PSYCHOMETRIC PROPERTIES OF THE PRIMARY CARE MENTAL HEALTH SCREENER FOR EARLY IDENTIFICATION OF DISRUPTIVE BEHAVIOR DISORDERS IN 3- TO 8-YEAR-OLD CHILDREN

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2003

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2005

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
July, 2009

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ACKNOWLEDGMENTS

I would like to thank the following people for their support and encouragement throughout this process: Maureen Sullivan, John Chaney, Thad Leffingwell, Amanda Harrist, David Thomas, Doug Scambler, Eileen Lefler, Steve Lefler, Rebecca Keating-Lefler, Angela Lefler, Hannah Lefler, Abigail Lefler, Matthew Burns, Chris Higgins, Todd Higgins, Kersten Higgins, Sean Higgins, Jessica Higgins, Christine Higgins, Mary Smolsky, Gabe Johnson, Aubri Meldrum, Zack Johnson, Nicky Johnson, Aja Kneip, Kristine Hull, Virginia Lefler, Fred Hearty, Josephine Hearty, Ben Sigel, Carrie Cleveland, Emily Voller, Angel Belden, Christina Colletti, Monica Armendariz, Rachael Hopper, Michi Fedele, Paul Stermer, Joe Mignogna, Melissa Mignogna, Jami Bartgis, Adelina Longoria, Cam Weaver, Jeff Seger, Cynthia Seger, Collin Davidson, Jeff Anderson, Shital Gaitonde, Cynthia Muhamedagic, Jessica Hankinson, Caroline Ducoin, Tana Clarke, Kim Bancroft, Antonio DiLeo, and especially Cynthia Hartung, David Fedele, and Jamie Haga. I am forever grateful.

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CHAPTER I

INTRODUCTION

The Disruptive Behavior Disorders (DBDs), as defined in the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994), are Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD). It has been suggested that treatment outcomes for DBDs will be more positive if intervention begins when the first signs of disruptive behavior occur (Keenan & Wakschlag, 2002). One reason for early intervention is that young children are more malleable than older children (Keenan & Wakschlag). For example, Eron (1990) reported that by age eight, if left untreated, aggression might become a set behavioral pattern for a child. Likewise, Shaw, Lacourse, and Nagin (2005) suggested that, from a low-income, highly urban population, 55% of boys with chronic conduct problems and 19% of boys with inattention and hyperactivity developed a persistent pattern of behavior without treatment.

Another reason for early intervention is that it might prevent related problems (e.g., poor social relationships, poor school performance, problems at home and school) from emerging (Keenan & Wakschlag, 2002). Also, despite earlier evidence to the contrary, Huffman and Nichols (2004) reported that behavioral problems can be identified in the

preschool years, some even in late infancy. This finding suggests that it would be possible to identify children at very young ages who are at risk for mental health problems. Finally, Patterson (2002) has theorized that children with behavior problems commonly enter into a coercive parent-child interaction cycle which helps to maintain disruptive behaviors over time. For all of these reasons, early intervention is a major goal of mental health practitioners concerned with the prevention and treatment of DBDs.

It has been suggested that pediatricians are in the best position to detect early signs of mental health problems (Huffman & Nichols, 2004). However, there is a paucity of data regarding pediatric mental health screening and its benefits. The current study was designed to examine these issues and to test the psychometric properties of a novel mental health screener designed for use in the pediatric setting.

CHAPTER II

REVIEW OF LITERATURE

Importance of Early Intervention

Early intervention is important because of the coexisting and life-long difficulties encountered by individuals with childhood psychopathology. This is true of DBDs as well as other childhood mental health problems, but DBDs are the focus of this review and the current study. Lahey et al. (2007) reported that 4- to 7-year-old children diagnosed with ADHD have continued impairment seven years later. Lavigne et al. (1998) suggested that 65% of 4- to 5-year-old children with DBDs continued to have a DBD at follow-up. Likewise, 76% of boys with ODD continued to have ODD, or ODD with comorbid ADHD, after two years (Speltz, McClellan, DeKlyen, & Jones, 1999). Stormont (2000) reported that behavior problems in boys are predicted by the combined presence of aggression and hyperactivity in preschool. Specifically, boys identified as having problems with hyperactivity, or hyperactivity combined with aggression, had significantly more externalizing problems, delinquent behaviors, attention problems, withdrawal, school problems, and social competence problems five years later than comparison boys (Stormont). Additionally, these data suggested that the combination of hyperactivity and aggression results in a more negative prognosis than hyperactivity alone and that it is important to assess, identify, and treat child behavior problems early (Stormont).

Furthermore, it has been shown that children with ADHD have more comorbid disorders than comparison children (Swenson et al., 2003). It should be noted that the participants in this study were mostly boys (74%) and ethnicity was not taken into account. Additionally, Barkley (2003) explained that children with ADHD have a much higher likelihood than their non-ADHD peers of having conduct problems, antisocial disorders, anxiety disorders, mood disturbances, motor incoordination, and impaired academic functioning. Further, adolescents with a history of ADHD have difficulties with adaptive functioning (e.g., personal care, chore performance, completing tasks, and trustworthiness; Barkley, 1998). Taken together, these studies show that children with DBDs have many associated impairments.

In addition to these associated impairments in childhood and adolescence, children with DBDs have also been shown to have continuing problems in adolescence and adulthood. For instance, Borowsky, Mozayeny, and Ireland (2003) stated that untreated behavior problems in childhood can lead to poor overall functioning in adulthood, including criminality, school failure, substance abuse, violent behavior, and even suicide. Further, some researchers have suggested that when DBDs, especially conduct problems, begin in childhood rather than adolescence future outcomes are even more bleak. Specifically, Moffitt and Caspi (2001) reported that childhood-onset conduct problems are related to substance use, partner violence, and perpetration of violent crimes. Similarly, Loeber and Hay (1997) found that children who displayed overt aggression were more likely to exhibit violent behavior as adults. Also, a study examining the adult outcomes of childhood ADHD showed that two thirds of the children with ADHD had continued difficulty as adults with inattention, hyperactivity, or impulsivity (Weiss & Hechtman, 1993). This study also showed that drivers who were hyperactive as children were much more likely to

be involved in automobile accidents (Weiss & Hechtman). Thus, the research has shown that having a DBD as a child is associated with coexisting and future problems.

It is important to note that in many of the aforementioned studies the participants were mainly, if not exclusively, Caucasian boys (e.g., Speltz et al., 1999; Stormont, 2000; Swenson et al., 2003). Nevertheless, in many instances the results were discussed as if they were relevant for both boys and girls and for children of all ethnicities. These generalizations have been shown to be inappropriate at times given the documented differences between groups (e.g., Hartung & Widiger, 1998; Tsai, Butcher, Munoz, & Vitousek, 2001) Therefore, although there is a strong foundation in the literature suggesting that DBDs cause many problems in childhood, adolescence, and adulthood, its usefulness for girls and minority boys does not have as solid a foundation.

DBDs can also be quite costly economically. Swenson et al. (2003) reported that children with ADHD had 2.6 times more medical claims than children without ADHD. Likewise, these authors reported that the annual medical costs for a family including a child with ADHD are double that of a family without a child with ADHD (i.e., $2,461 versus $1,220). Knapp (1997) also suggested that the more mental health problems an individual exhibits, and the broader these problems are, the more costly the assessment and treatment. It appears, then, that early identification and treatment could reduce the overall number of mental health problems by intervening before secondary problems and impairments begin (Swenson et al.). Early treatment may also help reduce overall treatment costs because the disruptive behaviors will not have become set, and the child may show a shorter duration of the problem (Knapp).

In addition to limiting future problems and costs, early detection can also lead to early and more effective treatments. Taylor and Biglan (1998) found that a child's behavioral

adjustment will be improved with early intervention, as will the chance of preventing later delinquency and drug abuse. A meta-analysis conducted by Durlak and Wells (1998) found that when children are screened early, and at-risk children are provided with effective treatment, they will have better outcomes than at-risk children who do not receive such treatment. Moreover, Keenan and Wakschlag (2002) suggested that it is appropriate to diagnose preschool children with mental health disorders as *DSM-IV* criteria are valid for young children. The authors contended that there is content, convergent, and predictive validity for such diagnoses when applied at very young ages. There are two caveats to this point, however. First, it is important to note that the data demonstrating validity for *DSM-IV* criteria in young children (Keenan & Wakschlag) were gathered from a sample that consisted of mostly African American children whose families were welfare recipients, and thus may not generalize to the broader population. Second, the validity of *DSM-IV* diagnoses in very young children is not agreed upon by all researchers in the area. Specifically, Campbell (2002) suggested that because there is substantial overlap between normal behavior in toddlers and some of the symptoms of ADHD and ODD, diagnosing children at very young ages may not be valid. Also, Lavigne et al. (1998) found that children between the ages of 1 and 3 who are diagnosed with a DBD often 'outgrow' the diagnosis, suggesting that diagnoses become more valid after the toddler years. Nonetheless, Campbell concedes that there is a growing body of literature documenting the predictive validity of disruptive diagnoses in very young children.

Further, Webster-Stratton and Taylor (2001) listed many empirically supported treatments for children under eight. These authors found that a child's positive outcome after treatment is directly related to the timeliness of treatment (Webster-Stratton & Taylor). Similarly, another study showed that early interventions for young children with behavior

problems reduced problems and increased competencies (Durlak & Wells, 1998). Thus, if young children with DBDs are referred to mental health practitioners, multiple empirically-based treatments are available to effectively treat these young children. However, if children with DBDs are not referred to mental health providers, there will not be an opportunity to intervene early and limit the consequences of the disorder(s).

Early identification and treatment for DBDs is also supported theoretically. A widely accepted theory suggests that DBDs are maintained by a coercive parent-child interaction (Patterson, 2002). Patterson theorizes that the maintenance of DBDs is cyclical in nature, and may begin in infancy. Specifically, when an infant cries and the parent subsequently finds the correct response to stop the crying, the baby's behavior is positively reinforced and the parent's behavior is negatively reinforced. In some cases after time, especially where the child has a difficult temperament and/or the parent has mental health or situational complications, this pattern becomes coercive. This proposed coercive cycle would suggest that the earlier a parent obtains and begins to implement more effective behavior management techniques, the less likely a child's inappropriate behavior is to continue. Patterson suggested that if this coercive interaction is in place by 18 months of age that children are more likely to have behavior problems by the time they reach school-age. Further, it has been suggested that hyperactivity exacerbates the coercive interaction pattern, making children with ADHD more susceptible to other disruptive behaviors (Patterson). Therefore, early identification and treatment of DBDs has theoretical support and implications for a more positive outcome.

Pediatricians as First Line of Care

Huffman and Nichols (2004) have argued that pediatricians and family practitioners, who have frequent, early contact with very young children, may be in the best position to

detect the early signs of behavioral and emotional problems including DBDs. Similarly, Bricker, Davis, and Squires (2004) pointed out that 75% of children in the United States use medical health services and, for this reason, medical professionals are in an excellent position to promote mental health assessment and treatment. Even the Surgeon General has argued that mental health problems be addressed in primary care settings (U.S. Public Health Service, 1999).

Additionally, there has been a recent push by the American Academy of Pediatrics (AAP; 2001, 2006) for developmental screening. It should be noted that the AAP's recommendation for developmental screening in primary care falls short of recommending screening for behavioral and emotional problems at this time. Thus, some researchers and practitioners are more focused on developmental screening, whereas others are focused on mental health screening. At this time the AAP has recommended that pediatricians assess children for developmental delays routinely and repeatedly given (1) the malleability of young children's behaviors and varying ages of onset of developmental delays, and (2) that pediatric offices are the only community setting routinely visited by children five years and younger. The AAP (2001, 2006) reported that a lack of developmental screening may lead to delays in assessment, diagnosis, and treatment. Although the current study has a focus on mental healthscreening, an increase in screening for both developmental delays and mental health problems has been endorsed (Burklow, Vaughn, Valerius, & Schultz, 2001; Huffman & Nichols, 2004; King & Glascoe, 2003). Further, arguments for both types of screening appear to be relevant and mutually beneficial. Therefore, in this literature review, primary care screening will be discussed both generally and with regard to mental health screening in particular.

