over time among children and adolescents with bipolar disorders?*

Based on within case qualitative analyses, social studies was identified as an area of relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11 students. For those students who demonstrated a relative strength in social studies, all students (i.e., 8 of 8) sustained a high level of performance over time, based on grades. For those students who exhibited a relative weakness in social studies, 1 of 3 students improved performance over time, while results were mixed for 2 of 3 students, based on grades.

*Sub-question #1: How does placement in a therapeutic day school affect the academic functioning of children and adolescents with bipolar disorders over time?*

Overall, based on qualitative analysis, 10 of 11 students sustained a high level of performance over time in all areas of relative strength. Regarding relative weaknesses, 6 of 11 students demonstrated improvement in all areas, 1 of 11 students demonstrated improvement in a majority of areas, and 4 of 11 students exhibited mostly mixed results in areas of relative weakness. No student demonstrated a clear deterioration of functioning over time in any academic subject.

In conclusion, a majority of students with bipolar disorders sustained performance in areas of academic strength, and improved performance in most or all areas of academic weakness, while enrolled in a therapeutic day school. However, degrees, rates, and patterns of improvement varied among students. Finally, variability in daily academic functioning was noted for all students (i.e., 11 of 11 students) included in this study.

*Component #1, Sub-question #2: How does on task/work completion behavior change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that on task/work completion behavior was an area of relative strength for 5 of 11 students, and an area of relative weakness for 6 of 11 students. Among those students who demonstrated a relative strength in on task/work completion behavior, 3 of 5 students sustained a high level of performance over time, while results were mixed for 2 of 5 students, based on percentages of daily points earned on average and meeting quarterly IEP benchmarks. For those students who exhibited a relative weakness in on task/work completion behavior, 5 of 6 students improved performance over time, while results were mixed for 1 of 6 students, based on percentages of daily points earned on average and meeting quarterly IEP benchmarks.

*Component #2, Sub-question #2: How does compliant (i.e., following instructions) behavior change over time among children and adolescents with bipolar disorders?*

Based on within case qualitative analyses, following instructions behavior was identified as an area relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11 students. For those students who demonstrated a relative strength in



following instructions behavior, 6 of 8 students sustained a high level of performance over time, while results were mixed for 2 of 8 students, based on percentages of daily points earned on average and meeting quarterly IEP benchmarks. For those students who exhibited a relative weakness in following instructions behavior, 2 of 3 students improved performance over time, while results were mixed for 1 of 3 students, based on percentages of daily points earned on average and meeting quarterly IEP benchmarks.

*Component #3, Sub-question #2: How does physically aggressive behavior change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that refraining from engaging in physically aggressive behavior was an area of relative strength for 8 of 11 students, and an area of relative weakness for 3 of 11 students. Among those students who demonstrated a relative strength in refraining from engaging in physically aggressive behavior, 6 of 8 students sustained a high level of performance over time, results were mixed for 1 of 8 students, and 1 of 8 students exhibited an increase in physically aggressive behavior over time, based on number of incidents of physical aggression and meeting quarterly IEP benchmarks. For those students who exhibited a relative weakness in refraining from physically aggressive behavior, 2 of 3 students improved performance over time, while 1 of 3 students exhibited an increase in physically aggressive behavior over time, based on number of incidents of physical aggression and meeting quarterly IEP benchmarks.

Finally, two patterns of physically aggressive behavior emerged for students with bipolar disorders: 1) a “spike” pattern that was characterized by initially low levels of aggression, followed by a dramatic spike in aggression, followed by a nearly linear decline afterward; and 2) a “low levels” pattern that was characterized by no more than two aggressive episodes per year. These patterns were discussed in greater detail in the cross case analyses portion of Chapter IV.

*Component #4, Sub-question #2: How does general social skills behavior change over time among children and adolescents with bipolar disorders?*

Based on within case qualitative analyses, social skills behavior was an area of relative weakness for all students (i.e., 11 of 11 students) in this study. However, it should be noted that 1 of 11 students demonstrated a clear relative strength in peer-oriented social skills, although academic- and adult-oriented social skills were relative weaknesses. Among these students, 6 of 11 students improved performance over time, while results were mixed for 5 of 11 students, based on social skills grades and meeting quarterly IEP benchmarks.

*Component #5, Sub-question #2: How does general coping skills behavior change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that coping skills behavior was an area of relative weakness for all students (i.e., 11 of 11 students) in this study. For these students, 6 of 11 students improved performance over time, while results were mixed for 5 of 11 students, based on coping skills grades and meeting quarterly IEP benchmarks.

*Component #6, Sub-question #2: For those children and adolescents with bipolar disorders receiving medical management, how do medication adjustments and hospitalizations change over time?*

Among the students in this study, all (i.e., 11 of 11 students) were prescribed psychotropic medication throughout the course of their enrollment in this school. Further, all (i.e., 11 of 11 students) experienced at least two medication changes or dosage adjustments while enrolled in this school. The average number of medication changes or dosage adjustments per year ranged from 0.29 to 7.00 among students. A total of 7 of 11 students averaged at least 2.00 medication changes or dosage adjustments per year.

Despite treatment guidelines that cautioned against the use of stimulants and SSRIs in treatment of children and adolescents with bipolar disorders (i.e., Kowatch et al., 2005), 9

of 11 students were prescribed stimulant medication sometime during the course of their enrollment in this school. Further, 7 of 11 were prescribed SSRIs. For some period of time, 2 of 11 students were prescribed a stimulant and/or a SSRI without an accompanying mood stabilizer or atypical antipsychotic, a practice clearly discordant with published treatment guidelines (i.e., Kowatch et al., 2005). Another student (i.e., Student 7) was completely unmedicated for a period of three months. The impact of these questionable psychiatric practices on students' performance was unclear. Medication compliance issues were noted for 5 of 11 students. For all (i.e., 11 of 11) students, the number of medication changes or dosage adjustments was variable over time, with no clear patterns evident. The number of different psychotropic medications prescribed to students while enrolled in this school ranged from 2 to 15, with a mean of 7.36. A total of 9 of 11 students were prescribed at least 5 different psychotropic medications while enrolled in this school.

