

## **The Addition of Disruptive Mood Dysregulation Disorder to DSM-5: Differential Diagnosis and Case Examples**

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### **Abstract**

There has been an explosive increase in the diagnosis of Pediatric Bipolar Disorder (PBD) in the past decade. The primary reason for this has been that severe, non-episodic irritability was considered to be the developmental equivalent of adult mania, and consequently many more children reached the diagnostic threshold to warrant a diagnosis of PBD than otherwise would have been the case. However, it has become increasingly clear that children with severe affective and behavioral dysregulation including chronic irritability punctuated by affective storms, aggression, and altered mood most probably do not have PBD but a different condition termed Disruptive Mood Dysregulation Disorder (DMDD) which appears for the first time in the recently released fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*. This article reviews the evidence establishing the validity of DMDD and provides guidelines for the differential diagnosis of DMDD from other disorders.

One of the changes in the 5<sup>th</sup> edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (American Psychiatric Association, 2013) should be of special interest to clinical child psychologists as it involves the addition of a new disorder to the Depressive Disorders Category termed “Disruptive Mood Dysregulation Disorder” (DMDD). The rationale for the addition is as follows.

There has been an explosive increase (up to 500% more) in the diagnosis of Pediatric Bipolar Disorder (PBD) in the past decade (Stringaris, 2013). Although it is clear that the ‘classic’ adult bipolar (BP) phenotype does present in children, albeit rarely (Margulies, Weintraub, Basile, Grover, & Carlson, 2012), the most important reason for this explosive increase is that some researchers and practitioners adopted new conventions in assigning the diagnosis of bipolar disorder (BP) to children. Namely, severe, non-episodic irritability was considered to be the developmental equivalent of adult mania (Margulies et al., 2012). Consequently many more children reached the diagnostic threshold of 4 of the criteria B symptoms required by the Diagnostic and Statistical Manual-IV-Text Revision (DSM-IV-TR) [American Psychiatric Association, 2000]. However, it has become increasingly clear that children with severe affective and behavioral dysregulation including chronic irritability punctuated by affective storms, aggression, and altered mood do not have PBD but a different condition, DMDD (Althoff, Verhulst, Rettew, Hudziak, & Van der Ende, 2010; Copeland, Angold, Costello, & Egger, 2013; Jucksch et al., 2011; Margulies et al., 2012), thus prompting its addition to DSM-5. Consequently, it is essential that clinical child psychologists be well educated in the assessment of DMDD and differential diagnosis from PBD as well as in the

differential diagnosis from Oppositional Defiant Disorder (ODD) and Attention-Deficit/Hyperactivity Disorder (ADHD), which are comorbid with DMDD most of the time (Leibenluft, 2011; Margulies et al., 2012). The goals of this article are twofold. First, it will review the evidence establishing the validity of DMDD. Second, it will provide guidelines for the most common and challenging differential diagnoses, i.e., the differential diagnosis from PBPD and from comorbid ADHD/ ODD. Treatment of DMDD will not be addressed as there is virtually no research on this topic that would provide evidence-based guidelines (Margulies et al., 2012; Towbin, Axelson, Leibenluft, & Birmaher, 2013).

## **Justification for the Addition of DMDD to the DSM-5**

### **Background**

As mentioned above, there has been an explosive increase in the diagnosis of PBPD in the past decade. This explosion has been primarily propelled by the decision of some researchers and practitioners to reject both the DSM-IV-TR and the DSM-5 standard that a diagnosis of BP cannot be made unless there is a clear hypomanic or manic *episode* (Margulies et al., 2012). In so doing, they have rejected the historic definition of BP as an episodic disorder that has continued throughout all the iterations of the DSM by contending that mania in children manifests as non-episodic irritability that is punctuated by frequent episodes of affective storms. Consequently, many more children have been diagnosed with and are being treated according to adult conventions with mood stabilizers or antipsychotics. The resulting controversy has generated a significant amount of research to determine if children with severe affective and behavioral dysregulation including chronic irritability punctuated by affective storms have PBPD or another disorder.

