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# ADHD CHILDREN AND MENTAL HEALTH SERVICE USE: MATERNAL DETERMINANTS

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ADHD CHILDREN AND MENTAL HEALTH SERVICE USE:  
MATERNAL DETERMINANTS

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THESIS

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A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in the  
College of Agriculture, Food, and Environment  
at the University of Kentucky

By

Katarina Krizova

Lexington, Kentucky

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2015

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## ABSTRACT OF THESIS

### ADHD CHILDREN AND MENTAL HEALTH SERVICE USE: MATERNAL DETERMINANTS

The current study investigated maternal determinants of mental health service use, namely, individual child therapy, among preadolescent children diagnosed with ADHD. The Behavioral Model of Health Care Utilization (Andersen, 2008) was used as a theoretical framework for the study. Data from the last three rounds of ECLS-K dataset were employed to test a longitudinal model using Bayesian analysis. Socio-demographic variables and maternal mental health were tested as exogenous variables and mother-child relationship variables, discipline variables, and perceived maternal concern about child's overall behavior and child's emotional symptoms were tested as intervening variables. Results showed that only maternal mental health remained in the model as an exogenous variable. The effect of mental health on child therapy was mediated by maternal aggravation and maternal concern about overall behavior in one path and by maternal concern about emotional symptoms in another path, suggesting that maternal mental health needs to be considered when attempting to understand help-seeking determinants. Both concern variables were found to have large direct effects on child therapy. The results of the current study showed the importance of maternal mental health and the importance of determinants related to mother-child relationship in a mother's decision to seek therapy for a child.

**KEYWORDS:** Mental health service utilization, parental determinants, parent-child relationship, Bayesian, Behavioral Model of Health Care Utilization

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## CHAPTER ONE

The current study examines maternal determinants of child mental health service use among preadolescent children with diagnosis of Attention Deficit/Hyperactivity Disorder (ADHD). The diagnosis of ADHD in children has risen significantly in last ten years and current estimate of ADHD prevalence in child population reaches 11%, according to the Center for Disease Control and Prevention (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015). Children diagnosed with ADHD experience a wide range of symptoms that often compromise their well-being, lead to personal discomfort, and interfere with their functioning and ability to perform in school settings (American Psychiatric Association, 2013). Although there is no known cure for ADHD, pharmacotherapy and behavior interventions, such as child psychotherapy, have been documented as successful in managing ADHD symptoms (Redja, 2012; Rowles & Findling, 2010). However, mental health services for children with ADHD and for children with a mental health disorder diagnosis in general remain underutilized (Merikangas et al., 2010). Considering that a large number of children suffer from a mental health disorder (U.S. Department of Health and Human Services, 1999), it is necessary to engage in a discussion about how to meet children’s needs for mental health treatment. One way to do so is to investigate what precedes child therapy use for children who have been utilizing mental health services. Since children do not make treatment decisions by themselves, in order to understand what leads to child service use the focus needs to be on parental determinants. This study considers child individual psychotherapy to be a mental health service and uses the terms *service use*, *service utilization*, and *child therapy* interchangeably.

The Behavioral Model of Health Care Utilization (Andersen, 2008), along with previous research findings, shapes the theoretical understanding of possible mental health service use determinants examined in this study. The Behavioral Model (Andersen, 2008) recognizes possible factors that predispose mental health service use, for example, age, sex, and race/ethnicity of a parent and a child (Tan & Marn, 2013; Thurston, Phares, Coates, & Bogart, 2014; Young, 2012), marital status (Banta et al., 2013), a parent's education (Gorman, 2006; Young, 2012), and a parental mental health (Burnett-Zeigler & Lyons, 2010), factors that enable service use, for instance, household income (Burnett-Zeigler & Lyons, 2010), and factors such as parental concern or parental perceptions of need (Pfefferle & Spitznagel, 2009) that highlight the need for service use. Moreover, this study recognizes parent-child relationship factors as possible predisposing factors (Pfefferle & Spitznagel, 2009).