King and Glascoe (2003) indicated that pediatricians have an obligation to perform screening, and to refer parents to early intervention and treatment services. Burklow et al. (2001) concurred, stating that pediatricians are the point of entry into the health system and should, therefore, be the point of referral to mental health professionals for children with behavioral and emotional problems. Also, Sices et al. (2003) reported that most pediatricians agreed that they are responsible for screening their patients and they recognize the value of early intervention services. Thus, the governing body of pediatricians, as well as researchers and practitioners, believe that brief mental health assessment is an important and urgent service that pediatricians should be providing. Nonetheless, widespread screening of emotional, behavioral, and mental health issues is not occurring (e.g., Sices, Feudtner, McLaughlin, Drotar & Williams, 2003; Simonian, 2006).

Therefore, pediatricians are now expected to recognize mental health problems in addition to physical and developmental problems (Burklow et al., 2001), but many of them lack comprehensive training in mental health (Olfson, 1992). Specifically, Gardner et al. (2000) stated that only 8% of pediatricians and family practitioners are 'well-trained' in child psychopathology. In a study conducted by Leaf et al. (2004), only 11.8% of children were seen by pediatricians with 'advanced' mental health training; whereas 69.9% of children were seen by pediatricians with no psychological training. Additionally, only 47% of pediatricians reported that they personally had the expertise necessary to detect developmental delays without a formal screening device (Sices et al., 2003). Thus, the amount of mental health training that pediatricians receive is low unless they seek out extensive training in behavioral/developmental pediatrics. Nevertheless, Levant (2006) found

that primary care physicians often treat mental health problems, possibly without the benefit of empirically supported treatment knowledge.

It follows, then, that pediatricians should be provided with tools to aid in the identification of childhood mental health problems and should be familiar with mental health services available in the community to which they can refer their patients. However, mental health screening it is not routinely taking place during pediatric visits. There are several reasonable explanations for the lack of routine mental health screening in pediatrics. First, time constraints are an obvious limitation. In one study, for instance, 61% of physicians did not believe that there is enough time for a developmental screener to be completed during routine pediatric visits (Sices et al., 2003). It can be assumed that if a majority of pediatricians did not have the time for a developmental screener they also would not have time for a mental health screener. Pediatricians are simply expected to cover such a broad area of potentially problematic issues in a very short amount of time that developmental and/or mental health screening and early detection can be quite challenging (Glascoe, 2005). In a study conducted by Blumenthal et al. (1999) the average length of a visit with a physician was 16.3 minutes. Physicians' time is an expensive resource, and controlling costs is important to managed care organizations. Indeed, health care managers and policy makers attempt to keep physician visits as short as possible while avoiding adverse effects (Blumenthal et al.). If pediatricians are going to screen for mental health problems, then it is vital that efficiency is preserved and costs controlled (Blumenthal et al.). Additionally, managed care organizations sometimes treat physicians as gatekeepers (Forrest et al., 1999). That is, they prefer that physicians do not make specialty referrals unless absolutely necessary so that costs will not rise. Thus, physicians already have very little time to screen

for mental health problems and they also have pressure from managed care to make very few specialty referrals.

Second, there are also some historical barriers to routine pediatric mental health screening. King and Glascoe (2003) lament that "inappropriate screening practices, high thresholds for referral, misplaced concerns about causing parental anxiety, and unfamiliarity with local resources all diminish the effectiveness with which many practitioners conduct developmental surveillance" (p. 624). Again, this article specifically references developmental screening, but the main tenant of the article is applicable to all types of primary care screening. Traditionally it was believed that because of the sensitivity and stigmatization of mental health issues caregivers might be hesitant to discuss such matters with pediatricians (Olfson, 1992). However, current data have suggested that this is not the case. Zimmerman et al. (1996) reported that over 80% of adult participants in a study were "not at all embarrassed, upset, annoyed or uncomfortable" (p. 434) when answering questions about their own emotional problems at a medical visit. Frowick, Shank, Doherty, and Powell (1986) reported that over 90% of adult participants expected general practitioners to provide some sort of care for their emotional problems. Thus, adults reported feeling comfortable talking about their mental health problems with a primary care practitioner, and similar studies have been conducted assessing parental comfort in discussing their child's mental health problems. For instance, Lish et al. (1997) found that more than 97% of caregivers (in a mostly African American and female sample) reported that physicians should ask about emotional problems. Also, when asked what they expected from pediatric visits, 51% of mothers (in a 99% Caucasian sample) indicated that they expected behavioral concerns to be addressed, and 56% stated that they expected developmental concerns to be addressed (Cheng et al., 1996). Likewise, 75% of mothers and 100% of pediatricians rated

behavioral and emotional problems as ‘somewhat’ or ‘very’ important goals for pediatric visits (Cheng et al.). More recently, Burklow et al. (2001) found that 87% of caregivers reported that pediatricians should discuss psychosocial issues with them, and Zuckerbrot et al. (2007) found parent and pediatrician acceptance of universal depression screening for adolescents. So, it appears that parents are not bothered by mental health concerns being discussed at pediatric visits and they expect it as part of quality care.

The stigma associated with mental health problems appears to be decreasing, albeit slowly, and parental concerns about mental health problems appear to be increasing (Knapp, 1997). However, as reported by Briggs-Gowan, Horwitz, Schwab-Stone, Leventhal, and Leaf (2000), fewer than 50% of caregivers who rated their child as having a mental health problem had consulted their pediatrician about the problem. That is, it appears that although parents are more and more accepting of pediatricians asking about mental health problems, they remain reluctant to bring it up in the absence of direct questioning. Therefore, routine pediatric mental health screening would apparently be welcomed by parents as a means of communicating these concerns with their child’s pediatrician, expressing to parents that mental health concerns are valid, and demonstrating that it is appropriate to discuss these concerns with their child’s pediatrician. Furthermore, Briggs-Gowan, Carter, Irwin, Wachtel, and Cicchetti (2004) reported that pediatric screening for mental health problems is beneficial because children may be on their best behavior during brief pediatric visits and screening would facilitate dialogue between parents and pediatricians about emotional and behavioral problems.

Another historical barrier to pediatric mental health screening is that some professionals believed that these problems do not affect young children. However, emotional, and especially behavioral problems, can and do emerge as early as infancy and toddlerhood (Huffman &

Nichols, 2004). Although these problems can be identified with screeners, they frequently go unnoticed by pediatricians (Huffman & Nichols). Also, although not unanimously agreed upon by all researchers in the area, *DSM-IV* criteria for DBDs have been shown to be valid for preschoolers (Keenan & Wakschlag, 2004).

It seems clear that there are many barriers to pediatricians using screening devices to make mental health referrals. However, it is difficult, if not impossible, for mental health professionals to provide widespread early intervention when such small numbers of children with mental health problems are being referred. Mental health providers are rarely seen at all, and are almost never among a family's first line of care (Ringel & Sturm, 2001). That is, mental health care professionals rarely see children until a behavioral or emotional issue has become problematic and impairing. Ringel and Sturm suggested that only 1-2% of children use mental health services before school entry, and only 6-9% of children ages 6 to 9 years do so. This is compared with the approximately 20% of children with mental health problems who might benefit from services (Wildman, Kinsman, Logue, Dickey, & Smucker, 1997). Ringel and Sturm reported the unmet need for mental health services to be between 69 and 87%, depending on several demographic factors. Kataoka, Zhang, and Wells (2002) reported that approximately 80% of children with mental health needs do not receive treatment. This number is far too high, especially when considering that 64-77% of children are seen yearly for a physical health care visit (Simpson et al., 2005). Costello et al. (1987) found that 11.8% of children in their sample showed symptoms of mental health problems using a diagnostic interview. By contrast, only 5.6% of children were identified by a pediatrician, without use of a mental health screening tool, as showing symptoms of mental health problems. Thus, the pediatricians would not have referred more than half (52.5%) of the children with symptoms of psychopathology to a mental health

practitioner. As suspected, children are not being referred to mental health care professionals as often as is needed.

Therefore, although many children are receiving physical health care services, virtually nothing has been implemented on a broad scale to ensure that children are receiving mental health screening, referrals and services. Consequently, under the current system it is unlikely mental health referrals will be made, and that resulting early interventions will be implemented. Screening in the pediatric setting would provide an opportunity to identify problems earlier and more frequently (Borowsky et al., 2003). Shedler (2000) reported that over 60% of individuals with a diagnosable mental health disorders never make it to a mental health professional but they do visit their primary care provider about the problem. As an example, Swenson, et al. (2003) indicated that approximately 50% of individuals with ADHD never receive treatment.

Another important issue is that the lack of mental health screening at pediatric visits may increase the likelihood that pediatricians will prescribe medications for behavioral and emotional problems without a full psychological evaluation. Although medication is commonly used with children with ADHD, medication combined with behavior therapy is thought to be more effective (Pelham, 1999), as it may help parents manage the child's behavior and reduce family stress (Anastopoulous & Farley, 2003). Moreover, Pelham and Gnagy (1999) reported several limitations of pharmacological treatments being used in the absence of psychosocial interventions for ADHD. The most pressing issue is the suggestion that medication alone has not been shown to have long-term positive effects on achievement and that it fails to address the interpersonal difficulties that are often associated with DBDs (Pelham & Gnagy). Accordingly, referrals to mental health providers are essential to get children the help they need.

Finally, pediatric screening might actually improve the effectiveness of psychological interventions because of increased parental investment in the validity and usefulness of interventions (AAP, 2001). That is, when parents are invited to be active participants in the reporting of mental health problems they are likely to be more interested and invested in seeking treatment. Asking parents to complete a mental health screener about a child presumably shows the parent that his/her expertise is respected, elicits parental concern about these problems, and may validate mental health concerns simply because a physician is inquiring. Huffman and Nichols (2004) suggested that an effective mental health screener could "help pediatricians substantiate parental concerns, validate clinical impressions, inform immediate care, and facilitate appropriate referrals" (p. 467). The AAP also purported that the use of primary care screening shows parents that the pediatrician is interested in and concerned with problems other than physiological ones, and that screening may lead to a plan for remediation. Therefore, as stated succinctly by Pagano, Cassidy, Little, Murphy, and Jellinek (2000), "The most commonly recommended way to improve identification of psychosocial problems in children is to use brief, parent-completed screening questionnaires during routine pediatric office visits" (p. 92-93).

Research on the Use of Mental Health Screeners

The current state of the literature in terms of mental health screening is largely comprised of screening for specific mental health problems, especially in adolescents. Cohen and colleagues (Cohen, Kelleher, & Mannarino, 2008) are making a push for pediatricians to screen for symptoms of Post-Traumatic Stress Disorder (PTSD) in all patients, and to make appropriate mental health referrals where warranted. Similarly, Katon, Russo, Richardson, McCauley, and Lozano (2008) explored the use of screening adolescents for anxiety and

depression in primary care. Although the importance of these pushes for specific screening is recognized, the focus of this study is on broader mental health screening in the pediatric setting.

Little research exists that looks directly at using broad pediatric mental health screening for young children. However, some guidelines have been suggested by researchers in this area in recent years. Glascoe (2005) reported that although pediatric mental health screening is not error free, it should be implemented and used as precisely as possible in order to maximize detection of mental health problems and appropriate referrals to mental health care providers. Currently, there is a need for a screening device that is short, uses waiting-room time, and helps physicians make appropriate referrals (Huffman & Nichols, 2004). Simonian (2006) also argued that screeners should have clear cut scores for determining when a child should be referred to a mental health professional. Shedler (2000) reported that screening instruments that do not meet these criteria are likely to sit unused on the shelf. Additionally, Glascoe (2005) suggested that screening instruments must have good psychometric properties, including evidence of reliability and validity. Further, physicians are not receptive to using mental health screeners when training in psychology is necessary to interpret the results or when the instrument is too time consuming. Thus, Shedler suggested that effective screeners also need to be usable in the absence of psychological training, inform users about a wide range of problems, be based on *DSM-IV* criteria, require little paperwork, and be easy for parents to complete without interfering with the other demands of pediatric visits.

Several childhood mental health instruments exist that fall short of these lofty requirements. Both Huffman and Nichols (2004) and Glascoe (2005) reviewed many of the narrow- and broad-band screening instruments available for childhood mental health. Among the

measures were the Child Behavior Checklist-Revised (CBCL-R; Achenbach & Rescorla, 2000), Behavior Assessment System for Children – 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004), Infant-Toddler Social and Emotional Assessment (ITSEA; Carter & Briggs-Gowan, 1993), Child Developmental Inventory (CDI; Ireton, 1992), the Parents' Evaluations of Developmental Status (PEDS; Glascoe, 1998), Conners Parent and Teacher Rating Scales-Revised: Short (CRS-R; Conners, 2001), Eyberg Child Behavior Inventory (ECBI; Eyberg, 1980), Missouri Children's Behavior Checklist (MCBC; Sines, Pauker, Sines, & Owen, 1969), the Child Symptom Inventory (CSI-4; Gadow & Sprafkin, 1994), and Pediatric Symptom Checklist (PSC; Jellinek et al., 1988). Many of these measures are widely used and have satisfactory reliability and validity. However, none meet all aforementioned criteria. Please see Table 1 for a summary of these issues.