Regarding psychiatric hospitalization, 9 of 11 students underwent psychiatric hospitalization in their lifetime. While enrolled in this school, 5 of these 9 students underwent psychiatric hospitalization. Among students who had undergone psychiatric hospitalization, the average number of lifetime hospitalizations was 3.11. No clear patterns of hospitalization emerged upon examining the data.

*Component #7, Sub-question #2: How does school attendance change over time among children and adolescents with bipolar disorders?*

The average number of school absences per year ranged from 1.67 to 21.0 among students. A total of 7 of 11 students missed more than 5 days per year on average, and 4 of 11 students missed more than 10 days per year on average. Only 3 of 11 students had an unexcused absence at any time during their enrollment, and unexcused absence appeared to be a chronic issue (i.e., at least 2 unexcused absences every year) for only 1 of 11 students. Overall, attendance patterns seemed to be variable among students, with no clear trends. While reasons for absences were not tracked, psychiatric hospitalizations

seemed to account for some extended periods of absence, based on the dates of hospitalization.

*Sub-question #2: How does placement in a therapeutic day school affect the behavioral/social-emotional functioning of children and adolescents with bipolar disorders over time?*

Overall, based on qualitative analysis, 8 of 11 students sustained a high level of performance over time in all areas of relative strength. Regarding relative weaknesses, 6 of 11 students demonstrated improvement in all areas, and 5 of 11 students exhibited mostly mixed results.

In conclusion, a majority of students with bipolar disorders sustained performance in all areas of relative behavioral/social-emotional strength, and improved performance in all areas of relative behavioral/social-emotional weakness, while enrolled in a therapeutic day school. However, it should be noted that degrees, rates, and patterns of improvement varied among students. Variability in daily behavioral/social-emotional functioning was noted for a majority of students (i.e., at least 10 of 11 students) included in this study. Finally, for a majority of students, psychiatric practices not necessarily in accordance with treatment guidelines may have negatively affected students' functioning, although this was unclear based on the data available.

*Component #1, Sub-question #3: How does standing within the school's level system change over time among children and adolescents with bipolar disorders?*

Within case qualitative analyses indicated that 9 of 11 students achieved Level 4 (the highest level) of the school's behavior modification level system at some point during their enrollment in this school. Further, 11 of 11 students achieved at least Level 3 status (the next-to-highest level) of the school's behavior modification system. However, level system standing was variable over time for all students, as every student in this study was on two to four different levels during every school year. Not a single student in this study remained on only one level for the duration of an entire school year.

*Component #2, Sub-question #3: How successful are children and adolescents with bipolar disorders at achieving either partial or full re-integration into their home schools, including high school placement (as appropriate)?*

Overall, within case qualitative analyses revealed that 7 of 11 students achieved partial re-integration into their home schools at some point during their enrollment in this school. However, of these students, 4 of 7 students had the re-integration process discontinued after a period of time, chiefly due to exhibiting behavioral difficulties within the mainstream setting. Of the remaining students, 2 of 3 students began the re-integration process during the final year of data collection for this study, and had positive initial progress reports. The remaining student achieved re-integration near the conclusion of this study, with the re-integration process set to begin during the school year that followed the conclusion of this study period. It is important to note that due to sample selection procedures, these results may have been negatively biased. For example, students who were successfully fully re-integrated prior to the end of the 09-10 school year would not have been included in the sample of students for this case study, as a full year of data would not have been available for these students.

As for high school placement, information was available for only 2 of the 3 graduating students included in this study. Both of these students were placed in an alternative high school rather than a mainstream high school.

*Sub-question #3: How does placement in a therapeutic day school affect the immediate educational outcomes of children and adolescents with bipolar disorders over time?*

Overall, based on within case qualitative analyses, 9 of 11 students achieved the highest level of the school's behavior modification level system at some point, while all students (i.e., 11 of 11) achieved at least the next-to-highest level. Variability in level system standing over time was noted for all (i.e., 11 of 11) students.

A total of 7 of 11 students achieved partial re-integration into their home schools, although the re-integration process was discontinued for 4 of 7 students, chiefly due to

exhibiting behavioral difficulties in a mainstream setting. Of the 3 graduating students, 2 of 3 were placed in an alternative high school, while no information was available for the remaining student.

*Primary research question: How does placement in a therapeutic day school as an educational intervention package affect the school functioning of children and adolescents with bipolar disorders over time?*

Overall, based on qualitative analysis, a majority of students with bipolar disorders sustained performance in areas of relative academic and behavioral/social-emotional strength while enrolled in a therapeutic day school. Further, a majority of students with bipolar disorders improved performance in areas of relative academic and behavioral/social-emotional weakness while enrolled in a therapeutic day school. However, variability in daily functioning was noted for most students in both academic and behavioral-social emotional performance, and degrees, rates, and patterns of improvement varied among students.

Regarding immediate educational outcomes, a majority of students with bipolar disorders achieved the highest level of the school's behavioral modification level system, as well as re-integration into their home schools. However, variability was present among students in both level system standing over time and degree of success within the re-integration process.