By recognizing the socio-demographic variables that characterize the parents whose children utilize services, it will be possible to identify the parents whose children, despite apparent need, do not receive mental health treatment, and target these populations in order to increase the rates of child treatment utilization. In addition to socio-demographic characteristics, this study examines parent-child relationship variables, namely maternal warmth, maternal aggravation, and maternal discipline, and maternal mental health variable, and it argues that these variables influence parental perception of treatment need/parental concern and a subsequent decision to seek treatment. Identifying parent-child relationship variables might also contribute to a clinician's understanding of the path that leads the parent to seek help, and therefore more specific therapeutic interventions might be employed to establish therapeutic relationship and prevent premature dropouts from treatment. Olfson et al. (2009) has estimated client dropout from mental health services to be

approximately 19% for adults; however, since adults make treatment decisions for children, this rate might be relevant for child service use as well. This study contributes to current knowledge by investigating these influences of the parent-child relationship.

The data from the Early Childhood Longitudinal Study-Kindergarten class (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007) dataset are utilized by this study. To author's knowledge, this study is one of the few that uses longitudinal dataset to examine parental help-seeking determinants. A longitudinal model is tested employing Bayesian analysis in order to answer the following research question:

Are socio-demographic variables, maternal mental health, maternal discipline, and mother-child relationship variables related to child therapy use?

It is hypothesized that socio-demographic variables, maternal mental health, maternal discipline, and parent-child relationship variables have direct and indirect effects on child therapy use.

This thesis uses the three chapter manuscript format. Chapter one provides an introduction to the study, including background and justification along with an overview of the work. Chapter two is the manuscript which documents and reports the work of the study. Lastly, chapter three concludes the thesis by providing an overall summary of the work and results.

## CHAPTER TWO

### Child Mental Health Service Use: Maternal Determinants

It is estimated that four million children and adolescents are affected by severe symptoms of mental health disorders that interfere with their normal functioning at home, at school, and with peers (U.S. Department of Health and Human Services, 1999) and many more exhibit milder symptoms. One in five children younger than 18 years of age has a diagnosable mental disorder (New Freedom Commission on Mental Health, 2003), and half of lifetime cases of mental health disorders start by the age of 14 (Kessler et al., 2005). One diagnosis that has recently been on the rise among US children is Attention Deficit/Hyperactivity Disorder (ADHD). The rates of ADHD diagnosis have been reported to increase an average of approximately 5% per year from 2003 to 2011; current rates are estimated to be between 5% according to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*; American Psychiatric Association, 2013) and 11% as stated by the Center for Disease Control and Prevention (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015). Moreover, prevalence of ADHD has been found to differ by state; from 5.6% in Nevada to 18.7% in Kentucky, and by gender; boys are three times more likely than girls to be diagnosed with ADHD (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015). The Center for Disease Control and Prevention (CDC) (2015) estimates that 6.4 million children had been diagnosed with ADHD as of 2011.

According to the DSM-5 (American Psychiatric Association, 2013), children with ADHD exhibit persistent patterns of symptoms such as inattention and/or hyperactivity-impulsivity that result in interference with their functioning and development. The DSM-5 (American Psychiatric Association, 2013) describes the symptoms of inattention to be behavioral in nature, such as lacking persistence,

having difficulty sustaining focus, and being disorganized. Hyperactivity is understood as excessive motor activity manifested in inappropriate situations and impulsivity refers to “hasty actions that occur in the moment without forethought and that have high potential for harm to the individual“ (American Psychiatric Association, 2013, p.61). Common behaviors of children diagnosed with ADHD include failure to pay close attention to details, difficulty organizing tasks and activities, excessive talking, fidgeting, or inability to remain seated in appropriate situations. Such behaviors are disruptive for the child’s individual functioning as well as for the functioning of the child’s family. Furthermore, comorbidity with other disorders, such as oppositional defiant disorder and other conduct disorders, learning disabilities, anxiety, or depression is not infrequent (American Psychiatric Association, 2013).