The BASC and CBCL are popular and widely used, but they are lengthy (BASC forms range from 134-160 items depending on the age of the target child, and CBCL forms range from 110-113 items depending on the age of the child) and do not correspond directly to the *DSM-IV*. Also, these forms require computer scoring that is likely to go unused in a pediatric office.

Likewise, the ITSEA is a good screener, but has limitations especially in the pediatric setting. It is long (139 items) and is only for children ages 1 to 3 years (Carter, Briggs-Gowan, Jones, & Little, 2003). The authors of the ITSEA have created a brief form that is significantly shorter, but it is still only for children 3 years and younger (BITSEA; Briggs-Gowan et al., 2004). Also, the CDI is widely used by mental health practitioners and is based on the *DSM-IV*, but is very long (300 items) and has a second version for very young children (Huffman & Nichols, 2004). Additionally, the CRS-R requires time to score and does not cover some childhood disorders (i.e., depression, autism spectrum), and the PEDS only asks 10 questions

regarding learning, development, and behavior. Thus, it does not map onto the *DSM-IV* and does not cover a broad range of mental health issues (Huffman & Nichols, 2004). The Attention, Behavior, Language, and Emotion Scale(ABLE; Barbarin, 2007) is a relatively new measure designed to assess behavioral, emotional, and developmental difficulties in young children, but was designed for use in pre-kindergarten classrooms and there is limited information about its psychometric properties.

The ECBI is a reliable and valid measure, but is not ideal for pediatric mental health screening purposes. Specifically, although it contains some *DSM-IV* items of ADHD and ODD, it does not address other childhood mental health problems such as anxiety, depression, learning problems, and autism spectrum disorders (Eyberg, 1980). Also, the MCBC is not based on the *DSM-IV* and research shows that it under-identifies children with emotional and behavioral problems (Merritt, Thompson, Keith, Johndrow, & Murphy, 1993). The CSI-4 is time-consuming to score and is fairly long (97 items).

The PSC seems to be an adequate measure for quickly and accurately screening for childhood mental health problems. It has been extensively validated, takes approximately five minutes to complete, and gives pediatricians an assessment of overall psychological functioning (Pagano et al., 2000). This measure fits the requirements for a good pediatric mental health screener put forth by Shedler (2000) with one exception: it does not map on to the *DSM-IV* criteria. This is important because pediatricians should be able to quickly and easily tell parents for which of the *DSM-IV* disorders the child is at risk, and inform parents about the corresponding mental health services in the community. Therefore, although the PSC is a good tool for screening for childhood mental health problems, it does have this one limitation.

Another promising screening instrument that was developed by Shedler (2000) is the Quick PsychoDiagnostics Panel (QPD). This instrument takes approximately six minutes to complete, is easy for physicians to decipher, is *DSM-IV*-based, and has shown adequate validity. However, it was designed for use with adults and does not have a parallel child version. Thus, combining the positive qualities of the PSC and the QPD would likely produce a pediatric screener that would be quite useful for pediatricians.

Finally, the Vanderbilt Assessment Scale (Wolraich et al., 2003) has good psychometric properties and has been endorsed by the AAP. Also, it contains 55 items and is *DSM-IV*-based. However, it was designed primarily to assess ADHD and comorbid conditions. Thus, it covers externalizing disorders more thoroughly than internalizing disorders and does not cover autism-spectrum disorders. Nonetheless, the Vanderbilt is a promising instrument and has an additional strength in that it includes impairment and academic items.

The Primary Care Mental Health Screener (PCMHS; Hartung & Lefler, 2009) was designed to meet the criteria established in the literature for a through, easy-to-use, effective screener and to address some of the limitations of other pediatric mental health screeners. The PCMHS takes approximately 10 minutes to complete (69 items), can be completed in the waiting room, does not require extensive pediatrician or pediatric staff training, covers a wide range of childhood mental health problems (i.e., hyperactivity, inattention, oppositionality, conduct problems, learning problems, anxiety, depression, developmental delays and autism spectrum disorders), requires only an 8^{th} grade reading level (as determined by the Flesch-Kincaid Scale; Microsoft Corporation, 2008), is *DSM-IV*-based, and includes items that may be more appropriate for girls (i.e. relational aggression, Crick & Grotpeter, 1995). Thus, the PCMHS

seems to be an ideal screening tool for pediatric visits. However, because the PCMHS is a novel measure, little data exist regarding its psychometric properties.

The current study is designed to examine the reliability and predictive validity of the PCMHS for identifying children at-risk for DBDs. The first study examining the PCMHS found good to excellent internal consistency reliability for the four DBD subscales and good content validity when it was administered to the parents of 303 children ages 3 to 12 years in a pediatric setting (Hartung & Lefler, 2009). Specifically, internal consistency was reported as excellent for inattention (.95), hyperactivity (.93) and oppositionality (.94), and good for conduct problems (.86). With regard to construct validity, the pattern of subscale means was compared to the literature (e.g., Hartung & Widiger, 1998; Keenan & Shaw, 1997; Lahey et al., 2000). As predicted based on patterns found consistently in the literature, boys had higher scores than girls on inattention, and although not statistically significant, boys had marginally higher scores on hyperactivity, oppositionality, and conduct problems when the entire sample was included in the analyses. Interestingly, when preschoolers were excluded from these analyses, boys had significantly higher scores than girls on hyperactivity, oppositionality and conduct problems. This paper contended that replicating existing literature in terms of sex differences provided evidence that the PCMHS demonstrated content validity. Therefore, there are some preliminary data to suggest that the PCMHS is valid for DBD screening. The current study is designed to extend the findings of Hartung and Lefler (2009) by examining the convergent, discriminant, and predictive validity of the PCMHS.

Early Treatment Options Available upon Early Identification

Many types of evidence-based therapies and remediation techniques are available, but unfortunately many children are not able to take advantage of these opportunities because their

mental health problem is not identified, or their parents do not seek mental health services independently. As discussed earlier, many children who need psychological services are not getting them, and pediatricians are in the optimal position to bridge this gap between identification and treatment (Briggs-Gowan et al., 2000). As Olfson et al. (1995) pointed out, pediatricians and primary care physicians are more likely to offer advice and reassurance when a behavioral or emotional problem is identified rather than making a referral to a mental health provider. But, primary care screening will be most effective when it is paired with referrals for intervention in the community (AAP, 2001). Moreover, Kochanek and Buka (1998) showed that many low income parents, when made aware of the opportunity, do in fact take advantage of early intervention services. Specifically, 69% of families in this study used 75% or more of services offered to them, suggesting that parents of very young children report willingness to attend and participate in early childhood interventions.

Therefore, evidence suggests that children need and parents want early intervention services and therapy for mental health problems. An example of early mental health screening being used and leading to positive outcomes is a recent study by Asarnow et al. (2005). In this study adolescents were screened for depression and given mental health referrals. In the group of children receiving the referrals, and therefore having access to evidence-based treatments, outcomes were more positive than children who were neither screened nor given referral information. This is a good example of mental health screening having a positive outcome with regard to an internalizing disorder. There are evidence-based treatments for many types of childhood mental health problems (e.g., anxiety, depression), but the current study focuses on evidence-based interventions that target disruptive behaviors. The following list of treatments for disruptive behaviors is not meant to be exhaustive. It is simply an illustration of the wide range

of efficacious treatments available to families after early identification and a referral to a mental health professional has taken place.

The most widely used evidence-based treatment for children with DBDs is behavioral training for parents (Anastopoulos & Farley, 2003). The origins of behavioral parent training are typically attributed to Constance Hanf's unpublished work (Hanf, 1968). Hanf was among the first to suggest that behavior training for parents, consisting of positive attention and negative consequences, was an effective way to curb noncompliance (1968). Today the basic theoretical principle of parent training remains largely unchanged, and aims to treat problems resulting from behavioral disinhibition. Parents learn to make the consequences of the child's behavior very closely linked to the child's actual behavior in order to either increase or decrease certain behaviors. Anastopoulos and Falry noted that it is "of utmost clinical importance to begin treatment as soon as possible" (p. 190).

On such empirically-supported parent training method is called *Parenting the Strong-Willed Child* and was created by Forehand and Long (2002). The theory behind this parent training technique is that by using simple behavioral techniques (e.g., positive attention, selective ignoring, rewarding) a child with behavior problems can learn to act appropriately. This method is shown to be effective for children between the ages of 2 and 6.

Further, Parent-Child Interaction Therapy (PCIT) has been shown to be an effective treatment for preschool children with disruptive behavior (Brinkmeyer & Eyberg, 2003). The theoretical underpinnings of PCIT are that maladaptive parent-child interactions lead to problematic behaviors, and that these poor interactions and problematic behaviors lead to a cycle of ineffective behavior management. Therefore, PCIT teaches caregivers how to more effectively create a positive environment for their children, and how to implement successful behavior

management strategies (Brinkmeyer & Eyberg). This treatment is typically conducted with the families of 3- to 6-year-olds, but has been extended to slightly older and younger populations. Brinkmeyer and Eyberg suggested that it is essential that young children with disruptive behaviors receive appropriate treatment to help avoid serious future problems.

Additionally, *The Incredible Years*, a multifaceted treatment for young children with conduct problems can be used to treat young children with DBDs (Webster-Stratton & Reid, 2003). This treatment is focused on 2- to 8-year-old children because, as the authors point out, more positive outcome is related to a younger age of intervention. The theory behind this treatment is that there are risk factors for disruptive behaviors due to parenting, the family, the child, and the school. Accordingly, parents are taught parenting skills, teachers are taught classroom management skills, and the children are helped to reduce their aggressive and non-compliant behaviors (Webster-Stratton & Reid).

Lochman, Barry, and Pardini (2003) described a treatment for aggressive youth. The theoretical paradigm of this treatment program is that young children with aggression begin a developmental course marked by negative outcomes, and that this developmental course emerges in the context of an ecological framework. Thus, treatment must use said ecological framework to have a positive outcome. This treatment involves modifying maladaptive parent and child behaviors that foster aggression, and has been shown to be effective for children ages 7 to 12 years (Lochman, Barry, & Pardini).

Also, in a book written by Kazdin (2005) general parent management training (PMT) is explained. The aforementioned therapies all include some type of PMT. The theory behind these therapies is operant conditioning. That is, treatment teaches children the relations among antecedents, behaviors, and consequences. Behavioral principals help guide parents in behavior

management techniques involving positive reinforcement and punishment to gain compliance. The age-range for these therapies is wide, but is usually used with children aged 2 to 13 years old. Again, the best outcomes are seen with children who are treated early (Kazdin).

Patterson and colleagues (Patterson, Reid, & Eddy, 2002) have also developed an evidence-based treatment for conduct problems in children and adolescents. This treatment is referred to as The Oregon Model. The Oregon Model takes a family systems approach to working with conduct problems in children and adolescents. That is, the premise behind the model is that a youth cannot change his/her behavior without a commensurate change in the social environment. Thus, The Oregon Model aims to make changes in the family and social life of the identified youth. This treatment has been used to treat children from very early childhood to adolescence.

Finally, Kazdin (2003b) proposed that teaching more effective problem-solving skills to children and adolescents with CD would increase appropriate behavior in this group. Problem-solving skills training (PSST) is based on the theory that children and adolescents with CD are prone to distorted cognitive processes. For example, these youth are reported to have problems understanding the consequences of their actions and may have difficulty making correct attributions for other people's behavior (Kazdin). Therefore, PSST attempts to teach more effective problem-solving steps to counter these cognitive distortions. PSST has preliminary support for use with children between the ages of 2 and 13 years.

As has been delineated, there are several evidence-based treatments for children with DBDs, not all of which have been outlined here. Even children who are several years from school entry are in the age-range for these treatments. So, if pediatricians were to screen for mental health problems regularly, they would be able to refer positively identified children and

their families to mental health providers with confidence in the availability of evidence-based treatments.

The Current Study

Because of the need for an efficient and accurate means of screening for mental health problems at pediatric visits, the aim of the current study was to measure the internal consistency reliability and predictive validity of the Primary Care Mental Health Screener (Hartung & Lefler, 2009) in a community sample. Parents of children between the ages of 3 and 8 completed the PCMHS as well as several other measures of child psychopathology.