### **Evidence for Validity of DMDD as a New Disorder for DSM-5**

Beginning with a series of studies by Leibenluft and colleagues (2011), evidence has accumulated to suggest that children with severe affective and behavioral dysregulation including chronic irritability punctuated by affective storms did not have PBPD but a condition they termed “severe mood dysregulation (SMD).” The research on SMD provided the evidentiary basis for adding DMDD to DSM-5 as the core feature of the two disorders, i.e., non-episodic, severe, and impairing irritability is the same (Towbin et al., 2013). Among the numerous criteria that are needed to establish the validity of a distinct disorder (Kendler, Kupfer, Narrow, Phillips, & Fawcett, 2009), longitudinal outcome is of paramount importance (Leibenluft, 2011). This critical criterion was applied as follows. If children with SMD but without the classic episodic manic symptoms of euphoria, elation, or grandiosity truly have PBPD then upon longitudinal follow up they should eventually manifest the classic DSM-IV-TR BP phenotype. If they do, this would provide powerful evidence for non-episodic irritability as a developmental equivalent of adult mania. If they do not, then such children should not be diagnosed with PBPD.

The findings of the longitudinal research have been very clear. Children who present with SMD but without the classic episodic manic symptoms of euphoria, elation, or grandiosity were at increased risk for unipolar depression and anxiety disorders in adulthood, but not BP (Leibenluft 2011; Towbin et al., 2013). These findings stand in stark contrast to those children who present with classic BP. Upon follow-up of these children, the frequency of manic or mixed

episodes are 50 times higher than those who presented with SMD. However, the outcome for children who present with the classic symptoms of BP, but not SMD, is quite different. In a 5-year prospective follow-up study (Axelson et al., 2011) of 140 juveniles who presented with subthreshold BP primarily because the duration of their (hypo) manic like episodes did not meet DSM-IV-TR criteria. Upon follow-up more than one-half of the youth presenting with subthreshold BP, developed BP-I or BP-II.

In addition to outcome, a second important criterion for establishing the validity of a distinct disorder is to examine the family history of those who present with PBP or subthreshold PBP. Approximately 25% of juveniles with either of these disorders have a first degree relative with BP, but the family rate for juveniles with SMD is only 3%, which reflects the general population prevalence (Towbin et al., 2013). Findings such as these resulted in the addition of DMDD to the DSM-5. The name was changed from SMD because a core symptom of SMD, hyperarousal, was eliminated as a criterion symptom and (Copeland et al., 2013).

The diagnostic criteria for DMDD have been concisely summarized by Axelson (2013, p. 136).

Disruptive mood dysregulation disorder has two symptom criteria: severe temper outbursts and irritable or angry mood. The diagnosis has criteria for frequency (at least three outbursts per week), persistence (at least 12 months, with no more than 3 consecutive months without meeting symptom criteria), age (minimum age 6 years), age of onset (before age 10), and context (present in multiple contexts).

In conclusion, DSM-5 has provided “a diagnostic home for children whose rages do not otherwise satisfactorily fit into the current concepts of ADHD or ODD and have thus been called ‘bipolar’ to signal the severity of the problem and its mood-related nature” (Margulies et al., 2012, p. 489). Furthermore, this nosological distinction is not a trivial academic exercise since it has profound implications for differential treatment. For example, if children with DMDD do not have a form of BP, then typical first line treatment with antipsychotic medication and/or mood stabilizers would be contraindicated (Margulies et al., 2012). Furthermore, when the diagnostic criteria for DMDD were applied to juveniles admitted to an inpatient setting, the reduction of a false diagnosis of PBP was about 50% (Margulies et al., 2012). Hence it is of critical importance that clinical child psychologists be able to differentially diagnose DMDD from PBP.

### **Differential Diagnosis of PBP from DMDD**

Besides episodicity, elation and grandiosity are by definition what distinguish mania from other forms of psychopathology (Carlson & Meyer, 2006) and provide the most discriminant validity between PBP and other disorders (Geller et al., 2002). Hence they are the cardinal mania symptoms that must be met to warrant a diagnosis of PBP (Leibenluft & Rich, 2008; Sala, Axelson, & Birmaher, 2009), and are the symptoms that must be ruled out if a diagnosis DMDD is to be made. They are also the symptoms that are the most difficult to diagnose in their juvenile manifestations (Carlson & Meyer, 2006) since it may be particularly challenging to differentiate manic elation and grandiosity from “normal fluctuations of extreme excitement, fantasy play and ideation, overactivity, and youthful indiscretions” (Leibenluft & Rich, 2008, p.

167). In addition to these cardinal symptoms, a decreased need for sleep has also been found to be discriminating (Margulies et al., 2012). Furthermore, since true juvenile mania is rare, with the exact prevalence unknown (Carlson & Glovinsky, 2009), the clinician should evaluate any putative manifestation of such with a healthy skepticism. The following phenomenological examples<sup>1</sup> of what are deemed to be the most discriminating symptoms of pediatric mania should be helpful in making this diagnosis.