In conclusion, based on both within case and cross case qualitative analyses focused on sustaining areas of relative strength, improving areas of relative weakness, achieving positive immediate educational outcomes, and ameliorating referral concerns, placement in a therapeutic day school seemed to be an effective educational intervention package for nearly all students with bipolar disorders included in this study. However, degrees, rates, and patterns of success varied among students, as did students' ability to succeed in a mainstream setting following the removal of the supports and structure provided by a therapeutic day school. For the one student (i.e., Student 2) who seemed to

exhibit a worsening of behavioral/social-emotional symptoms over time while enrolled in this therapeutic day school, it was hypothesized that she may ultimately exhibit gains in the future, as she may be in the early stages of a “things must get worse before they can get better” type of pattern. However, at this time, one cannot claim that placement in a therapeutic day school was effective for her as an educational intervention package. Finally, it is important to note that ongoing medical management of psychiatric symptomology occurred for all (i.e., 11 of 11) students included in this study, and likely played a significant role in achieving these results, despite the occurrence of some questionable psychiatric practices (e.g., prescribing stimulants and SSRIs) in a number of cases.

#### Research Questions and Hypothesis Testing

In this section, hypotheses generated prior to data collection will be compared to the results from this study.

*Hypotheses #1: Regarding academic functioning, it is predicted that all children and adolescents will demonstrate progress over time in all academic subjects studied (i.e., reading, mathematics, writing, science, and social studies), although the degree of progress will be highly variable among individual students. In addition, it is predicted that all children and adolescents will demonstrate fluctuations in academic performance over time, rather than linear progression.*

This hypothesis was mostly confirmed. A majority of students with bipolar disorders sustained performance in areas of academic relative strength, and improved performance in most or all areas of academic relative weakness, based on qualitative analyses. However, not all students clearly demonstrated progress in all academic subjects over time. Variability in daily academic functioning was noted for all students in this study, and degrees, rates, and patterns of improvement varied among students.

*Hypothesis #2: Regarding behavioral/social-emotional functioning, it is predicted that all children and adolescents will demonstrate progress over time in on task/work completion, following instructions, and physically aggressive behaviors, as well as in general social and coping skills. However, it is predicted that the degree of progress will vary widely among students. Also, it is predicted that children and adolescents will demonstrate fluctuations in these behaviors over time, rather than linear improvements.*

This hypothesis was mostly confirmed. A majority of students with bipolar disorders sustained performance in all areas of behavioral/social-emotional relative strength, and improved performance in all areas of behavioral/social-emotional relative weakness. However, not all students clearly demonstrated progress in all areas of behavioral/social-emotional functioning over time. Variability in daily behavioral/social-emotional functioning was noted for a majority of students in this study, and degrees, rates, and patterns of improvement varied among students.

*Hypothesis #3: Next, it is predicted that all children and adolescents receiving medical management will experience medication adjustments over time, and that hospitalizations will occur periodically for some students, but not all.*

This hypothesis was confirmed. All students in this study experienced at least two medication changes or dosage adjustments over time. A total of 9 of 11 students underwent psychiatric hospitalization during their lifetime. It should be noted that despite treatment guidelines that cautioned against the use of stimulants and SSRIs in treatment of children and adolescents with bipolar disorders (i.e., Kowatch et al., 2005), 9 of 11 students were prescribed stimulant medication sometime during the course of their enrollment in this school, and 7 of 11 were prescribed SSRIs. Further, 2 of 11 students were prescribed a stimulant and/or a SSRI without an accompanying mood stabilizer or atypical antipsychotic for some period of time, a practice that was clearly discordant with published treatment guidelines (i.e., Kowatch et al., 2005). Another student (i.e., Student



7) was completely unmedicated for a period of three months. The impact of these questionable psychiatric practices on students' performance was unclear.

*Hypothesis #4: It is predicted that variability in school attendance will occur among children and adolescents, and that for some, attendance will be impacted by hospitalizations, appointments with physicians, involvement with the legal system (e.g., attending court appointments), and other types of excused absences related to medical or legal issues.*

This hypothesis was mostly confirmed. Among all students, school attendance was variable over time. While reasons for school absences were not available, there appeared to be a relation between the dates of psychiatric hospitalization and high absence totals for students, as appropriate.

*Hypothesis #5: Regarding immediate educational outcomes, it is predicted that all children and adolescents will demonstrate a wide degree of variability in terms of their standing within the school's level system. Also, it is predicted that a small number of students - but not all - will demonstrate sustained consistency in adequate school performance to the point of achieving partial or full re-integration into their home schools.*

This hypothesis was mostly confirmed. Every student's level system standing spanned two to four levels during every year for which data were available. A majority of students (i.e., 7 of 11) achieved re-integration into their home schools at some point, although the re-integration process was discontinued for 4 of these 7 students. No student included in this study achieved full re-integration into his or her home school, although this was recognized as a limitation of the sample selection process for this study.

*Hypothesis #6: Finally, to address the primary research question of this study, it is predicted that placement in a therapeutic day school as an educational intervention package for children and adolescents with bipolar disorders will be associated with some*

*positive gains in both academic and behavioral functioning, as well as some gains in immediate educational outcomes. However, it is predicted that there will be great variability among students in the types of gains achieved and ability to sustain those gains consistently over time, due to the severity and complexity of bipolar disorders in children and adolescents.*

This hypothesis was confirmed. A majority of students with bipolar disorders sustained performance in areas of relative academic and behavioral/social-emotional strength, and improved performance in areas of relative academic and behavioral/social-emotional weakness, while enrolled in a therapeutic day school. Variability in daily functioning was noted for most students in both academic and behavioral-social emotional performance, and degrees, rates, and patterns of improvement varied among students. Psychiatric practices not necessarily in accordance with treatment guidelines may have contributed to this variability.

Further, a majority of students with bipolar disorders achieved both the highest level of the school's behavioral modification level system and re-integration into their home schools. Again, variability was present in both level system standing over time, and degree of success within the re-integration process, among the students included in this study.