The statistics and the nature of symptoms clearly show the need for specialized mental health services. There are multiple treatment options for children diagnosed with ADHD, more specifically, pharmacotherapy, behavioral intervention strategies, parent training, and school interventions. Even though a combination of pharmacotherapy and behavior therapy is recommended in most cases (American Academy of Pediatrics, 2011; “Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015), a recent study showed that the standard treatment recommendation of physicians for children with ADHD is pharmacotherapy at a rate of 95% (Redja, 2012).

Despite the availability, mental health services are often underutilized, and not exclusively by children diagnosed with ADHD. It has been reported that only one-fourth to one-half of children with a wide range of mental health disorders received therapeutic treatment (Merikangas et al., 2011). According to the Center for

Behavioral Health Statistics and Quality (SBHSQ) (2012), 63% of 12 to 17 year-olds diagnosed with major depressive disorder did not receive any treatment. Similarly, Merikangas et al. (2011) found that approximately two-thirds of adolescents suffering from mental disorders did not receive specialty mental health services, and an older report by the U.S. Department of Health and Human Services (1999) states that 4 out of 5 children with mental health problems did not receive any help. Youth with ADHD and with conduct disorders seem to have the highest rates of service utilization (47.7% and 46.4%, respectively), while the lowest treatment rates (32.2%) seem to be for youth with anxiety and panic disorders (Merikangas et al., 2010). A report prepared by the CDC (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015) states that the parents of 82.5% of children diagnosed with ADHD reported their children have received treatment. However, the report did not differentiate between pharmacotherapy and mental health therapy, and while pharmacotherapy rates for children 4-17 years of age increased by 28% between 2007 and 2011 (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015), mental health therapy rates are undetermined. It is important to note that taking medication has been reported as an efficient and by some even a sufficient treatment option for ADHD (The MTA Cooperative Group, 1999), although taking medication does not guarantee that child does not need psychotherapy intervention. With that in mind, it is possible that even medicated children underutilize mental health services which they might be in need for.

There are multiple reasons for low treatment utilization rates for children and adolescents. Several overlapping factors have been examined in the previous literature, such as age, sex, and race/ethnicity of the child, and parent’s age, parent’s education, and parent’s income (Banta, James, Haviland, & Andersen, 2013;

Barksdale, Azur, & Leaf, 2009; Breland et al., 2014). However, there is no consensus in the findings regarding parental, child, and other determinants. In general, pathways to child mental health treatment utilization regardless of diagnosis or manifesting problem are believed to be complex, influenced by multiple interrelated factors, and usually navigated by parents (Boulter & Rickwood, 2013).

Even though a large body of literature examining both children with and without diagnosis of ADHD has focused on the parental determinants of child mental health service use, distinct differences are noticeable in research. Previous studies have varied regarding terminology, examined aspects of parental help-seeking, applied theoretical models, methodology, sample size, methods of analysis, and findings.

### **Terminology**

The current study refers to child individual psychotherapy as mental health service use. Both *service use* and *service utilization* have been used in studies examining factors influencing access to child mental health treatment. In previous studies, either one term has been used consistently throughout a study (Tan & Marn, 2013) or both terms were used interchangeably. The latter seemed to be a more common occurrence (Banta et al., 2013; Barksdale et al, 2009; Breland et al., 2014; Burnett-Zeigler & Lyons, 2010; Williams, Lindsey, & Joe, 2011). Regardless of the term used, the studies focused for example on whether the child received mental health services (Tan & Marn, 2013), number of days of service use (Burnett-Zeigler & Lyons, 2010), different types of mental health treatment (Barksdale et al., 2009), and help-seeking attitudes and behaviors (Girio-Herrera, Sarno Owens, & Langberg, 2013).