Specific hypotheses with regard to DBD symptomatology (i.e., hyperactivity, inattention, oppositionality, and conduct problems) were as follows: 1) the PCMHS will have excellent internal consistency reliability, 2) the PCMHS will have good predictive validity, 3) the PCMHS will have good convergent validity, and 4) the PCMHS will have good discriminant validity.

CHAPTER III

METHOD

Participants

Fifty eight child-parent dyads were the participants in this study (47% girls and 53% boys; 98% mothers, 0% fathers, 2% grandmothers). Children between the ages of 3 and 8 years were recruited, with 9 or 10 children of each age participating. The mean age of children in the study was 5.82 (*SD* = 1.71). All participants resided in or around a small Southwestern town. Participants were recruited either through their participation in a previous research project (Hartung & Lefler, 2009), word-of-mouth, or flyers advertising the study.

The racial/ethnic breakdown of the 58 participants was 92% Caucasian, 3% Asian American, 3% Hispanic, and 2% African American. In terms of family income, 3% of families earned less than $20,001 per year, 12% earned between $20,001 and $40,000, 31% earned between $40,001 and $60,000, 19% earned between $60,001 and $80,000, 14% earned between $80,001 and $100,000, 19% earned more than $100,000, and 2% declined to report income. Two (3%) of children who participated were on some type of psychotropic medication, five (9%) had undergone a psychological evaluation in the past, and four (7%) had been held back one grade in school. Also, 20% of the children in the study were the sibling of another participant. That is, five families in the current sample had more than one child participate in the study, resulting in a total of 12 children in the final sample who are related to another participant.

Exclusion criteria included IQ below 80, failure to complete the entire research protocol, and active suicidal or psychotic behavior. No children were excluded from the study for these reasons.

Development of the PCMHS

The PCMHS (see Appendix) was developed as an easy-to-use measure of childhood mental health problems. It has 69 items and measures inattention, hyperactivity, oppositionality, anxiety, depression, and conduct, learning and pervasive developmental problems. It was written at an 8th grade reading level. The 1st, 2nd, and 3rd subscales measure inattention (9 items), hyperactivity (9 items) and oppositionality (8 items), respectively. Each of these items directly corresponds to *DSM-IV* symptoms for ADHD and ODD (APA, 1994). The 4th subscale consists of 10 items measuring conduct problems; 7 items are *DSM-IV*-based and 3 items measure relational aggression (e.g., Crick & Grotpeter, 1995). Some of the more severe *DSM-IV* CD symptoms were not included (i.e., using a weapon; forcing sexual activity; breaking and entering; running away). These items were not included since this is a screener and some parents, in a non-clinical setting, might be offended by the more severe items. In addition, it was expected that children who exhibit these more severe behaviors would also exhibit some of the less severe items that were included.

The 5th subscale measures learning problems and contains 8 items. Six items screen for learning disorders and 2 items focus on developmental delays. These 8 items were adapted from Willcutt, Boada, Riddle and Pennington (2008). The 6th subscale measures anxiety and contains 8 items. Four items address *DSM-IV* generalized anxiety disorder (GAD; APA, 1994); and 4 items address *DSM-IV* separation anxiety disorder (SAD). The 7th subscale measures depression and has 9 items. Six items address *DSM-IV* major depressive disorder (MDD). Two items

address suicidality and were adapted from Willcutt et al. Finally, one item addresses low self-esteem. The 8th subscale measures pervasive developmental problems and consists of 8 items. Six items address *DSM-IV* autism and/or Asperger's Disorder (APA, 1994). Two items that also address *DSM-IV* symptoms of autism were adapted from Willcutt et al.

When completing the PCMHS parents/caregivers were instructed to "check the column that best describes your child in comparison to other children the same age." Parents were also told that "some items may not be relevant for younger children" and instructed that the shaded items were optional for 3- to 5-year-olds. Parents chose from 5 forced-choice answers (i.e., never, rarely, sometimes, often, and very often).

Measures

Please see Table 2 for a summary of the instruments that were used. Recent research on assessment practices, as outlined previously, informed the methodology of the current study. All children were administered a brief psychoeducational assessment in addition to parent-report measures and a parent-report structured interview. It is standard procedure during ADHD assessments to administer a psychoeducational battery to determine whether a child's chronological age matches his/her intellectual abilities (Neul, Applegate, & Drabman, 2003). This ensures that a child's level of inattention and/or hyperactivity is not, in fact, within normal limits given the child's developmental age. The Wechsler series is a widely used and accepted series of intelligence tests (Sattler, 2001).

Primary Care Mental Health Screener (PCMHS). Please see the aforementioned description.

Wechsler Abbreviated Scale of Intelligence (WASI). The WASI is a brief screening device to assess intellectual functioning (Wechsler, 1999) and was administered to the 6- to 8-

year-olds in the current study. The four-subtest form was used which includes the Vocabulary, Similarities, Block Deign and Matrix Reasoning Subtests. The WASI was normed for use with individuals ages 6 to 89 and takes approximately 30 minutes to administer. Approximately 700 participants were included in the normative data for children ages 6 to 12 years. The test-retest stability coefficient for the WASI Full Scale IQ score using the 4-subtest version was .92. Also, as a measure of content validity, Sattler (2001) reported that when children were given both the WASI and a more lengthy measure of IQ (*viz*, Wechsler Intelligence Scale for Children, Third Edition) the two IQ scores had a correlation of .87.

Wechsler Preschool and Primary Scale of Intelligence – Third Edition (WPPSI-III). The WPPSI-III is a measure of intelligence for children between the ages of 2 years 6 months and 7 years 3 months (Wechsler, 2002) and was administered to the 3- to 5-year-olds in the current study. The WPPSI-III has one version for children ages 2 years 6 months to 3 years 11 months and another for children ages 4 years 0 months to 7 years 3 months. Thus, the following subtests were administered to the 3-year-old children: Receptive Vocabulary, Block Design, Information, and Object Assembly; whereas the following subtests were administered to the 4- and 5-year-olds: Block Design, Information, Matrix Reasoning, Vocabulary, Word Reasoning, and Coding. Test-retest reliability coefficients for the Full Scale IQ scores were .92 for the 2 years 6 months to 3 years 11 months version and .80 for the 4 years 0 months to 7 years 3 months version (Wechsler). Also, when compared to another test of intelligence (*viz*, Differential Abilities Scales) the WPPSI-III had a correlation of .87 (Wechsler).

Wechsler Individual Achievement Test – Second Edition (WIAT-II). The WIAT-II (Wechsler, 2002) is a valid and reliable test of achievement. Selected subtests from the WIAT-II were administered to assess for possible Learning Disorders, as DBDs are often comorbid with

LD (Barkley, 2006). Specifically, the Word Reading, Pseudoword Decoding, Spelling, Math Reasoning, and Numerical Operations subtests were administered to all 6- to 8-year-old participants. According to the manual (Wechsler), the test-retest coefficients for the five selected subtests in 6- to 8-year-olds ranged from .81 to .99. Likewise, content validity was measured by comparing scores from the WIAT-II to another widely-used achievement test (*viz*, Wide Range Achievement Test – Third Edition). The correlation between the selected subtests and their counterparts on the other achievement test ranged from .67 to .78.

Gray Oral Reading Test (GORT-4). The GORT-4 measures oral reading rate, accuracy, fluency, and comprehension (Wiederholt & Bryant, 2001). The test was normed on 1,677 persons in grades 1 through 12 and takes approximately 20 minutes to administer. The GORT-4 manual reported test-retest reliability coefficients ranging from .91 to .95, internal consistency correlations ranging from .88 to .97 and criterion-related validity correlations ranging from .41 to .72. These figures are reported to be in the acceptable to highly consistent range. It should be noted, however, that much of the validity data from the GORT-4 is based on comparisons with previous versions of the GORT, but that these versions too have shown adequate concurrent and predictive validity (Wiederholt & Bryant).

Letter Name Knowledge. Five-year-old participants were given a test of letter name knowledge, which has been shown to be a predictor of future reading problems in 5-year-olds (Pennington & Lefly, 2001). Specifically, if a 5-year-old child is unable to correctly identify at least 12 letters of the alphabet they are considered at-risk for reading problems. Thus, 5-year-old children were shown flash cards of the 26 letters of the alphabet in a random order and were simply asked to report the name of each letter.

Computerized Diagnostic Interview Schedule for Children – Fourth Edition (C-DISC-IV). The C-DISC-IV (Shaffer, Fisher, Lucas, Dulcan & Schwab-Stone, 2000) was administered to parents of all children. The C-DISC-IV is a computer-based structured interview based on *DSM-IV* criteria that was developed by researchers at the National Institute of Mental Health (NIMH). The computer format allows the interviewer to enter and score information immediately, and has been shown to reduce errors, data entry time, and training. The ADHD, ODD, CD, Separation Anxiety, General Anxiety, and Depression sub-sections were administered in the current study. One-year test-retest reliability coefficients for the Parent Version were estimated to be between .43 and .79 (Shaffer et al., 2000). Validity data on the C-DISC-IV are nonexistent and validity estimates are extrapolated from previous versions of the non-computerized DISC and the C-DISC. Predictive validity scores on the DISC-2.3 for the Parent Version were estimated to be between .59 and .74 (Shaffer et al.).

Child Symptom Inventory (CSI-4). The CSI-4 is a rating scale designed to assess specific symptoms of a wide range of childhood disorders founded on *DSM-IV* criteria (Gadow & Sprafkin, 1994). The disorder categories include ADHD, ODD, CD, Generalized Anxiety Disorder, Specific Phobia, Obsessive-Compulsive Disorder, Posttraumatic Stress Disorder, Tic Disorder, Schizophrenia, Depressive Disorder, Pervasive Developmental Disorders, Social Phobia, Separation Anxiety Disorder, and Elimination Disorders. The CSI-4 is used for measuring the behavior of children ages 5 to 14 years, although in the current study it was used for the 6- to 8-year-olds. CSI-4 sensitivity scores were estimated to range from .69 to .80; whereas specificity rates were estimated to range from .74 to .83 (Gadow & Sprafkin). Because it was designed as a link to *DSM-IV* criteria, it has limited normative data and is not recommended

for normative interpretations (Frick & Kamphaus, 2001).

Early Childhood Inventory (ECI-4). The ECI-4 is also a *DSM-IV*-based rating scale designed to assess many childhood mental health problems (Gadow & Sprafkin, 1997). The disorder categories include ADHD, ODD, CD, Generalized Anxiety Disorder, Social Phobia, Separation Anxiety Disorder, Obsessive Compulsive Disorder, Posttraumatic Stress Disorder, Specific Phobia, Selective Mutism, Major Depressive Disorder, Dysthymic Disorder, Eating Disorders, Elimination Disorders, Pervasive Developmental Disorders, Reactive Attachment Disorder, Sleep Disturbances, and Tic Disorders. The ECI-4 is used for measuring the behavior of preschool children and in the current study was administered to all 3- to 5-year-olds. ECI-4 sensitivity scores were estimated to range from .72 to .95; whereas specificity rates were estimated to range from .71 to .87 (Gadow & Sprafkin).

Behavior Assessment System for Children – Second Edition (BASC-2). The BASC-2 (Reynolds & Kamphaus, 2004) measures a wide range of symptoms of behavioral and emotional problems in childhood, and is widely used. It is not *DSM-IV*-based, but provides population-based norms on many childhood mental health problems. Two different versions of the BASC-2 were used in the current study; the parent-report preschool version was used for 3- to 5-year-olds and the parent-report childhood version was used for 6- to 8-year-olds. Test-retest reliability ranged from .76 to .92 for the composite scores across the preschool and childhood versions (Reynolds & Kamphaus). Also, the externalizing composite of the BASC-2 was highly correlated (.82) with the externalizing composite of another widely-used rating scale (*viz*, Child Behavior Checklist), as was the internalizing composite of the BASC-2 and the internalizing composite of the same alternative rating scale (.75; Reynolds & Kamphaus).

Impairment Rating Scale (IRS). The IRS is a parent-report measure that assesses the level to which a child's emotional and behavioral problems interfere with his/her daily life in several domains (Fabiano et al., 2006). The domains include relationship with peers, relationship with parents, relationship with siblings, self-esteem, academic achievement, and family functioning (Fabiano et al.). Estimates of temporal stability for the IRS ranged from .60 to .89. Also, when compared to another measure of functioning (*viz*, Parent-report Children's Global Assessment Scale) the IRS was highly negatively correlated (-.79, Fabiano et al.).