#### Rival Explanations

A series of rival explanations, derived from Yin (2009), were examined in order to test the results of this study.

*Rival Explanation #1: Null Hypothesis. These results occurred due to chance.*

It is believed that these results did not occur solely due to chance. Because nearly all students (i.e., 10 of 11 students) included in this study demonstrated appreciable gains in academic and behavioral/social-emotional functioning, improvement occurred at a much higher rate than one might expect solely on the basis of chance.

*Rival Explanation #2: Maturation Effects. These results occurred due to physical, emotional, and/or cognitive maturation.*

It is believed that these results did not occur due to maturation effects, as students of various ages and at various grade levels demonstrated appreciable gains in academic and behavioral/social-emotional functioning. Further, the literature review conducted for this study suggested that symptoms of bipolar disorders may worsen with the onset of puberty, not improve.

*Rival Explanation #3: Direct Rival. These results occurred due to an intervention besides the targeted intervention.*

It is believed that these results did not occur due to an intervention other than the targeted intervention. Perhaps the intervention most likely to challenge placement in a therapeutic day school in producing these results was students' ongoing medical management of symptoms. Every student in this study was prescribed psychotropic medication during the course of his or her enrollment, yet gains in academic and behavioral/social-emotional functioning varied among students in degree, pattern of improvement, and rate. Additionally, questionable psychiatric practices such as prescribing stimulants and SSRIs may have negatively affected students' performance overall (e.g., Kowatch et al., 2005). Also, in particular, improvements in the areas of academic, social, and coping skills involved learning and implementing specific skills, which could not be accomplished simply through medical management.

*Rival Explanation #4: Commingled Rival. These results occurred due to another intervention plus the targeted intervention.*

Because every student in this study was prescribed psychotropic medication while enrolled in this school, it was impossible to separate the effects of placement in a therapeutic day school alone versus ongoing medical management alone. However, the literature review conducted for this study indicated that the most effective treatment for bipolar disorders in children and adolescents is a combination of pharmacological and

psychosocial interventions. Therefore, it seems likely that ongoing medical management of psychiatric symptoms played a role in supporting the effectiveness of placement in a therapeutic day school as an educational intervention package. However, questionable psychiatric practices such as prescribing stimulants and SSRIs may have negatively impacted students' performance overall (e.g., Kowatch et al., 2005). This intermingling of interventions was an artifact of conducting field-based research, and may be separated out in future studies with different students and/or experimental control groups.

## CHAPTER V

### DISCUSSION

This chapter begins with a brief introduction. Next, results of this study are compared to findings from the literature review that was conducted for this study. Specifically, results are explored in the areas of educational functioning (including academic, behavioral/social-emotional, and cognitive/neuropsychological functioning) and interventions (both psychopharmacological and psychotherapeutic). Next, contributions of this study to the professional literature are outlined. Following this is a discussion of the limitations of this study. Finally, directions for future research are identified.

#### Introduction

Broadly, the present study was conceptualized as an initial step toward ultimately finding effective, empirically-supported interventions for children and adolescents with bipolar disorders, and more specifically, to find effective educational interventions for this population. This study explored the effectiveness of placement in a therapeutic day school as an educational intervention package for eleven children and adolescents with bipolar disorders, who were followed over the course of at least two full academic years. Using a case study research design, within- and cross-case analyses were conducted. Both quantitative and qualitative data were analyzed, primarily using the qualitative techniques of pattern matching and triangulation, following case study research methodology outlined by Yin (2009). Ultimately, this study answered the primary research question: How does placement in a therapeutic day school as an educational intervention package affect the school functioning of children and adolescents with bipolar disorders over time?

### Educational Functioning

All students in the present study received full-time special education services due to the nature of their placement within a therapeutic day school. These findings were consistent with results obtained across eight studies, which reported rates of placement in special/remedial classes or special education programs ranging from 10.8 to 67.3 percent of students with bipolar disorders (Doyle et al., 2005; Faedda et al., 2004; Findling et al., 2001; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Pavuluri et al., 2006; Wilens et al., 2003; Wozniak et al., 1995). Specific rates of the provision of tutoring services were not explored in this study, although students in this study were placed in classrooms with a typical student to staff ratio of 10:3, therefore a significant amount of adult support was available on a full-time basis. One student in this study had repeated at least one grade level, which was relatively consistent with results from five studies that reported rates of grade retention between 7.5 and 19 percent of students with bipolar disorders (Doyle et al., 2005; Geller, Bolhofner, et al., 2000; Henin et al., 2007; Wilens et al., 2003; Wozniak et al., 1995). Finally, high school graduation rates were not explored in this study, given that the students in this study attended a K-8 school.

### Academic Functioning

Students in the present study demonstrated considerable variability in academic performance on a day-to-day basis. This finding was consistent with McIntosh and Trotter's (2006) report of inconsistent or erratic academic performance among students with bipolar disorders, which was thought to be linked to students' ability to regulate affect. However, the present study extended McIntosh and Trotter's efforts by discovering a trend: academic performance seemed to be most variable on very brief assessments (e.g., AIMSweb), and least variable on assessments that sampled performance over a much longer period of time (e.g., academic grades).