Similarly, the terms used to name variables influencing child mental health service use have not been consistent. *Influences* and *variables* have been used by Cauce et al. (2002) and Zwaanswijk, Verhaak, Bensing, van der Ende, and Verhulst (2003), respectively, in their theoretical overviews. While the differences in terms might be a result of different types of analyses used, Breland et al. (2014) talked about *determinants*, Burnett-Zeigler and Lyons (2010) about *factors*, and Mendenhall (2012) about *predictors* while employing the same type of analysis, namely multivariate regression.

Moreover, multiple terms have been used to indicate children's issues related to mental health. Terms such as *child psychopathology* used by Young (2012) and measured by the Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001), *children with mental health needs* used by Williams et al. (2011) and assessed using information from administrative clinical diagnostics data, *child's mental health need* used by Villagrana (2010) and measured by CBCL (Achenbach, 1991), *child internalizing and externalizing behaviors* used by Turner and Liew (2010) and measured by Behavior Assessment System for Children-2 (Reynolds & Kamphaus, 2004), *adolescents with mental disorders* used by Tegethoff, Stalujanis, Belardi, and Meinschmidt (2014) and assessed using structured clinical interviews, *child behavioral and emotional problems* used by Pfefferle and Spitznagel (2009) and measured by CBCL (Achenbach, 1966), *at-risk kindergarteners* used by Girio-Herrera et al. (2013) and measured by Behavior Assessment System for Children-2 (Reynolds & Kamphaus, 2004), and *impairment in functioning* used by Cabiya et al. (2006) and measured by Children's Global Assessment Scale (Bird et al., 1996) were used to address the children whose parents engaged in help-seeking behavior. ADHD-related studies talked about *children with ADHD symptoms* as used by Gorman (2006)

and assessed by CBCL (Achenbach & Rescorla, 2001), *children at risk of ADHD* used by Sayal, Mills, White, Merrell, & Tymms (2014) and measured by the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1999), and *children with ADHD diagnosis* used by Mychailyszyn, dosReis, & Myers (2008) and based on the treating clinician's assessment. The differences in terms referring to child's emotional and behavioral issues point toward different conceptualization and operationalization of variables despite overlapping research foci of the studies.

### **The Focus of Previous Studies**

Much research has been conducted regarding parents seeking help for their children's issues related to mental health. There is consensus in the literature that parents are gatekeepers to their children's mental health treatment (Banta et al., 2013; Cho, Kim, Cho, & Shin, 2007; Weisz & Weiss, 1991). Likewise parental factors need to be considered when attempting to understand help-seeking determinants (Villagrana, 2010).

The focus of previous studies has been on child, parent, and contextual factors that influence children's access to mental health services. Among most commonly examined factors have been age, sex, and race/ethnicity of parent and child (Barksdale et al., 2009; Merikangas et al., 2010; Merikangas et al., 2011; Tan & Marn, 2013; Thurston et al., 2014; Young, 2012), area of residence (Banta et al., 2013), marital status (Banta et al., 2013), parent's education (Barksdale et al., 2009; Gorman, 2006; Young, 2012), income (Barksdale et al., 2009; Burnett-Zeigler & Lyons, 2010), poverty ratio (Merikangas et al., 2011), insurance (Burnett-Zeigler & Lyons, 2010; Pfefferle & Spitznagel, 2009), parent's physical and/or mental health (Burnett-Zeigler & Lyons, 2010; Breland et al., 2014; Pfefferle & Spitznagel, 2009; Sayal et al., 2014; Thurston et al., 2014; Villagrana, 2010), past parental service use (Barksdale et al.,

2009; Turner & Liew, 2010), parental perceptions of need/perceived strain/impacted functioning (Banta et al., 2013; Pfefferle & Spitznagel, 2009; Thurston et al., 2014), diagnosis (Merikangas et al., 2011), the severity of symptoms (Breland et al., 2014), and externalizing and internalizing problems (Young, 2012).