### **Examples of Elation**

“A 7-year-old boy was repeatedly taken to the principal for clowning and giggling in class (when no one else was) and was suspended from school. He had to leave church with his family for similar behaviors”(Geller et al., 2002, p. 6).

“A 9-year-old girl continually danced around at home stating, “ I’m high, over the mountain high” after suspension from school ”(Geller et al., 2002, p. 6).

“If he is getting manic, we’ll see very up-up-up behavior. He quotes Ren and Stim, the cartoon characters, and shouts ‘Happy, happy, joy, joy.’ His voice gets louder and louder. He starts grabbing tools, playing loud music in his room. I don’t know when it is to end...could be tonight, could be a couple of days” (Papolos & Papolos, 2007, p. 20).

### **Examples of Grandiosity**

“A 7-year-old boy stole a go-cart because he just wanted to have it, even though he knew stealing was wrong. He did not, however, believe it was wrong for *him* to steal. When the police arrived, the child thought the officers were there to play with him” (Geller et al., 2002, p. 6).

“An 8-year-old girl, failing at school spent her evenings practicing for when she would be the first female president. She was also planning how to train her husband to be the First Gentleman. When asking how she could fail school and still be president, she said she just knew” (Carlson & Meyer, 2006, p. 945).

“An 8-year-old boy told us that he controlled the way the waves came into shore (he lived near the beach). ‘I get my power from the moon. I have pent up energy. I cannot control my own strength’ (Carlson & Meyer, 2006, p. 945).

### **Example of Decreased Need for Sleep**

“An 8-year-old-boy chronically stayed up until 2 a.m. rearranging the furniture or playing games. Then he awoke at 6 a.m. for school and was energetic throughout the day without evident tiredness or fatigue” (Geller et al., 2002, p.6).

## **Differential Diagnosis of DMDD from ADHD/ODD**

DMDD’s biggest diagnostic problem is that irritability and explosive outbursts occur in many disorders (Carlson, 2012). Differential diagnosis of DMDD from disorders which

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<sup>1</sup> The examples occurred in the context of a number of other manic symptoms that collectively warranted a diagnosis of PBPD.

commonly present with irritability and explosive outbursts such as Autism Spectrum Disorder, Post-Traumatic Stress Disorder, or severe traumatic brain injury should pose no particular problem for a reasonably competent clinical child psychologist, because the presence of the other diagnostic features of these disorders clearly rule out DMDD. It is ADHD/ODD that poses the greatest challenge (Carlson, 2009). By way of prologue, it is important to realize that comorbid ADHD/ODD is such a common occurrence that most clinic-referred cases of children with ADHD are also comorbid for ODD (Barkley, 2010). This is because the core ADHD impairments in behavioral and emotional dysregulation commonly result in symptoms such as irritability, impatience, anger, low frustration threshold, and reactive aggression (Barkley, 2010; Frick & Viding, 2009) which greatly increase the risk of a transactional interplay with the interpersonal environment that can easily develop into coercive, oppositional interchanges (Barkley, 2006; Burns & Walsh, 2002; van Lier, van der Ende, Koot, & Verhulst, 2007) and hence “create a press to oppose and circumvent adult rules” (Lahey & Waldham, 2008, p. 270). Indeed, it is estimated that a typical child with ADHD has an astonishing half a million of these negative interchanges each year (Pelham & Fabiano, 2008), thereby adding impressive support to Barkley’s (2010, p. 4) observation that “Having ADHD-(Combined Type) virtually creates a borderline case of ODD in children.” Thus the critical differential diagnostic question that will commonly confront the clinician is that given that a child obviously has ADHD/ODD and because most cases of DMDD (i.e., over 80%) are comorbid for ADHD and ODD symptoms<sup>2</sup> (Margulies et al., 2012), is there more to it than that, i.e. does the child also have DMDD?

There are two ways to distinguish between the persistent, severe irritability and frequent explosive temper outbursts that characterize DMDD from the irritable outbursts that commonly occur in normal children as well as those with ADHD and ODD (Axelson, 2013; Leibenluft, 2011). The first is to focus on the phenomenology of the severity of symptom presentation in terms of the explosiveness of the temper outburst being grossly disproportionate to the provocation (Geller et al., 2002). The second is to focus on the frequency, persistence, and occurrence of the symptoms in multiple contexts (Copeland et al., 2013). The phenomenology of temper outbursts characteristic of DMDD are as follows.<sup>3</sup>

### **Phenomenology: Explosive Temper Outbursts**

Leibenluft and Rich (2008) recommended that the assessment of this feature focus specifically on evaluating for “severe, extremely impairing irritability” with a question about whether or not the child becomes “super angry, grouchy, or cranky.”<sup>4</sup> If the response to this question reports outbursts that are described in the most extreme terms such as *rages* or *meltdowns* that can last for hours (Kowatch et al., 2005), then the criterion of “severe, extremely impairing irritability” can be considered met (Leibenluft and Rich, 2008). In contrast to garden-variety tantrums (screaming, threatening, slamming doors, etc.), rages are exemplified by

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<sup>2</sup> Note that in DSM-5, a diagnosis of DMDD precludes making a comorbid diagnosis of ODD, but not ADHD.