In a summary of the professional literature, Fields and Fristad (2009) reported “significant and varied” academic impairment among students with bipolar disorders, with deficits noted in reading, writing, and mathematics (p. 240). In the present study, students with bipolar disorders exhibited significant and varied academic impairments, with at least 3 of 11 students exhibiting a relative weakness in each of five academic subjects (i.e., reading, mathematics, writing, science, and social studies). However, the present study discovered a clear trend of an increased likelihood of a relative weakness in mathematics, as 10 of 11 students exhibited a relative weakness in this area. This finding was somewhat consistent with results from the literature review, where it was reported that students with bipolar disorders were more likely to exhibit deficits in mathematics than clinical or control groups, based on seven studies. However, in the literature review it was noted that across studies, many children and adolescents with bipolar disorders did not exhibit deficits in mathematics (Doyle et al., 2005; Henin et al., 2007; Lagace et al., 2003; Lagace & Kutcher, 2005; Pavulri et al., 2006; Quackenbush et al., 1996; Wozniak et al., 1995). In the present study, a possible explanation for an increased likelihood of a relative weakness in mathematics may be that the combination of rapid cycling of moods and comorbid ADHD impacted students’ ability to engage successfully in an academic subject that involved a sequential learning process, such as mathematics. Because, presumably, only the most severely impaired students with bipolar disorders may be placed in a therapeutic day school, this deficit may have been more pronounced in the present study than other studies. Finally, it should be noted that the present study was the first study to report on the performance of students with bipolar disorders in the areas of science and social studies, to the best of the author’s knowledge.

#### *Behavioral/Social-emotional Functioning*

As indicated in the literature review, no study to date had reported data on the day-to-day school-based behavioral or social-emotional functioning of students with

bipolar disorders. However, across ten studies, results indicated that children and adolescents with bipolar disorders were likely to demonstrate a host of behavioral difficulties, including aggressive behaviors, attentional difficulties, symptoms of anxiety and depression, social difficulties, delinquency, and thought problems (Althoff et al., 2006; Boomsma et al., 2006; Geller, Bolhofner, et al., 2000; Grier et al., 2007; McIntosh & Trotter, 2006; Meyer et al., 2009; Mick et al., 2003; Reichenberg et al., 2002; Sala et al., 2009; Wozniak et al., 2003). Further, across eight studies, children and adolescents with bipolar disorders were found to demonstrate significant impairments in psychosocial functioning, including deficits in global functioning, and in more specific domains such as social skills, making friends, and family relations (Geller, Bolhofner, et al., 2000; Goldstein et al., 2009; Kutcher et al., 1998; Lagace & Kutcher, 2005; Quackenbush et al., 1996; Reichenberg et al., 2002; Wilens et al., 2003; Wozniak et al., 1995). Generally, these results were confirmed in the present study, which noted considerable relative weaknesses in social and coping skills for all eleven students. Further, nearly all students demonstrated variability in daily functioning, and multiple students exhibited relative weaknesses in the areas of on task/work completion behavior, following instructions behavior, and physical aggression.

Finally, in a meta-analysis of studies involving the CBCL in clinical assessment, Mick et al. (2003) reported that children and adolescents with bipolar disorders were likely to receive clinically elevated scores on the Aggression subscale of the CBCL. However, no information was provided about differing patterns of physical aggression among subjects. The present study identified two distinct patterns of physically aggressive behavior: a “spike” pattern, which involved initially low levels of aggression, followed by a dramatic spike in aggression, followed by a near-linear decline in aggressive behavior afterward; and a “low levels” pattern, which involved no more than two incidents of physical aggression in any academic year. These differing patterns of aggression may relate to differing types of bipolar disorders, or even differing diagnoses



(e.g., a diagnosis of TDDD may be more appropriate for students who exhibited a “low levels” pattern of physical aggression). Unfortunately, the present study did not generate definitive results in this regard. However, it may be important to offer a hypothesis as to the process represented by a “spike” pattern of physical aggression, for purposes of future studies. It is hypothesized that this pattern reflected an initial “honeymoon” period of maintaining a high standard of behavior, followed by settling into a new school and acclimating to surroundings and routines. It was then that psychiatric symptoms began to emerge more frequently and intensely, resulting in a “spike” in aggression for these students. When students eventually learned the coping skills necessary to ameliorate their psychiatric symptoms, their aggressive behavior began to subside, and this was followed by continued gains in social and coping skills, and thus continued improvement in being able to refrain from engaging in physically aggressive behavior.

#### *Cognitive/Neuropsychological Functioning*

In a meta-analysis, Joseph et al. (2008) reported that children and adolescents with bipolar disorders generally scored within the average range of intellectual functioning, although lower than healthy control subjects. This finding was confirmed in the present study, as all ten of the students who had undergone an assessment of intellectual functioning scored within the average range or higher. Because limited additional information regarding cognitive/neuropsychological functioning was available for the students included in the present study, additional comparisons will not be made.

#### *Intervention Studies*

##### *Psychopharmacological Interventions*

As indicated in the literature review, traditional mood stabilizers and atypical antipsychotics are considered first-line treatments for bipolar disorders in children and adolescents (Kowatch et al., 2005). In the present study, the most widely prescribed

psychotropic medications were Risperdal and Abilify, both atypical antipsychotics, in accordance with the most recent treatment guidelines (Kowatch et al., 2005). In all, 8 of 11 students were prescribed Risperdal, and 7 of 11 students were prescribed Abilify. The next most frequently prescribed traditional mood stabilizers and atypical antipsychotics were Depakote and Seroquel, each prescribed to 4 of 11 students. Therefore, results from the present study indicate that use of traditional mood stabilizers and atypical antipsychotics was widespread among students, a finding in accordance with best practices, as determined in the literature review.