Further, studies have looked at parental attitudes towards mental health service use (Lindsey, Chambers, Pohle, Beall, & Lucksted, 2013), beliefs about mental health illness (Thurston et al., 2014), barriers to services (Girio-Herrera et al., 2013; Mukolo, Heflinger, & Wallston, 2010), and the importance of social support and social networks for help-seeking (Lindsey, Barksdale, Lambert, & Ialongo, 2010; Villagrana, 2010). Parental characteristics have also been examined for school mental health service use (Green et al., 2013; Tegethoff et al., 2014) and school service utilization have been found to serve as a guide to and a predictor of out-of-school services (Green et al., 2013; Tegethoff et al., 2014).

The factors influencing a child's access to mental health services have been investigated in, for example, depressed adolescents (Breland et al., 2014), among youth participating in a school-based mental health intervention (Burnett-Zeigler & Lyons, 2010), among urban, under-resourced Black youth (Lindsey et al., 2013), youth diagnosed with mood disorders (Mendenhall, 2012); children at high risk of ADHD (Sayal et al., 2014; Bussing, Koro-Ljungberg, Gary, Mason, & Garvan, 2005) and in children and youth in the child welfare system (Villagrana, 2010). Multiple older studies examined help-seeking determinants among children in foster care (Garland et al., 2000; James, Landsverk, Slymen & Leslie, 2004; McMillen et al., 2004; Zima, Bussing, Yang & Belin, 2000).

Variability in mental health services has been analyzed by, for example, race/ethnicity (Banta et al., 2013; Barksdale et al., 2009) and by socio-cultural

determinants (Young, 2012). A vast amount of studies employed quantitative analysis to examine the determinants of a child's mental health service use. The qualitative approach seemed to be utilized more by international researchers, such as by Boulter and Rickwood (2013) in Australia and by Guzder, Yohannes, and Zelkowitz (2013) in Canada. An example of the qualitative approach in the U.S. would be Lindsey et al. (2013) who used focus groups in order to understand the attitudes of parents and adolescents toward help-seeking.

### **Theoretical Models**

Multiple theoretical models, among these the theory of planned behavior (Turner & Liew, 2010), the unified theory of behavior (Lindsey et al., 2013), and the Youth Help-seeking and Service Utilization Model (Cauce et al., 2002) have been utilized in previous research to understand the factors influencing parental help-seeking.

As a comprehensive framework, the unified theory of behavior (Jaccard, Litardo, & Wan, 1999) was created in order to integrate a group of theories believed to be important in examining an individual's decision to engage in a target behavior. The unified theory of behavior (Jaccard, Litardo, & Wan, 1999) included theories from social and developmental psychology, such as social learning theory (Bandura, 1975) and the theory of reasoned action (Ajzen & Fishbein, 1980), and it has been used to understand the behavioral determinants in urban, under-resourced Black youth (Lindsay et al., 2013) and to inform a parent empowerment program for children's mental health service use (Olin et al., 2010).

According to the theory of planned behavior (Ajzen, 1991), three components need to be considered to determine one's intention to perform a behavior: attitudes toward the behavior, beliefs about what the norms are regarding the behavior, and

one's perception of their ability to perform the behavior. The theory has been employed, for example, to demonstrate the importance of attitudes towards help-seeking (Godin et al., 1992).

The Youth Help-Seeking and Service Utilization Model was developed by Cauce et al. (2002). It combined problem recognition, decision to seek help, and service support in order to understand help-seeking pathways for adolescents. As a model specifically focused on youth, it specified problem recognition to be an epidemiologically defined need and/or perceived need; the decision to seek help was understood as either a voluntary or coercive process; and service support included informal supports such as family and friends, collateral services such as school counselors, and formal mental health services such as psychologists. Thurston et al. (2014) have utilized this model to explore the relationship between parental recognition of child mental health problems and their decisions to seek help among Black and White parents.