Procedure

Participants were recruited in one of three ways: a letter, word-of-mouth, or flyers posted in various locations. The letters detailed the purpose of the study and were followed-up with a phone call. At that time the researcher elaborated upon the letter and scheduled an appointment. Addresses and phone numbers were gathered during a previous research study (Hartung & Lefler, 2009) where parents gave permission to be contacted in the future. Alternatively, participants called the researchers in response to hearing about the study from others who had participated or after seeing a flyer posted in the community.

When the family, typically just the parent-child dyad, arrived at the laboratory, written informed consent was obtained from the parent or legal guardian, written assent was obtained from child participants over the age of seven, and verbal assent was obtained from children ages seven and younger. After consent and assent were obtained, the parent completed the rating scales and an interview in one room and the child completed the intelligence and achievement testing in an adjacent room. The parent was informed that written results of the testing would be mailed within three weeks. All written results were mailed to the families within this timeframe. In addition, parents were invited to meet with the examiner to discuss the results after receiving

the written report. However, this feedback session was optional and was not considered part of the research study. Finally, families were paid $40 for their participation.

Children were given stickers for each subtest completed and were given the opportunity to take frequent breaks. The length of the study differed based on the age of the child. For 3- and 4-year-olds the study took an average of 1 hour and 15 minutes, for 5-year-olds the study took an average of 1 hour and 30 minutes, and for 6-, 7-, and 8-year-old the study took an average of 2 hours 30 minutes. All individuals who conducted the child testing were students in a clinical psychology doctoral program at a large Southwestern university. All examiners had taken a class on cognitive assessment and were trained in the standardized administration of the tests. Individuals who conducted the parent interviews were either doctoral students or advanced, well-trained undergraduate students. All examiners were blind to the child's scores on the PCMHS.

CHAPTER IV

RESULTS

Data Analyses. Dependent variables (DVs) included summary scores from the PCMHS, CSI-4 or ECI-4, symptom counts from the PCMHS and CSI-4 or ECI-4, *t*-scores from the BASC and diagnostic decisions based on the C-DISC-IV. Summary scores on the PCMHS were created by assigning zero points for responses of "never," one point for "rarely," two points for "sometimes," three points for "often," and four points for "very often". See Tables 3 through 6 for PCMHS summary scores. Summary scores for the CSI-4 or ECI-4 were created by assigning zero points for responses of "never," one point "sometimes," two points for "often," and three points for "very often." Symptom counts for the PCMHS and CSI-4/ECI-4 were created by considering a response of "often" or "very often" as endorsement of a symptom and considering all other responses non-endorsements. Symptom counts for the C-DISC-IV were created by considering responses of "yes" an endorsement and responses of "no" as a non-endorsement. See Table 7 for C-DISC-IV results. Outlying dependent variable scores were re-coded so that all scores were within three standard deviations of the mean. This resulted in two changes: one in the PCMHS conduct problem summary score and one on the PCMHS hyperactivity summary score. Finally, according to Faul and Erdfelder's (1992) power analysis program, power of .80 can be obtained when $\alpha = .05$ and a medium effect size is expected with 56 participants for the analyses used in this study. The current study had enough power to test for this effect, as a

medium to large effect size can be expected when the tests being administered have high reliability (Kazdin, 2003a) such as the measures used in this study.

Primary Results. The first hypothesis was that the PCMHS would have excellent internal consistency reliability for each of the DBD constructs. Cronbach's alpha was calculated to measure internal consistency reliability. Values of .69 or lower were referred to as "unacceptable,".70 to .79 were referred to as "acceptable,".80 to .89 were referred to as "good" and .90 or higher were referred to as "excellent" (Charter, 2003; Henson, 2001). See Table 8 for a summary of all alpha values. The hypothesis was partially supported such that the alpha values for hyperactivity (.92), inattention (.93) and oppositionality (.91) were all in the excellent range. The alpha value for the conduct problems subscale, however, was unacceptable (.49). This finding holds true when only girls were included in the analysis, with alpha values of .92 for hyperactivity, .90 for inattention, .91 for oppositionality, and .52 for conduct problems. Likewise, when only boys were considered the alpha values were .92 for hyperactivity, .95 for inattention, .91 for oppositionality, and .37 for conduct problems. Finally, when age groups were taken into account, alpha values on the PCMHS for children between the ages of 3 and 5 years were .90 for hyperactivity, .92 for inattention, .93 for oppositionality, and .63 for conduct problems. Likewise, alpha values for children between the ages of 6 and 8 years were .95 for hyperactivity, .93 for inattention, .89 for oppositionality, and .13 for conduct problems.

The second hypothesis was that the PCMHS would have good predictive validity. To test this hypothesis, Bayesian analyses were conducted. A total of six Bayesian analyses were conducted: PCMHS compared to C-DISC-IV for ADHD, PCMHS compared to CSI-4 for ADHD, PCMHS compared to ECI-4 for ADHD, PCMHS compared to C-DISC-IV for ODD, PCMHS compared to CSI-4 for ODD, and PCMHS compared to ECI-4 for ODD. See Tables 9

through 14 for a summary of the Bayesian analyses. Bayesian analyses were not conducted for conduct problems as hypothesized because no children in the sample met criteria for CD on the C-DISC-IV and there was zero variance on most of the items.

First, Bayesian analyses were conducted to determine the sensitivity, specificity, positive predictive power (PPP), and negative predictive power (NPP) of the PCMHS compared to the C-DISC-IV for Attention-Deficit/Hyperactivity Disorder (see Table 9). Using C-DISC-IV diagnosis compared to *DSM-IV* ADHD cutoffs on the PCMHS, the PCMHS had a sensitivity index of .80. This results in a 20% false positive rate with the PCMHS ADHD subscales. The specificity index was .98, which resulted in a false negative rate of 2%. The PPP was .89, and the NPP was .98.

Second, Bayesian analyses were conducted to compare the PCMHS to the CSI-4 for ADHD (see Table 10). This analysis was only conducted with school-age children as the CSI-4 was administered only to 6-, 7-, and 8-year-olds. The PCMHS had a sensitivity index of .75. This resulted in a 25% false positive rate. The specificity index was 1.00, resulting in a false negative rate of 0%. The PPP was 1.00, and the NPP was .96.

Third, Bayesian analyses were conducted to compare the PCMHS to the ECI-4 for ADHD (see Table 11). This analysis was only conducted with preschool children as the ECI-4 was administered only to 3-, 4-, and 5-year-olds. The PCMHS had a sensitivity index of 1.00, resulting in a 0% false positive rate. The specificity index was .96, resulting in a false negative rate of 4%. The PPP was .83, and the NPP was 1.00.

Fourth, Bayesian analyses were conducted to compare the PCMHS to the C-DISC-IV for Oppositional Defiant Disorder (see Table 12). Using C-DISC-IV diagnosis compared to *DSM-IV* ODD cutoffs on the PCMHS, the PCMHS had a sensitivity index of .63, resulting in a 37% false

positive rate. The specificity index was .98, resulting in a false negative rate of 2%. The PPP was .83, and the NPP was .94.

Fifth, Bayesian analyses were conducted to compare the PCMHS to the CSI-4 for ODD (see Table 13). This analysis was only conducted with school-age children as the CSI-4 was administered only to 6-, 7-, and 8-year-olds. The PCMHS had a sensitivity index of 1.00, resulting in a 0% false positive rate. The specificity index was 1.00, resulting in a false negative rate of 0%. The PPP was 1.00, and the NPP was 1.00.

Sixth, Bayesian analyses were conducted to compare the PCMHS to the ECI-4 for ODD (see Table 14). This analysis was only conducted with preschool children as the ECI-4 was administered only to 3-, 4-, and 5-year-olds. The PCMHS had a sensitivity index of .63, resulting in a 37% false positive rate. The specificity index was 1.00, resluting in a false negative rate of 0%. The PPP was 1.00, and the NPP was .88.

The third and fourth hypotheses were that the PCMHS would have good convergent and discriminant validity respectively. According to Kazdin (2003a) convergent validity occurs when measures of the same construct are significantly correlated, whereas discriminant validity occurs when measures of different constructs are less correlated than measures of the same construct. Therefore, in terms of convergent validity it was hypothesized that the DBD summary scores from the PCMHS (inattention, hyperactivity, oppositionality, and conduct problems) would be significantly correlated with scores from other measures of these same constructs. Unlike the dichotomous Bayesian analyses above, it was appropriate to analyze conduct problems as a continuous variable for the third and fourth hypotheses. In terms of the third hypothesis, the PCMHS DBD constructs were expected to be positively correlated with corresponding (or within-trait) CSI-4, ECI-4, BASC-2, and C-DISC-IV items (see Tables 15-18 respectively). For

example, the convergent validity of PCMHS inattention was tested by correlating it with CSI-4 inattention, ECI-4 inattention, BASC-2 inattention, and C-DISC-IV inattention. This was repeated for PCMHS hyperactivity, oppositionality, and conduct problems in the same way.

This hypothesis was partially supported such that PCMHS inattention was significantly correlated with CSI-4 inattention ($r = .91$, $p < .001$), ECI-4 inattention ($r = .90$, $p < .001$), BASC-2 inattention ($r = .78$, $p < .001$), and C-DISC-IV inattention ($r = .82$, $p < .001$). Also, PCMHS hyperactivity was significantly correlated with CSI-4 hyperactivity ($r = .96$, $p < .001$), ECI-4 hyperactivity ($r = .95$, $p < .001$), BASC-2 hyperactivity ($r = .85$, $p < .001$), and C-DISC-IV hyperactivity ($r = .88$, $p < .001$). Next, PCMHS oppositionality was significantly correlated with CSI-4 oppositionality ($r = .91$, $p < .001$), ECI-4 oppositionality ($r = .95$, $p < .001$), and C-DISC-IV oppositionality ($r = .81$, $p < .001$). PCMHS oppositionality was not compared to the BASC-2 as there is not a truly similar construct on the BASC-2. Contrary to the hypothesis, PCMHS conduct problems was not significantly correlated with CSI-4 conduct problems ($r = .29$, $p = .141$) nor ECI-4 conduct problems ($r = .29$, $p = .141$). It was, however, significantly correlated with C-DISC-IV conduct problems ($r = .40$, $p = .002$). Please see Tables 15-18 for all correlations.

In terms of discriminant validity, it was hypothesized that the PCMHS DBD constructs would be less strongly correlated with measures of other constructs than with measures of corresponding constructs. To test this hypothesis, the DBD constructs from the PCMHS were correlated with cross-trait items from the PCMHS itself (cross-trait, within method), and cross-trait items from the CSI-4, ECI-4, BASC-2, and C-DISC-IV (cross trait, cross method). Discriminant validity was confirmed if the DBD symptoms from the PCMHS are less strongly correlated with cross-trait, within method items and with cross trait, cross

method items than they are with within-trait, cross method items. For example, the discriminant validity of PCMHS inattention was tested by comparing the correlation between PCMHS inattention and C-DISC-IV inattention (r = .82) with the correlations between PCMHS inattention and the six other possible correlations (i.e., C-DISC-IV hyperactivity, C-DISC-IV oppositionality, C-DISC-IV conduct disorder, PCMHS hyperactivity, PCMHS oppositionality, and PCMHS conduct problems). All correlations can be found in Tables 15 – 18. These comparisons of correlations were conducted using the formula laid out for multitrait-multimethod matrices (Campbell & Fiske, 1959). Table 19 outlines the number of correlations out of six that were significantly smaller than the within train/cross method correlation. An alpha value of .008 was used because of the number of family-wise calculations. As can be seen in Table 19 the fourth hypothesis was partially supported. Discriminant validity was quite variable for PCMHS inattention, hyperactivity, and oppositionality and very poor for PCMHS conduct problems (see Table 19).

CHAPTER V

DISCUSSION

The aim of the current study was to examine the psychometric properties of the Primary Care Mental Health Screener (PCMHS) in 3- to 8-year-olds, with a focus on screening for DBDs. This screener was designed to aid pediatricians in the early identification of mental health problems in children. The PCMHS, if shown to have good psychometric properties, could be a viable option for primary care physicians as it was specifically designed to meet the suggested requirements (e.g., Glascoe, 2005; Huffman & Nichols, 2004). Therefore, the internal reliability, predictive validity, convergent validity, and discriminant validity of the PCMHS were examined in the current study. It was hypothesized that this novel screening measure would have acceptable to excellent psychometric properties, making it a good option for primary care providers.