Given high rates of comorbidity, psychopharmacological agents are often used to treat comorbid psychiatric disorders as well (Kowatch, 2009d; Smarty & Findling, 2007). Kowatch et al. (2005) cautioned against the use of stimulants and SSRIs in this population, as medications from each class can exacerbate bipolar symptoms. Despite this warning in the most recently published treatment guidelines, 9 of 11 students were prescribed stimulant medication sometime during the course of their enrollment in this school. Concerta was prescribed to 6 of 11 students, and Adderall was prescribed to 4 of 11 students. Next, 7 of 11 students were prescribed SSRIs. Zoloft was the most prevalent SSRI, as it was prescribed to 4 of 11 students. Additionally, 2 of 11 students were prescribed a stimulant and/or a SSRI without an accompanying mood stabilizer or atypical antipsychotic for some period of time. This practice was clearly discordant with published treatment guidelines (i.e., Kowatch et al., 2005). An additional student (i.e., Student 7) was completely unmedicated for a period of three months. The impact of these questionable psychiatric practices on students' performance was unclear due to the nature of this study. However, it is important to be aware that they may account for some of the students' difficulties exhibited in this study. It is also important to recognize that the most recently published treatment guidelines primarily focused on treating Bipolar I Disorder in children and adolescents, and none of the children in this study had a specific diagnosis of Bipolar I Disorder, although diagnoses were vague in many cases.

Also, in the literature review, it was noted that adolescents with bipolar disorders may exhibit high rates of medication non-adherence (Singh et al., 2007). In the present study, medication compliance issues were reported for 5 of 11 students, which was in line with expectations based on the literature review.

### *Psychotherapeutic Interventions*

The literature review highlighted that currently, psychotherapeutic interventions are considered as adjuncts to psychopharmacological interventions in treating children and adolescents with bipolar disorders. Further, evidence regarding the efficacy of psychotherapeutic interventions is still emerging, but promising preliminary results have been reported for three types of psychotherapeutic interventions: family-focused therapy, cognitive-behavioral therapy, and dialectical behavior therapy (Feeny et al., 2006; Fristad, 2006; Fristad et al., 2003; Goldstein et al., 2007; Miklowitz et al., 2004; Miklowitz et al., 2006; Pavuluri et al., 2004; West et al., 2007; Young & Fristad, 2007).

The psychotherapeutic components of the intervention package utilized within the therapeutic day school in the present study were primarily cognitive-behavioral in nature. These components included provision of individual and group therapeutic services to students, as well as “in vivo” social, coping, and problem-solving skills training. Additionally, therapists engaging in frequent phone consultation with parents/guardians, and provided periodic brief family therapy services. Therefore, results from the present study seemed to be consistent with the literature review, in that cognitive-behavioral therapy and some elements of family-focused therapy were significant parts of the intervention package that yielded positive results for students with bipolar disorders who were placed in a therapeutic day school.

### *Contributions of Study*

Perhaps the greatest contribution of this study was its overall finding that the majority of children and adolescents with bipolar disorders benefited from placement in a

therapeutic day school. More specifically, a majority of students with bipolar disorders were able to sustain performance in areas of relative strength, improve performance in areas of relative weakness, achieve positive immediate educational outcomes, and ameliorate some referral concerns, while attending a therapeutic day school. This finding was important for two key reasons: 1) it provides guidance for further study in an effort to develop and/or identify effective, specific educational interventions for these students, as the intervention packaged utilized in this school was outlined in Chapter III; and 2) it offers support for making data-based educational placement decisions for students with bipolar disorders, as these students are some of the most complex and difficult students to place into appropriate educational programs.

Another important contribution of this study was its provision of data regarding the day-to-day educational functioning of students with bipolar disorders. This study provided data on the daily functioning of students in five academic areas (i.e., reading, mathematics, writing, science, and social studies) and five behavioral/social-emotional areas (i.e., on task/work completion behavior, following instructions behavior, physically aggressive behavior, social skills, and coping skills). This was the first study to provide any data on the day-to-day educational functioning of students with bipolar disorders in any of the aforementioned ten areas. Such information is important because findings from this study highlighted the tremendous amount of variability in both academic and behavioral/social-emotional performance that seems to occur within this population of students on a daily basis. In addition, to the best of this author's knowledge, this was the first study to provide any type of data regarding the performance of students with bipolar disorders in the areas of science and social studies.

A third contribution of this study was its offering of a framework in which to analyze students with bipolar disorders. Although this framework was primarily qualitative in nature, it may be more appropriate for analyzing the performance of students with bipolar disorders than more traditional quantitative analyses, because

students with bipolar disorders tend to be so complex in nature, and their performance tends to be so variable over time. For example, when a non-parametric statistical procedure was used to analyze students' performance in reading fluency, reading comprehension, and mathematics computation based on AIMSweb data, results indicated no significant improvements over time among students. However, qualitative analyses indicated that a majority of students with bipolar disorders were able to sustain performance over time within areas of relative academic strength and improve performance over time within areas of relative academic weakness, while enrolled in a therapeutic day school.

Fourth, this study identified that nearly all students (i.e., 10 of 11 students) exhibited a relative academic weakness in mathematics, and that mathematics was considerably more likely to be an area of relative weakness than any other academic subject. The value of the current study was that it included multiple measures of performance – rather than a single measure – across five academic subjects, and explored deficits in terms of relative standards rather than absolute standards.

The fifth important contribution of this study was its identification of relative weaknesses in social and coping skills among all students with bipolar disorders included in this study. While this result may be biased in that any student with deficits in social and coping skills may be more likely than other students to be referred to a therapeutic day school, given that development of social and coping skills is the professional niche area of a therapeutic day school, it seems to highlight the importance of social and coping skills in determining successful educational outcomes for students with bipolar disorders. Presumably, some students with bipolar disorders who exhibit adequate social and coping skills may be able to succeed in a general education school, but when there are deficits in these areas, a more restrictive educational placement may be required.