The current study builds on the Behavioral Model of Health Care Utilization (Andersen, 1968; Andersen & Davidson, 2007; Andersen, 2008) to understand the parent-related factors contributing to a child's mental health service use. The Behavioral Model is a conceptual framework developed to identify determinants important to improve access to health care. Even though the Behavioral Model was developed using national health surveys (Andersen, 2008) and has primarily been applied to identify pathways to medical health care (Lyman, 2009), its components are useful for identifying important factors for mental health service use. More specifically, it has been employed to examine the variability in mental health services utilization by race/ethnicity among California children (Banta et al., 2013) and to

determine the predictors of service utilization among youth diagnosed with mood disorders (Mendenhall, 2012).

The Behavioral Model was developed in the 1960s and its original intention was to attempt to understand why families use health services (Andersen, 2008). Its most recent fifth version developed in the 2000s, combines four components into a comprehensive framework that seeks to address access to health care as a complex multidimensional phenomenon. The four components are contextual characteristics, individual characteristics, health behaviors, and outcomes. Further, the Behavioral Model organizes contextual and individual determinants affecting service utilization by aggregating them into three groups: predisposing variables, enabling variables, and need variables (Andersen & Davidson, 2007). The individual predisposing, enabling, and need variables help to guide this study's understanding of salient parent-related factors in help-seeking.

### **Predisposing Variables**

The predisposing variables might be on a child level, parent level, or family level and might include factors such as family composition, social structure, and health beliefs. Age, race/ethnicity, and sex are typically examined as predisposing variables on the child level and education on the parent level. Factors on the family level might include family size and stress the family experiences (Zwaanswijk, Van der Ende, Verhaak, Bensing, & Verhulst, 2003).

### **Enabling Variables**

Enabling variables are described as factors that contribute to the parent's ability to seek help (Andersen, 2008), such as social support, income, and health insurance, as well as the availability of professionals in the area. In addition to enabling variables, it is important to consider barrier variables and their contribution

to obstructions between parents and mental health services. The decision to seek help is partially influenced by the level of stigmatization parents attach to a visit to a mental health provider (Young, 2012), whether the stigma stems from their community perception, from their culture norm, or from their worry about being perceived as a failure. Especially stigmatization reinforced by religion and culture might encourage parents to seek help elsewhere, for instance from spiritual leaders or people considered “healers” in the community (Pate, 2010). Barriers to help-seeking were examined by several authors (Girio-Herrera et al., 2013; Mukolo, Heflinger, & Wallston, 2010). Geographic location of the mental health provider, travel time, transport means, and financial affordability of services are considered to be significant barriers. Similarly, health insurance might be an enabling factor or barrier. Insured children are more likely to get help than uninsured children (Lurie, 2009). Recent changes in insurance policies in the U.S. might enable more parents to seek treatment for their children.

### **Need Variables**

Need variables include health status and illness as reflected by symptoms, diagnoses, and level of impairment. Parental perception of treatment need was found to be an important indicator of utilization of mental health treatment (Banta et al., 2013; Mendenhall, 2012). Parents were more likely to seek services for children with behavior disorders such as ADHD and oppositional defiant disorder who express externalizing behaviors (Merikangas et al., 2011; Wahlin & Deane, 2012). It can be speculated that children behaving in a way that disturbs others in the household or at school are perceived to be in a greater need of help than children who are withdrawn and depressed who might often be misread as well-behaved and shy. Parental

perception of a child's behavior as normal or disrupted, therefore, contributes to the decision to seek help.

### **Child and Parental Factors Related to Child Mental Health Service Use**

To author's knowledge, not many recent studies focused on children diagnosed with ADHD or children at risk of ADHD; those that have examined mental health service use among ADHD children have reported diverse outcomes (Gorman, 2006; Scahill, 1997). Similarly, despite the fact that a large body of literature oriented on help-seeking examined child and parental characteristics influencing child mental health service use, no consistent findings can be identified across studies. However, it is important to keep in mind that studies have often varied in focus and, therefore, findings need to be considered within the conceptualization and methodology of previous studies.