The hypotheses were partially supported. Overall the PCMHS inattention, hyperactivity, and oppositionality scales fared better than the PCMHS conduct problems scale. Specifically, the first hypothesis was partially supported. The internal consistency reliability values were excellent for PCMHS inattention, hyperactivity, and oppositionality when the whole sample was taken into account, and all alpha values remained in the excellent range when the sample was broken down by age and sex. However, PCMHS conduct problems alpha values were in the unacceptable

range for the whole group, for each sex independently, and for each age group independently. It seems that the first three scales have higher levels of internal consistency reliability than the conduct problems scale. This could be because so few parents reported any type of conduct problem, resulting in zero variability for some items. Alternatively, the conduct problems symptoms used on the scale may not be effective for use with 3- to 8-year-olds. In any event, PCMHS inattention, hyperactivity, and oppositionality demonstrated high levels of internal consistency reliability whereas PCMHS conduct problems did not.

The second hypothesis was that the PCMHS DBD scales would have good predictive validity. Again, this hypothesis was partially supported. In terms of specificity, positive predictive power, and negative predictive power, values were all above 80%. Specificity is the proportion of people who are truly asymptomatic as determined by the gold standard, and who were also measured to be asymptomatic by the PCMHS. All specificity values were greater than 95%, suggesting that the PCMHS has excellent specificity for ADHD and ODD. PPP is the proportion of people measured to be symptomatic on the PCMHS who truly are symptomatic as determined by the gold standard. PPP values ranged from 83% to 100% suggesting that the PCMHS has good positive predictive power for ADHD and ODD. Next, NPP is the proportion of people who were measured to be asymptomatic on the PCMHS, and who are truly asymptomatic as determined by the gold standard. NPP values ranged from 88% to 100% suggesting that the PCMHS has good negative predictive power for ADHD and ODD. Finally, contrary to the second hypothesis, the PCMHS fell short in terms of sensitivity. Sensitivity is the proportion of people determined to be symptomatic by the gold standard, who were also rated as symptomatic by the PCMHS. Sensitivity values ranged from 63% to 100%, with three values falling below 80%. This indicates that the PCMHS has low sensitivity on three of six

comparisons. This suggests that the PCMHS has too high a false negative rate, and therefore Type II Errors become more likely. In summary, the PCMHS demonstrated good predictive validity as measured by three values (i.e., specificity, PPP, NPP), but inadequate predictive validity as measured by one value (i.e., sensitivity). Thus, the second hypothesis was partially supported.

Testing the convergent validity of the PCMHS was the aim of the third hypothesis. The PCMHS scales were correlated with other measures of the same construct to test this hypothesis. As with the results from the first hypothesis, the inattention, hyperactivity, and oppositionality scales were shown to have higher validity than the conduct problems scale. Correlations between the PCMHS inattention scale and the inattention scales from the CSI-4, ECI-4, BASC-2, and C-DISC-IV were all significant suggesting that the inattention scale on the PCMHS has good convergent validity. This pattern of highly significant correlations held for both the hyperactivity and oppositionality scales of the PCMHS. However, the PCMHS conduct problems scale was only significantly correlated with the conduct problems scales from the BASC-2 and the C-DISC-IV. It was not found to be significantly correlated with the conduct problems scale from either the CSI-4 or the ECI-4. This could possibly be explained by the inclusion of relational aggression items on the PCMHS which are not mentioned in any form on the strictly *DSM-IV*-based CSI and ECI. The inclusion of these extra items was expected to make the conduct problems scale of the PCMHS more valid for girls, and therefore may make it less correlated with measures that do not include such items. This could be viewed as positive as the *DSM-IV* symptoms of conduct disorder may not be as appropriate for girls as for boys. Moreover, the highly significant correlations seen with the inattention, hyperactivity, and oppositionality scales suggest that the PCMHS is a very effective screener for ADHD and ODD.

The fourth hypothesis was that the PCMHS would have good discriminant validity. This hypothesis, again, was partially supported with the inattention, hyperactivity, and oppositionality scales demonstrating much higher levels of discriminant validity than the conduct problems scale, though in this instance the inattention scale did not fare as well as hyperactivity and oppositionality. The hyperactivity and oppositionality scales did very well, with a majority of the target correlations more highly correlated than the non-target correlations. Specifically, of the 24 possible correlations, the target correlation for the hyperactivity scale was significantly higher than the non-target correlation for 22 of the pairings. This suggests that the hyperactivity scale has excellent discriminant validity. Similarly, of the 18 possible correlations, the target correlation for the oppositionality scale was significantly higher than 16 of the non-target correlations. This demonstrates excellent discriminant validity for the oppositionality scale. The inattention scale, on the other hand, had very mixed results. Of the 24 possible correlations, the target correlation for the inattention scales was significantly higher than 11 non-target correlations. Therefore, the inattention scale has fair discriminant validity, suggesting that this PCMHS scale may not be as refined as possible in terms of being sensitive to inattention distinct from other symptom clusters. Finally, the conduct problems scales fared poorly in terms of discriminant validity. Of the 24 possible correlations, the target correlation was not significantly larger than any of the non-target correlations. Therefore, the PCMHS conduct problems scale demonstrated very poor discriminant validity for this population. There are many possible explanations for the low discriminant validity demonstrated by the inattention and conduct problems scales and the high discriminant validity demonstrated by the hyperactivity and oppositionality scales. First, in such a young sample of children it is possible that inattention has not yet become noticeable to the parent as different from other behavior problems, and therefore

it was more difficult to discriminate between inattention and other problems, resulting in low discriminant validity. Also, the fact that there was zero variability on some items from the conduct problems scale suggests that it may be difficult to discriminate between conduct problems and other issues in a sample with such a small *N*. Conversely, the ability to discriminate hyperactivity and oppositionality from other constructs suggest that the PCMHS does a very good job screening for these two behavior problems in particular.

Implications. The PCMHS has been shown to have excellent internal consistency reliability, good predictive validity, and variable convergent and discriminant validity. Given that this is the first paper examining the psychometric properties of this measure, much more research is needed. However, there are several implications related to pediatric mental health screening in general that will be discussed.

The current study was conducted in a small town where it was relatively easy to educate primary care physicians about appropriate mental health care providers in the area. The author was able to call all psychologists in the town to determine the types of services that were available, and compiled a list of referrals for pediatricians to give to the parents of children with elevated screeners. In a bigger city this would be much more difficult, as it would be challenging to compile a list of practitioners, and such a list may be overwhelming to parents. Thus, it is possible that screening will be implemented broadly, but will not result in more children in mental health care because the pediatricians will lack knowledge of possible referrals.

Related to this is the trend in primary care to have a mental health professional on site to handle behavioral and emotional issues as they come up at visits. Therefore, it may no longer be a problem that primary care physicians are unaware of all mental health options in the area as they will be able to refer the patient to their colleague down the hall when a child presents with

an elevated screener. Also, anecdotally the author found that pediatricians were reluctant to screen because it was seen as an open invitation for the parents to ask several extra questions. This is a problem for primary care physicians who need to minimize appointment time, but would be less burdensome if there is a mental health professional on site to answer such questions. Universal mental health screening therefore seems to fit with the new direction in primary care and mental health care collaboration.

Medication delivery may also be affected by universal use of primary care screening. That is, under the current system there is evidence that primary care physicians medicate children for ADHD and other behavior problems before the child undergoes a full diagnostic evaluation and without the child ever receiving a *DSM-IV* or *ICD-9* diagnosis (Goodwin, Gould, Blanco & Olfson, 2001). This can be problematic in several ways. For example, if a parent describes symptoms of inattention and irritability to a pediatrician these symptoms might be misattributed to ADHD and/or ODD and the pediatrician may prescribe a stimulant. However, if the inattention and irritability were truly symptoms of a mood or anxiety issue the symptoms could be exacerbated by stimulant medication. With more systematic screening pediatricians may be more apt to make appropriate referrals, and in turn mental health practitioners can make appropriate diagnoses. At this point parents will be able to make an informed decision about whether to return to a physician for medication, pursue behavioral options, or both. This may decrease the number of children without a diagnosis who are prescribed psychotropic medication, and may increase the number of children seeing a mental health practitioner.

Finally, because of the lingering stigma related to seeking mental health care, it may be helpful for parents to know that this is an important issue to their family pediatrician. Having a trusted family physician interested in behavioral and emotional problems may lend credence to

parental concern, and may have an effect on the number of families who find it acceptable to seek mental health care (Cheng et al., 1996; Lish et al., 1997). As a result more families may obtain mental health services, which is appropriate theoretically. Specifically, the Coercive Parent-Child Interaction theory (Patterson, 2002) suggests that parents and their children with behavior problems enter into a negative cycle of interaction that, if left unbroken, will lead to negative outcomes for the family. Thus, early screening and treatment for behavior problems may reduce the number of families with continued conflict due to this negative interaction.

Strengths and Limitations. This study had several strong points. The development of a novel screening device and the number of children assessed in a short amount of time are strengths of the study. Also, the use of Baysian analyses and the thorough review of the literature improved the quality of the paper.

However, although the current study suggests that the PCMHS is a promising mental health screener, there are some limitations. Because this study was conducted in a small town in the Southwest the sample was 92% Caucasian. This demographic limitation decreases the generalizability of the findings, and calls into question the usefulness of the PCMHS in other ethnic groups. Also, the socioeconomic status of the sample was relatively high, in that over 50% of the participating families made more than $60,000 per year, with nearly 20% of families making more than $100,000. Again, this decreases the generalizability of the findings. These demographic limitations are important because this screener would ideally be used with a very diverse group of children, and it needs to be effective for all of them. Moreover, the sample used in the current study contained 12 children with a sibling also participating. This means that five mothers completed measures for more than one child, introducing the possibility that the data were not fully independent for a percentage of the sample.

In terms of the screener itself, there are also some limitations. First, the PCMHS screens for behavioral, emotional, and learning problems to the exclusion of developmental delays. As discussed, the AAP (2001, 2006) has stopped short of recommending mental health screening, but has endorsed developmental screening. From the perspective of primary care physicians, it makes good sense to screen for both mental health problems and developmental delays simultaneously so as to reduce paperwork and maximize waiting room time. Also with regard to the preference of the pediatricians, the screener could be shortened from its current length of 69 items, and could benefit from a more clear-cut scoring rubric to help primary care doctors determine when to make a referral. Further, the PCMHS does not include questions related to the level of impairment a child experiences. This is an important issue because symptoms of mental health problems do not necessarily correlate with impairment (Gordon et al., 2006).

Additionally, this study did not measure the test-retest reliability of the PCMHS. This is an important piece of a measure's psychometric properties, and therefore needs to be assessed. This study also did not obtain teacher ratings. This was the initial intention of the author, but because of the low response rate (0%) of the first 15 teachers this important piece of information is missing from the current study. Finally, the psychometric properties of the PCMHS are best at older ages and poorest for the youngest children in the sample. This is unfortunate because a mental health screener would theoretically be most useful for very young children, identifying problems and facilitating referrals when the problem has not yet crystallized.

Future Directions. First, as stated above, the psychometric properties of the PCMHS should be examined in a more culturally diverse sample. Also, the test-retest reliability of the PCMHS is a suggested area of future research, as well as the feasibility of adding impairment items. Additionally, it is necessary to examine whether pediatricians and pediatric staff find the

PCMHS effective and easy-to-use. It would also be beneficial to explore shortening the screener if reliability and validity could be maintained. That is, it is recommended that future research examine the elimination of items without compromising reliability and validity.

A main focus of future research should be simply to gather data from many more children. A limitation of this study is the fact that fewer than 60 children were assessed. This is problematic because of the base rates of the disorders in question, as well as the usefulness of measuring the psychometric properties of a new measure with only 58 participants. With a larger sample of children there would be more children with symptoms of inattention, hyperactivity, oppositionality, and conduct problems. This would result in higher numbers in the Bayesian analyses resulting in more convincing conclusions about the utility of the PCMHS.

Additionally, because the Vanderbilt and the PCMHS are both thought to be good tools for mental health screening in a pediatric setting, it would be advantageous to compare the two measures empirically. This could possibly involve the authors of both measures collaborating in an effort to develop the most effective, easy-to-use screener. Also, in an effort to make the screening devices as user-friendly as possible, primary care physicians and staff should be recruited to provide input.