Finally, an important outcome of this study may be its calling attention to the amount of structure and support some students with bipolar disorders need to be

successful at school. While 7 of the 11 students with bipolar disorders in this study were able to demonstrate and sustain successful academic and behavioral/social-emotional functioning over time to the point of achieving re-integration into their home schools, 4 of the 7 students had their mainstreaming discontinued after a period of time, primarily due to behavioral difficulties re-surfacing within their home schools. While the nature of this study prohibits drawing any sort of definitive conclusions, the relation seems clear between the removal of some of the supports and structure provided by a therapeutic day school and the decline in overall functioning among some students. It is possible that if students had similar levels of structure and support available in mainstream settings, they may have demonstrated similar levels of success and thus avoided referral to a therapeutic day school.

### Limitations

Perhaps one of the greatest limitations of this study was limited generalizability of results, given that this study was primarily qualitative in nature. However, while this study utilized a case study research format and was highly contextual in nature, it yielded many important contributions to the field. These contributions included providing some directions for future research, which will be discussed later in this chapter.

Next, this study involved generating academic and behavioral/social-emotional profiles for students that were highly contextual in nature. While efforts were made to be as transparent as possible in the decision-making process, and to provide rationales for decisions regarding categorization, it is recognized that not everyone may agree with how decisions were made. To address this concern, Merriam (2009) wrote:

Replication of a qualitative study will not yield the same results, but this does not discredit the results of any particular study; there can be numerous interpretations of the same data. The more important question for qualitative research is *whether the results are consistent with the data collected*' (p. 221).

Third, for many students, data sets in some areas (e.g., daily points earned on average for on task/work completion and following instructions behaviors) were not

available for the duration of students' enrollment within this therapeutic day school. As a result, no true "baseline" data were available. While this situation was not ideal, it was reflective of the challenges of conducting field-based research. Circumstances such as these seemed to lend support to choosing a case study research design rather than a traditional quantitative research design, as these limitations were more easily accounted for in the data analysis process within a case study design than would have been possible within a quantitative design.

It was recognized that the Primary GPA and Standard GPA scales devised for this study did not align perfectly with one another. However, these scales were considered the best available method for comparing students' grades across primary and intermediate/middle school classrooms. In this school, different types of grades were given in primary classrooms versus intermediate/middle school classrooms.

Next, in a majority of cases, school records provided limited information about students' specific DSM-IV diagnoses. For example, school records often listed a student's diagnosis as "Bipolar Disorder" rather than "Bipolar I Disorder" or "Bipolar Disorder Not Otherwise Specified." As a result, it was not possible to differentiate research findings based on specific types of bipolar disorders. Again, this was a reflection of the challenges of conducting field-based research, and in particular, school-based research.

Another limitation of this study was that no information was available regarding students' levels of effort or compliance during AIMSweb or ISAT testing. Therefore, it was unknown whether variable levels of effort and/or compliance may have influenced the highly variable scores obtained by some students.

Next, in this study, all students were prescribed psychotropic medication throughout the course of their enrollment in this school. However, in a majority of cases, psychiatric practices were not necessarily in accordance with treatment guidelines, including those regarding stimulant medication and SSRIs (e.g., Kowatch et al., 2005).

The impact of these practices on students' performance was unclear, but they may have contributed to some of the students' difficulties.

The final limitations of this study related to the sample of students included in this study. In this sample, students were predominantly White males (i.e., 8 of 11 students were White males). Therefore, findings may or may not be relevant to students with bipolar disorders of a different gender or racial/ethnic background. Also, due to sample selection criteria, no students in this study achieved full re-integration into their home schools. Because this phenomenon seemed to negatively bias outcome results, it may be worthwhile for a future study to explore the percentage of students with bipolar disorders who successfully achieve full re-integration into their home schools.

#### Directions for Future Research

First, this study was conceptualized as an initial step toward finding specific, empirically-supported, educational interventions for students with bipolar disorders. A logical next step in this line of research would be to separate out and explore the effectiveness of individual interventions that were part of the intervention package employed within this therapeutic day school. Conceivably, this direction could spawn several smaller research studies, each investigating the impact of a single intervention on the school-based functioning of students with bipolar disorders.

Another future direction for research may involve grouping students based on their patterns of aggressive behavior (i.e., "spike" pattern versus "low levels" pattern). One hypothesis may be that students who exhibit a "spike" pattern of aggression may be more likely than students who exhibit a "low levels" pattern to be matched to appropriate interventions, and therefore more likely to demonstrate improvement in symptomology over time. Because "spike" pattern students seem to be more externalizing than internalizing in nature, it may be easier to determine when interventions are effective, and when students have successfully resolved their difficulties coping with - and living with -



a bipolar disorder. Students who exhibit a “low levels” pattern of aggression may be more internalizing in nature, and thus it may be more difficult to match them to appropriate interventions and ultimately determine their successfulness in resolving difficulties coping with a bipolar disorder. Thus, their long-term improvement in symptomology may be more variable as a group.

Based on the considerable levels of variability in daily functioning (both academic and behavioral/social-emotional) that most students seemed to exhibit in this study, it seemed that these students more closely fit transitional definitions of bipolar disorders (i.e., Bipolar Disorder Not Otherwise Specified or TDDD) than classic definitions of bipolar disorders (i.e., Bipolar I Disorder, Bipolar II Disorder, Cyclothymia). In fact, DSM-IV-TR lists the first criterion for Bipolar Disorder Not Otherwise Specified as: “Very rapid alternation (over days) between manic symptoms and depressive symptoms that meet symptom threshold criteria but not minimal duration criteria for Manic, Hypomanic, or Depressive Episodes” (p. 400). A future direction for research may be attempting to differentiate patterns of school-based performance for those students with Bipolar Disorder Not Otherwise Specified versus those who meet proposed diagnostic criteria for TDDD.