<sup>3</sup> Note that in the examples, maltreatment or other forms of pathogenic care have been ruled out as causal variables.

<sup>4</sup> An scale for measuring severe irritability termed the *Affective Reactivity Index: An Irritability Rating Scale* constructed by one of the premier researchers on assessing irritability, Argyris Stringaris (Stringaris et al., 2012) should be helpful in this regard.

behaviors such as “hitting, kicking, spitting, needing restraint, etc.” (Carlson & Meyer, 2006, p. 958). Children can tantrum for hours; kick holes in walls, and parents, siblings, and pets can feel threatened and hurt (Papolos & Papolos, 2007). For example, as reported by the mother of a 7 year-old: “He had major, major raging cycles. I’m talking raging violently, throwing things, attacking me, throwing a chair out the window, going through a knife drawer saying he was going to kill me. I couldn’t go to the bathroom, for fear he would hurt himself or me.” (Papolos & Papolos, 2007, p. 14).

### **Phenomenology: Grossly Disproportionate**

In contrast to ADHD or ODD, the frustrations and provocations that trigger rages/meltdowns can be as trivial as a change in routine or a demand that is not immediately met; and, parents often report they simply do not know what prompted the explosion (Carlson & Meyer, 2006). For example,

Jennifer (age 11) awakened in good humor and was contentedly finishing her breakfast of 3 pancakes when she noticed that her mother was going to give her brother the remaining 3 pancakes that she was planning (unbeknownst to anyone else) to have for breakfast the following morning. She screamed, pushed her mother out of the way, seized the coveted pancakes, pushed over a kitchen chair, and stalked off to her room. This episode was actually one of the milder versions of hundreds of explosions, triggered by similarly trivial frustrations, which frequently resulted in more prolonged and violent eruptions such as the time when 8 year old Jennifer kicked out a window in the family car (Greene, 2010, p. x).

Similarly, Heidi is a 12 year old whose emotions can careen quickly between giddiness and fury. “It’s like walking around with an arm full of explosives. You hope you don’t trip” (Wang, 2012. P.1). Max is an 11 year old who since infancy has flown into a rage at the smallest of slights, such as being told “no.” He sent one child to a hospital during a play session, and has “drawn blood a few other times” (Wang, 2012. P.1).

### **Frequency, Persistence, Multiple Contexts**

Copeland and colleagues (2013) studied prevalence, comorbidity, and correlates of DMDD using existing data from three community samples of 3,258 children from 2 to 17 years old. Although nearly half of the children from 6 to 17 years old (recall that DMDD cannot be diagnosed in children under 6) were reported to have had severe temper outbursts during the 3 months prior to assessment, when the frequency, persistence and multiple context criteria were applied, the prevalence dropped to about 1%. Hence strict application of these criteria not only counters concern about “pathologizing” normal behavior (Copeland et al., 2013) but should also ease the challenge of differential diagnosis of most cases of pure ADHD/ODD from DMDD, because most cases of ADHD/ODD would not satisfy the severity, frequency, persistence and multiple context criteria. It should also be noted that the Copeland and colleagues study provided additional support for the validity of DMDD in the sense that the 1% of juveniles who met the criteria clearly satisfied the common standard for “caseness” as they had high rates of comorbidity, impairment, and service use (e.g., mental health, school system, child welfare, juvenile justice).

In conclusion, skillful application of the foregoing criteria should enable the clinician to differentially diagnose ADHD/ODD, as it typically presents, from DMDD. However, differential diagnosis from a child with virulent ADHD/ODD, especially a child with virulent ADHD/ODD who has been reared in a severely dysfunctional environment (Carlson, 2012; Leibenluft, 2011), is extremely challenging.