Whether primary care physicians choose to use the PCMHS, the Vanderbilt, or another screener, it is suggested that they begin screening for mental health problems in all children. This will increase the likelihood that children will receive needed mental health services. Nonetheless, the current limitations of these instruments should also be considered. Thus, we recommend additional research using pediatric screeners to examine the sensitivity and specificity of these instruments across disorders, age and gender. We believe that pediatricians can be extremely helpful in decreasing stigma and increasing the number of

children who obtain mental health evaluations and services but we do not want to promote the use of screeners that have not been adequately tested in terms of sensitivity and specificity. Ultimately, it is hoped that promoting mental health screening in primary care settings, as stated by Levant (2006), will help "raise the visibility of psychology and it's perceived relevance to solving a wide range of personal, health, educational, social and family problems" and "promote the integration of physical and psychological health care in a reformed health care system, one in which health care professionals team up to treat the whole person" (p. 383).

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APPENDICES

PEDIATRIC MENTAL HEALTH SCREENER FOR AGES 3-12

Name of child: _____ Child's date of birth: _____ Sex of child: M F

Name of person completing form: _____

Relationship to child: _____ Date completed: _____

Please read these instructions before completing this checklist: Check the column that best describes your child in comparison to other children the same age. Some items may not be relevant for younger children; therefore, items in the shaded sections are optional for parents of 3-5 year olds.

	Compared to others the same age, my child…	Never	Rarely	Some times	Often	Very often
A1	Has difficulty sustaining attention in tasks or play activities					
A2	Does not seem to listen when spoken to directly					
A3	Is easily distracted by nearby noises or activities					
A4	Is forgetful in daily activities					
A5	Does not follow through on adult requests or instructions and fails to finish things (ex. putting on coat, doing homework, finishing chores)					
A6	Fails to give close attention to details or make careless mistakes					
A7	Has difficulty organizing tasks and activities					
A8	Avoids or dislikes activities that involve a lot of mental effort (ex. puzzles, math worksheets, board games)					
A9	Loses or misplaces necessary items (ex. homework, coat, or toys)					
B1	Fidgets with hands or feet or squirms in seat					
B2	Leaves seat when staying seated is expected (ex. school, church, or dinner)					
B3	Runs or climbs when it is unacceptable (ex. doctor's office, grocery store)					
B4	Has difficulty playing or engaging in activities quietly					
B5	Is "on the go" or acts as if "driven by a motor"					
B6	Talks excessively					
B7	Has difficulty waiting for a turn in games or group situations					
B8	Interrupts ongoing conversations, games or activities					
B9	Blurts out answers before questions have been completed					
C1	Loses temper					
C2	Argues with adults					
C3	Defies or refuses to comply with adults' requests or rules					
C4	Deliberately annoys people					
C5	Blames others for his/her mistakes or misbehavior					
C6	Is touchy or easily annoyed by others					
C7	Is angry and resentful					
C8	Is spiteful (bitter) and vindictive (unforgiving)					
D1	Excludes other children from activities or play					
D2	Initiates physical fights					
D3	Lies or "cons" for personal gain or to get out of something					
D4	Has been physically cruel to people and/or animals					
D5	Ignores or stops talking with other children when he/she is mad at them					
D6	Threatens to end friendship unless friends do what he/she says					
D7	Bullies, threatens, or intimidates others					
D8	Stays out at night or skips school (plays hookey) without parent permission					
D9	Has stolen valuable items (ex. shoplifting)					
D10	Has set fires and/or destroyed others' property on purpose					

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PEDIATRIC MENTAL HEALTH SCREENER CONTINUED

	Compared to others the same age, my child…	Never	Rarely	Some times	Often	Very often
E1	Has difficulty with basic self-help skills (ex. asking for help, getting dressed)					
E2	Has or had difficulty with basic academic skills (ex. shape names, letter names, sounding out words, or spelling)					
E3	Has difficulty remembering important information (ex. names of close relatives, phone numbers, or dates)					
E4	Has or had difficulty learning the days of the week or months of the year					
E5	Reads slowly and/or below grade or expectancy level					
E6	Has difficulty in all academic areas (ex. reading, spelling and math)					
E7	Has more difficulty with reading and spelling than with math					
E8	Has more difficulty with math than with reading and spelling					
F1	Is distressed when he/she expects to be temporarily separated from caregivers (ex. parent going to work)					
F2	Refuses, or is reluctant, to go to school because of fear of separation from parents or caregivers (ex. child going to day care school)					
F3	Worries about many events or activities (ex. school performance)					
F4	Has difficulty controlling his/her worries					
F5	Worries that his/her parents or caregivers will be harmed or lost					
F6	Worries that he/she will be permanently separated from caregivers (ex. getting lost or being kidnapped)					
F7	Is irritable (grumpy) with others					
F8	Is unable to relax and/or feels tense or "on edge"					
G1	Seems sad, unhappy or hopeless					
G2	Has difficulty with falling asleep, staying asleep, or sleeping too much					
G3	Has low self-esteem and/or poor self-confidence					
G4	Has had significant changes in body weight and/or appetite not due to normal growth (ex. weight loss, poor appetite)					
G5	Seems to enjoy most activities less than he/she used to					
G6	Seems to have less energy or be more tired than he/she used to					
G7	Blames self and/or feels guilty when something goes wrong					
G8	Says "I wish I were dead" or "I wish I had never been born"					
G9	Has expressed definite suicidal thoughts or wishes					
H1	Has difficulty using eye contact, gestures, or facial expressions effectively when interacting with others (ex. smiles back at others, points out interesting things to others, nods head for "yes" and shakes head for "no")					
H2	Has difficulty making or keeping friends or is not interested in peers					
H3	Has or had difficulty with language development (ex. late talker, difficult to understand speech)					
H4	Has difficulty pretending, using imagination, or imitating others when playing (ex. lines up or sorts toys, does not "make believe" or pretend when playing)					
H5	Is extremely preoccupied with certain interests or activities (ex. only plays with one toy or type of toy)					
H6	Insists on doing things in a particular order and becomes distressed if required to change pattern (ex. taking different route to school)					
H7	Has difficulty understanding how others are feeling and/or reacting					
H8	Has difficulty starting or continuing a conversation with others					

This screener was compiled by Cynthia M. Hartung, Ph.D. and Elizabeth K. Lefler, M.S.
Please contact Dr. Hartung at chartung@uwyo.edu for more information about screener development.

PAGE 2 – THANK YOU FOR COMPLETING THIS FORM

Table 1

*Current Available Instruments for Screening in Pediatric Offices**

	***DSM-IV* – Based?**	**Length**	**Wide Range of Problems?**	**Useable for Pediatricians**	**Acceptable Psychometrics?**
BASC-2	No	134-160 items	Yes	Computer scoring necessary	Yes
CBCL-R	No	110-113 items	Yes	Computer scoring necessary	Yes
ITSEA	No	169 items	No (designed for children 1-3 years of age)	Scoring necessary	Yes
CDI	Yes	300 items	Yes	Complicated scoring	Yes
PEDS	No	10 items	No (for disabilities and delays)	Easy to use	Yes
CRS-R	Yes	80 items	Yes (although not autism or Dep)	Complicated scoring	Yes
ECBI	No	36 items	No (only DBDs)	Easy to use	Yes
MCBC**	No	*N/A*	*N/A*	*N/A*	Yes
PSC	No	35 items	Yes	Easy to "eye-ball" No scoring/training necessary	Yes
ABLE	No	40	No (focused on developmental issues)	Easy to use	No
Vanderbilt	Yes	55 items	Yes (although not Autism)	Easy to use	Yes
PCMHS	Yes	69 items	Yes (ADHD, ODD, CD, LD, MR, Autism Spect., Anx, Dep)	Easy to "eye-ball" No scoring program/training necessary	The current study was designed to answer this question

Note. BASC-2 (Behavior Assessment System for Children – 2); CBCL-R (Child Behavior Checklist – Revised); ITSEA (Infant-Toddler Social and Emotional Assessment); CDI (Child Development Inventory); PEDS (Parents' Evaluations of Development Status); CRS-R (Conners' Rating Scales – Revised); ECBI (Eyberg Child Behavior Inventory); MCBC (Missouri Children's Behavior Checklist); PSC (Pediatric Symptom Checklist); ABLE (Attention, Behavior, Learning, and Emotion Scale); Vanderbilt (Vanderbilt Assessment Scale); PCMHS (Primary Care Mental Health Screener).

* Information in table partially adapted from Glascoe (2005) and Huffman and Nichols (2004)

** Information has not yet been gathered from the author of this measure.

Table 2

Key Constructs and Measures

Construct	Measure	Participant
I. ADHD		
A. Inattention	PCMHS Symptom Count	Parent
	CSI-4/ECI-4 Symptom Count	Parent
	DISC-IV Symptom Count	Parent
	BASC-2 Inattention Score	Parent
B. Hyperactivity	PCMHS Symptom Count	Parent
	CSI-4/ECI-4 Symptom Count	Parent
	DISC-IV Symptom Count	Parent
	BASC-2 Hyperactivity Score	Parent
II. Oppositionality	PCMHS Symptom Count	Parent
	CSI-4/ECI-4 Symptom Count	Parent
	DISC-IV Symptom Count	Parent
III. Conduct Problems	PCMHS Symptom Count	Parent
	CSI-4/ECI-4 Symptom Count	Parent
	DISC-IV Symptom Count	Parent
	BASC-2 Conduct Problems Score	Parent
IV. Associated Impairments		
A. Functional Impairment	IRS Total Score	Parent
B. Cognitive Ability	WASI or WPPSI-III Full Scale IQ	Child
C. Academic Achievement	WIAT-II	Child
	GORT	Child
	Letter Name Knowledge	Child

Note. PCMHS (Primary Care Mental Health Screener; Hartung & Lefler, 2009); BASC-2 (Behavioral Assessment Scale for Children-2nd Edition; Reynolds & Kamphaus, 2004); CSI-4 (Child Symptom Inventory-DSM-IV; Gadow & Sprafkin, 1994); DISC-IV (Diagnostic Interview Schedule for Children – Fourth Edition; Shaffer et al., 2000); IRS (Impairment Rating Scale; Fabiano et al., 2006); WIAT-II (Wechsler Individual Achievement Test – Second Edition; Wechsler, 2001); WASI (Wechsler Abbreviated Scale of Intelligence; Wechsler, 1999): WPPSI-III (Wechsler Preschool and Primary Scale of Intelligence – Third Edition; Wechsler, 2002); GORT (Gray Oral Reading Test; Wiederholt & Bryant, 2005). Only children 6 years of age and older completed the WIAT and GORT, and only 5-year-old children completed Letter Name Knowledge. Three- to 5-year-olds were administered the WPPSI-III and older children were administered the WASI.

Table 3

PCMHS Subscale Summary Scores by Age Group

Subscale	Preschool *n* = 30			School-Age *n* = 28			*t*-tests	
	M	*SD*	α	*M*	*SD*	α	*t*	*p*
Inattention	10.83	7.24	.92	12.14	7.16	.93	0.69	.492
Hyperactivity/impulsivity	12.27	7.45	.90	10.50	8.52	.95	0.84	.403
Oppositionality	9.27	6.65	.93	6.79	4.96	.89	1.62	.112
Conduct problems	2.37	2.36	.63	2.21	1.64	.13	0.28	.778

Table 4

PCMHS Subscale Summary Scores by Sex

Subscale	Boys $n = 31$			Girls $n = 27$			*t*-tests	
	M	*SD*	α	*M*	*SD*	α	*t*	*p*
Inattention	11.45	7.84	.95	11.48	6.45	.90	0.02	.988
Hyperactivity/impulsivity	12.61	8.51	.92	10.07	7.33	.92	1.21	.232
Oppositionality	8.19	6.18	.91	7.93	5.85	.91	0.17	.867
Conduct problems	1.87	1.69	.37	2.89	2.65	.52	1.77	.083

Table 5

PCMHS Subscale Summary Scores for Preschoolers by Sex

Subscale	Boys $n = 17$			Girls $n = 13$			*t*-tests	
	M	*SD*	α	*M*	*SD*	α	*t*	*p*
Inattention	9.88	6.74	.93	12.08	7.94	.92	0.82	.420
Hyperactivity/impulsivity	13.00	6.92	.88	11.31	8.28	.92	0.61	.547
Oppositionality	8.18	6.88	.94	10.69	6.33	.90	1.03	.313
Conduct problems	1.82	1.85	.50	3.31	3.40	.66	1.53	.136