Fourth, in this study, all students were prescribed psychotropic medication while enrolled in this school. A future direction for research may be to compare the effectiveness of placement in a therapeutic day school for students who are taking psychotropic medication versus those students who are not taking psychotropic medication. One hypothesis may be that students who are taking psychotropic medication have more positive outcomes, as the literature review conducted for this study revealed that the most effective treatment for bipolar disorders in children and adolescents is psychopharmacological plus psychotherapeutic treatment.

Finally, in this study, no students with bipolar disorders achieved full re-integration into their home schools. In large part, this was due to sample selection

criteria based on the availability of data. A future direction for research would be to investigate the percentage of students with bipolar disorders who are able to successfully re-integrate into their home schools on a full-time basis, and to explore the factors responsible for their success.

APPENDIX

Table A1. Summary of Demographic Characteristics.

Category	Number (n)	Percentage
<b>Gender</b>		
Male	10	91
Female	1	9
<b>Racial/Ethnic Background</b>		
White	9	82
Black	1	9
Latino/a	1	9
<b>Age at Time of Study</b>		
8 years	1	9
9 years	0	0
10 years	0	0
11 years	2	18
12 years	3	27
13 years	2	18
14 years	2	18
15 years	1	9
<b>Grade Level at Time of Study</b>		
3	1	9
4	0	0
5	2	18
6	3	27
7	2	18
8	3	27

Table A1. Continued

## Grade Level at Entry

K	1	9
1	2	18
2	1	9
3	3	27
4	0	0
5	3	27
6	1	9

## Free/Reduced/Regular Lunch Status

Free	4	36
Reduced	0	0
Regular	7	64

## Living Status at Time of Study

Two Biological Parents	6	55
One Biological Parent	4	36
Other Biological Relative	1	9

## Prescribed Psychotropic Medication at Time of Study

Yes	11	100
No	0	0

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Table A2. Summary of Cognitive Ability Test Scores.

Student	Test	Scores
1	WISC-IV	VC 96, PR 104, WM 104, PS 78, FSIQ 95
2	N/A	No testing; No reported concerns about ability
3	WASI	FSIQ 105
4	WISC-IV	VC 95, PR 110, WM 94, PS 83, FSIQ 95
5	Unavailable	Average functioning reported; Scores not on file
6	WPPSI-R	VS 93, PFS 115, FSIQ 103
7	WISC-IV	VC 110, PR 129, WM 94, PS 100, FSIQ 114
8	WISC-IV	VC 102, PR 106, WM 97, PS 94, FSIQ 102
9	WISC-IV	VC 106, PR 98, WM 80, PS 80, FSIQ 91
10	WISC-IV	VC 110, PR 112, WM 86, PS 78, FSIQ 99
11	Unavailable	Average functioning reported; Scores not on file

*Note.* FSIQ=Full Scale IQ, PR=Perceptual Reasoning, PFS=Performance Scale, PS=Processing Speed, VC=Verbal Comprehension, VS=Verbal Scale, WM=Working Memory.

Table A3. Summary of Academic Profiles.

Student	Reading	Mathematics	Writing	Science	Social Studies
1	S(SUS)	W(UNC)	S(SUS)	W(UNC)	S(SUS)
2	S(SUS)	W(I)	S(SUS)	S(SUS)	S(SUS)
3	W(I)	W(I)	W(I)	S(SUS)	S(SUS)
4	S(SUS)	W(I)	S(SUS)	S(SUS)	S(SUS)
5	S(SUS)	W(UNC)	S(SUS)	W(I)	W(UNC)
6	W(I)	W(UNC)	W(I)	S(SUS)	W(I)
7	S(SUS)	W(I)	S(SUS)	S(SUS)	S(SUS)
8	W(I)	W(UNC)	W(UNC)	S(SUS)	S(SUS)
9	S(SUS)	W(I)	S(SUS)	S(SUS)	S(SUS)
10	S(SUS)	W(I)	S(SUS)	S(SUS)	S(SUS)
11	S(UNC)	S(UNC)	S(DNS)	W(UNC)	W(UNC)

*Note.* S=Strength (Relative), W=Weakness (Relative). DNI=Did Not Improve Performance, DNS=Did Not Sustain Performance, I=Improved Performance, SUS=Sustained Performance, UNC=Unclear.

Table A4. Summary of Behavioral/Social-emotional Profiles.

Student	OT/WC	FI	AGG	SS	CS
1	S(UNC)	S(UNC)	S(DNS)	W(UNC)	W(UNC)
2	W(UNC)	W(UNC)	W(DNI)	W*(UNC) S*(UNC)	W(UNC)
3	W(I)	S(SUS)	W(I)	W(I)	W(I)
4	S(SUS)	W(I)	S(SUS)	W(I)	W(I)
5	W(I)	W(I)	S(SUS)	W(UNC)	W(UNC)
6	W(I)	S(SUS)	S(SUS)	W(I)	W(I)
7	W(I)	S(SUS)	S(SUS)	W(I)	W(I)
8	S(SUS)	S(SUS)	S(SUS)	W(UNC)	W(UNC)
9	S(SUS)	S(SUS)	W(I)	W(I)	W(I)
10	W(I)	S(SUS)	S(SUS)	W(I)	W(I)
11	S(UNC)	S(UNC)	S(UNC)	W(UNC)	W(UNC)

*Note.* OT/WC = On Task/Work Completion, FI=Following Instructions, AGG=Physical Aggression, SS=Social Skills, CS=Coping Skills. S=Strength (Relative), W=Weakness (Relative). DNI=Did Not Improve Performance, DNS=Did Not Sustain Performance, I=Improved Performance, SUS=Sustained Performance, UNC=Unclear. Student 2 exhibited relative weaknesses in Academic- and Adult-oriented Social Skills, but a relative strength in Peer-oriented Social Skills.



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