### **Differential Diagnosis of DMDD from Virulent ADHD/ODD**

By way of prologue, it should be noted that because the differential diagnosis of DMDD from virulent ADHD/ODD is so difficult, there remains significant dispute as to whether or not it is indeed a disorder that is distinct from virulent ADHD/ODD (Axelson, 2013; Axelson et al., 2012). For example, Carlson and Meyer (2006) presented a case of George, a 6 year old who had to be hospitalized because he was highly distractible, irritable, oppositional, and explosive when he did not get his way. Hence for all intents and purposes George seemed to fit the DMDD criteria. However, on closer inspection, it was determined that George's difficulties began after his father had been sent to jail, the family had moved, and George was unmercifully teased by his peers in the new school setting. Also, his mother, without her husband's aid, was incapable of setting limits. After hospitalization with consistent limits, treatment with stimulant medication for his ADHD, and placement with a relative, there was a rapid, major improvement in his behavior that was maintained over a 5-year follow-up. Because behavior that is truly DMDD is not so easily managed and controlled (Carlson, 2005), hospitalization would be one way of differentiating DMDD from a phenocopy caused by environmental factors.

Another way of addressing this seemingly insurmountable diagnostic challenge would be to have recourse to a robust trial of treatment with stimulant medication and using this information to help with the diagnosis. Whereas treatment of true cases of DMDD with such medication and/or lithium (even though the evidence base for this is seminal), will not be efficacious for the DMDD symptoms independent of ADHD (Dickstein et al., 2009), cases of severe ADHD/ODD can be expected to show marked improvement.

An extensive literature has clearly documented the robust efficacy of stimulant treatment for core ADHD symptoms of inattention, impulsivity and hyperactivity for children (Biederman & Spencer, 2008; Connor, 2006). These studies have also found that the core symptoms of ADHD in children with ADHD/ODD respond as well to stimulant treatment as symptoms in children with ADHD alone (Pliszka, 2009). The effect size of the response of stimulants relative to placebo (response to which is generally low, e.g., 13%) is close to 1.0 thereby making stimulants among the most efficacious medications in all of health care, rivaling the antibiotics in this regard (Pliszka, 2009).

Moreover, and most importantly for the purposes of this article, stimulants also have similarly robust effects on the oppositional/defiant behaviors and overt aggression behaviors that are comorbid with ADHD (Connor 2006; Connor et al., 2002; Pliszka, 2009), especially when an optimal medication regimen is combined with behavior therapy (Blader et al., 2010). Perhaps the best indication of the efficacy of treating children with ADHD/ODD come from the landmark MTA study in which 40% of the participants had ODD (Smith, Barkley, Shapiro, 2006). Fourteen months of combined stimulant and behavior treatment resulted in a success rate of 68% (defined as an excellent response such that functioning was in the normal range, i.e., no or almost

no symptoms of ADHD or ODD) in contrast to a 25% success rate for the community comparison group (Swanson et al., 2001).

Lastly, a related issue is the concern that stimulant treatment might trigger manic or hypomanic episodes in vulnerable individuals. The 8-year follow-up in the MTA study provided no support for this concern (Molina et al., 2009). A total of 257 children received intensive treatment with stimulants for 14 months, with 1/3 of these still receiving such treatment 8 years later. However, episodes of mania and hypomania were extremely rare and did not exceed the base rate in the population.

### Conclusion

It is clear that juveniles who present with persistent, explosive irritability and anger are highly impaired and thus clinicians must do their best to determine the causes of such severe irritability. The addition of DMDD to the DSM-5, despite continuing controversy as to whether or not it is really different from virulent ADHD/ODD, makes it incumbent upon the clinician to consider this diagnosis in cases of severe irritability. This is especially important with regard to differential diagnosis from pediatric bipolar disorder, because many youth (as many as 50% in one study, Margulies et al., 2012) who otherwise would have been diagnosed with BP will be diagnosed with DMDD. Similarly, in addition to examining the many possible causes for severe irritability such as a history of maltreatment, psychosocial stressors, family conflict, or some combination of these or other factors, the possibility of DMDD must be considered because in many cases the severity of the irritability appears to be far out of proportion to any contributing psychosocial factors (Axelson, 2013). This article has provided guidelines for making these differential diagnoses. Lastly, it should be noted that, given the challenges of differential diagnosis, it is important to understand that in many cases it will be impossible to make such a diagnosis in a single initial evaluation — ongoing observation and evaluation is required (Carlson, 2009). Two extensive case histories of 10 year old boys illustrate this point (Carlson, 2009) and should be consulted in this regard. For example, although it was clear that both boys had severe ADHD/ODD as well as explosive outbursts, it was only when one of the boys clearly had a manic episode that it was possible to diagnose one with BP and the other with DMDD (Carlson, 2009, 2012 personal communication).

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