Table 6

PCMHS Subscale Summary Scores for School-Age Children by Sex

Subscale	Boys $n = 14$			Girls $n = 14$			*t*-tests	
	M	*SD*	α	*M*	*SD*	α	*t*	*p*
Inattention	13.36	8.88	.95	10.93	4.94	.84	0.89	.382
Hyperactivity/impulsivity	12.14	10.38	.95	8.93	6.43	.92	0.99	.334
Oppositionality	8.21	5.48	.89	5.36	4.09	.86	1.56	.130
Conduct problems	1.93	1.54	.17	2.50	1.74	.10	0.92	.367

Table 7

Diagnostic results from the C-DISC-IV

	n	%
ADHD	10	17.2
ODD	8	13.8
CD	0	0.00

Table 8

Coefficient alpha values for the PCMHS by sex for the total sample and by age group

Subscale	Total sample *N* = 58		Preschoolers *n* = 30		School-age *n* = 28	
	Boys *n* = 31	Girls *n* = 27	Boys *n* = 17	Girls *n* = 13	Boys *n* = 14	Girls *n* = 14
Inattention	.95	.90	.93	.92	.95	.84
Hyperactivity	.92	.92	.88	.92	.95	.92
Oppositionality	.91	.91	.94	.90	.89	.86
Conduct problems	.37	.52	.50	.66	.17	.10

Table 9

Bayesian Analysis for PCMHS compared to C-DISC-IV diagnosis for ADHD

	Positive based on C-DISC-IV	Negative based on C-DISC-IV
Positive based on PCMHS	8	1
Negative based on PCMHS	2	47

Sensitivity = a/(a+c) = 8/(8+2) = .80
Specificity = d/(b+d) = 47/(1+47) = .98
Positive Predictive Power = a/(a+b) = 8/(8+1) = .89
Negative Predictive Power = d/(d+c) = 47/(47+2) = .98

Table 10

Bayesian Analysis for PCMHS compared to CSI-4 symptom count diagnosis for ADHD for school-age children

	Positive based on CSI-4	Negative based on CSI-4
Positive based on PCMHS	3	0
Negative based on PCMHS	1	24

Sensitivity = a/(a+c) = 3/(3+1) = .75
Specificity = d/(b+d) = 24/(0+24) = 1.00
Positive Predictive Power = a/(a+b) = 3/(3+0) = 1.00
Negative Predictive Power = d/(d+c) = 24/(24+1) = .96

Table 11

Bayesian Analysis for PCMHS compared to ECI-4 symptom count diagnosis for ADHD for preschool children

	Positive based on ECI-4	Negative based on ECI-4
Positive based on PCMHS	5	1
Negative based on PCMHS	0	24

Sensitivity = a/(a+c) = 5/(5+0) = 1.00
Specificity = d/(b+d) = 24/(1+24) = .96
Positive Predictive Power = a/(a+b) = 5/(5+1) = .83
Negative Predictive Power = d/(d+c) = 24/(24+0) = 1.00

Table 12

Bayesian Analysis for PCMHS compared to C-DISC-IV diagnosis for ODD

	Positive based on C-DISC-IV	Negative based on C-DISC-IV
Positive based on PCMHS	5	1
Negative based on PCMHS	3	49

Sensitivity = a/(a+c) = 5/(5+3) = .63
Specificity = d/(b+d) = 49/(1+49) = .98
Positive Predictive Power = a/(a+b) = 5/(5+1) = .83
Negative Predictive Power = d/(d+c) = 49/(49+3) = .94

Table 13

Bayesian Analysis for PCMHS compared to CSI-4symptom count diagnosis for ODD for school-age children

	Positive based on CSI-4	Negative based on CSI-4
Positive based on PCMHS	1	0
Negative based on PCMHS	0	27

Sensitivity = a/(a+c) = 1/(1+0) = 1.00
Specificity = d/(b+d) = 27/(0+27) = 1.00
Positive Predictive Power = a/(a+b) = 1/(1+0) = 1.00
Negative Predictive Power = d/(d+c) = 27/(27+0) = 1.00

Table 14

Bayesian Analysis for PCMHS compared to ECI-4 symptom count diagnosis for ODD for preschool children

	Positive based on ECI-4	Negative based on ECI-4
Positive based on PCMHS	5	0
Negative based on PCMHS	3	22

Sensitivity = a/(a+c) = 5/(5+3) = .63
Specificity = d/(b+d) = 22/(0+22) = 1.00
Positive Predictive Power = a/(a+b) = 5/(5+0) = 1.00
Negative Predictive Power = d/(d+c) = 22/(22+3) = .88

Table 15

Multi-Trait, Multi-Method Matrix for PCMHS and CSI-4

	PCMHS Inattn	PCMHS Hyp	PCMHS Opp	PCMHS Conduct	CSI-4 Inattn	CSI-4 Hyp	CSI-4 Opp	CSI-4 Conduct
PCMHS Inattn	1.00							
PCMHS Hyp	**.77** **p < .001**	1.00						
PCMHS Opp	**.60** **p < .001**	**.65** **p < .001**	1.00					
PCMHS Conduct	**.42** **p = .001**	**.43** **p = .001**	**.55** **p = .001**	1.00				
CSI-4 Inattn	*.91* *p < .001*	.74 p < .001	.47 p = .013	.31 p = .103	1.00			
CSI-4 Hyp	.75 p < .001	*.96* *p < .001*	.63 p < .001	.54 p = .003	**.75** **p < .001**	1.00		
CSI-4 Opp	.50 p = .007	.61 p = .001	*.91* *p < .001*	.56 p = .002	**.44** **p = .019**	**.63** **p < .001**	1.00	
CSI-4 Conduct	-.02 p = .909	.11 p = .592	.23 p = .237	*.29* *p = .141*	**.02** **p = .941**	**.15** **p = .437**	**.27** **p = .163**	1.00

Note. **Correlations in BOLD represent discriminant validity** and *correlations in Italics represent convergent validity.*

Table 16

Multi-Trait, Multi-Method Matrix for PCMHS and ECI-4

	PCMHS Inattn	PCMHS Hyp	PCMHS Opp	PCMHS Conduct	ECI-4 Inattn	ECI-4 Hyp	ECI-4 Opp	ECI-4 Conduct
PCMHS Inattn	1.00							
PCMHS Hyp	**.77 p < .001**	1.00						
PCMHS Opp	**.60 p < .001**	**.65 p < .001**	1.00					
PCMHS Conduct	**.42 p = .001**	**.43 p = .001**	**.55 p = .001**	1.00				
ECI-4 Inattn	*.90 p < .001*	.71 p < .001	.62 p < .001	.51 p = .004	1.00			
ECI-4 Hyp	.71 p < .001	*.95 p < .001*	.65 p < .001	.40 p = .030	**.64 p < .001**	1.00		
ECI-4 Opp	.76 p < .001	.70 p < .001	*.95 p < .001*	.61 p < .001	**.65 p < .001**	**.69 p < .001**	1.00	
ECI-4 Conduct	.55 p = .002	.23 p = .240	.44 p = .018	*.29 p = .141*	**.41 p = .027**	**.17 p = .371**	**.48 p = .009**	1.00

Note. **Correlations in BOLD represent discriminant validity** and *correlations in Italics represent convergent validity.*

Table 17

Multi-Trait, Multi-Method Matrix for PCMHS and BASC

	PCMHS Inattn	PCMHS Hyp	PCMHS Opp	PCMHS Conduct	BASC Inattn	BASC Hyp	BASC Agg*	BASC Conduct
PCMHS Inattn	1.00							
PCMHS Hyp	**.77** **p < .001**	1.00						
PCMHS Opp	**.60** **p < .001**	**.65** **p < .001**	1.00					
PCMHS Conduct	**.42** **p = .001**	**.43** **p = .001**	**.55** **p = .001**	1.00				
BASC Inattn	*.78* *p < .001*	.62 p < .001	.48 p < .001	.32 p = .015	1.00			
BASC Hyp	.74 p < .001	*.85* *p < .001*	.61 p < .001	.45 p < .001	**.76** **p < .001**	1.00		
BASC Agg*	.63 p < .001	.56 p < .001	*.69* *p < .001*	.65 p < .001	**.59** **p < .001**	**.67** **p < .001**	1.00	
BASC Conduct	.57 p = .002	.58 p = .001	.45 p = .001	*.38* *p = .046*	**.55** **p = .003**	**.71** **p < .001**	**.79** **p < .001**	1.00

Note. **Correlations in BOLD represent discriminant validity** and *correlations in Italics represent convergent validity.*

* The BASC does not have an oppositionality sub-scale, so the BASC Aggression subscale was substituted.

Table 18

Multi-Trait, Multi-Method Matrix for PCMHS and C-DISC-IV

	PCMHS Inattn	PCMHS Hyp	PCMHS Opp	PCMHS Conduct	DISC Inattn	DISC Hyp	DISC Opp	DISC Conduct
PCMHS Inattn	1.00							
PCMHS Hyp	**.77** **p < .001**	1.00						
PCMHS Opp	**.60** **p < .001**	**.65** **p < .001**	1.00					
PCMHS Conduct	**.42** **p = .001**	**.43** **p = .001**	**.55** **p = .001**	1.00				
DISC Inattn	*.82* *p < .001*	.67 p < .001	.42 p = .001	.28 p = .038	1.00			
DISC Hyp	.67 p < .001	*.88* *p < .001*	.58 p < .001	.38 p = .003	**.75** **p < .001**	1.00		
DISC Opp	.55 p < .001	.65 p < .001	*.81* *p < .001*	.58 p < .001	**.48** **p < .001**	**.68** **p < .001**	1.00	
DISC Conduct	.23 p = .085	.15 p = .259	.37 p = .005	*.40* *p = .002*	**.16** **p = .243**	**.16** **p = .225**	**.41** **p = .002**	1.00

Note. **Correlations in BOLD represent discriminant validity** and *correlations in ITALICS represent convergent validity.*

Table 19

Discriminant validity based on number of cross-trait correlations that were significantly smaller than within trait correlations

	CSI-4	ECI-4	BASC-2	C-DISC-IV
PCMHS Inattn	4 out of 6	3 out of 6	1 out of 6	3 out of 6
PCMHS Hyp	6 out of 6	6 out of 6	5 out of 6	5 out of 6
PCMHS Opp	6 out of 6	6 out of 6	N/A	4 out of 6
PCMHS Conduct	0 out of 6	0 out of 6	0 out of 6	0 out of 6

$p < .008$

VITA

Elizabeth K. Lefler

Candidate for the Degree of

Doctor of Philosophy

Dissertation: PSYCHOMETRIC PROPERTIES OF THE PRIMARY CARE MENTAL HEALTH SCREENER FOR EARLY IDENTIFICATION OF DISRUPTIVE BEHAVIOR DISORDERS IN 3- TO 8-YEAR-OLD CHILDREN

Major Field: Clinical Psychology

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Pages in Study: 86 Candidate for the Degree of Doctor of Philosophy

Major Field: Clinical Psychology

Scope and Method of Study: The Disruptive Behavior Disorders (DBDs), as defined in the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994), are Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD). It has been suggested that treatment outcomes for DBDs will be more positive if mental health professionals are able to intervene at the earliest signs of a disorder (Keenan & Wakschlag, 2002). However, it is uncommon for mental health services to be obtained, and when they are obtained it is not typically as part of a family's first line of care (Ringel & Sturm, 2001). It has been proposed that pediatricians and family practitioners, who have frequent, early contact with very young children, may be in the best position to detect early signs of DBDs and other mental health concerns (Huffman & Nichols, 2004). The Primary Care Mental Health Screener (PCMHS; Hartung & Lefler, 2009) may be an appropriate measure for use as a screener in pediatric offices. The current study measured the internal consistency reliability of the PCMHS, as well as its predictive validity by comparing the results of the PCMHS to a broader, evidence-informed psychological evaluation to ascertain the predictive validity of the PCMHS.

Findings and Conclusions: The PCMHS was found to have excellent internal consistency reliability for inattention, hyperactivity, and oppositionality, but not for conduct problems. Also, to test for predictive validity, Bayesian analyses were conducted to assess the sensitivity, specificity, negative predictive power (NPP), and positive predictive power (PPP) of scores on the PCMHS. Results were mixed. Finally, to test the convergent and discriminant validity of the PCMHS, a multi-trait/multi-method matrix was created to determine the correlations between constructs. Specifically, convergent validity was tested by correlating PCMHS subscale scores with similar constructs from different measures. All correlations were statistically significant. Conversely, discriminant validity was tested by comparing the correlations of similar constructs to the correlations of dissimilar constructs. Results were mixed. Implications, limitations, and future directions for research in primary care mental health screening are discussed.

ADVISER'S APPROVAL: Dr. Maureen Sullivan