### **Socio-demographic Determinants**

Though there is evidence that socio-demographic factors influence child mental health service use, the findings are not consistent. Age, sex, and race/ethnicity have been most commonly examined. However, it is important to note that there have been few studies focusing on the same socio-demographic variables for both parents and children (Banta et al., 2013). More commonly, the age, sex, and race/ethnicity were examined for children and other socio-demographic variables for parents. For example, Merikangas et al. (2011) investigated age, sex, and race/ethnicity for children and marital status and education for parents. Breland et al. (2014) analyzed only child's age, sex, and race/ethnicity and no parental socio-demographic factors.

Some studies suggest that older parents have been more likely to utilize services. Banta et al. (2013) reported the likelihood of treatment to be higher if parents were 50 years of age and older. Birth parents and foster parents have been



found to be older for children in the welfare system who used mental health services (Villagrana, 2012). Older parents have been more likely to report intentions to seek help; however, the intentions were examined using hypothetical vignette scenarios (Thurston et al., 2014). On the contrary, in the study that examined the number of days mental health services were used, there has been a four percent decrease in days of youth service utilization reported for every one year's increase in caregiver's age (Burnett-Zeigler & Lyons, 2010), suggesting that children of older caregivers use mental health services less than children of younger caregivers.

The child's age has been found to be significant in multiple studies utilizing large and/or national datasets. More specifically, older children have been associated with greater likelihood of mental health service utilization (Banta et al., 2013; Girrio-Herrera et al., 2013; Kataoka, Zhang, & Wells et al., 2002; Merikangas et al., 2010); however, there is no consensus regarding age and the likelihood of service utilization. Children in early adolescence and adolescence seem to be most likely to use services (Zwaanswijk, Verhaak et al., 2003). Merikangas et al. (2010) reported that children 12 to 15 years of age were found to be more likely to receive services; children older than 11 years of age were found to be more likely to use services in Banta et al.'s (2013) study, with odds increasing by 20% and 10% for White and Latino children, respectively. When considering different diagnoses, Merikangas et al. (2011) reported that 13.2% of 13- and 14-year olds suffering from anxiety received treatment compared to 25% of 17- and 18- year olds, suggesting that likelihood of treatment increases with age.

Higher treatment rates were also reported for children six years of age and older compared to preschool children (Kataoka et al., 2002). Similarly, Girrio-Herrera et al. (2013) who screened children in rural communities at kindergarten entry to

identify their risk status found no differences in help-seeking between parents of low and high-risk children, suggesting that parents may not be motivated to seek services for kindergarten-age children. It is important to note that Merikangas et al. (2010) used a national dataset, Banta et al. (2013) used a large longitudinal sample, and Kataoka et al. (2002) conducted secondary data analyses in three nationally representative household surveys, while Girrío-Herrera et al. (2013) analyzed a sample of almost 600 children.

Few recent studies examined the effects of sex of the parent on parental help-seeking. Caregiver sex has been found to influence the choice of mental health services utilized; both individual therapy and family therapy have been primarily used by youth of female caregivers; while youth of male caregivers have primarily used individual therapy (Burnett-Zeigler & Lyons, 2010). Pfefferle and Spitznagel (2009) examined the influence of maternal aggravation and maternal mental health suggesting that mothers play a bigger role in help-seeking than fathers. Similarly, Thurston et al. (2014) found that mothers were more likely to report intention to seek help for children when presented with hypothetical vignette scenarios.

Considering the sex of a child, Merikangas et al. (2010) reported that boys were more likely to receive services than girls; however, the findings, by diagnosis, revealed that girls were more likely treated for anxiety, panic disorder, and eating disorders, and boys for ADHD (Merikangas et al., 2011). On the other hand, Cabiya et al. (2006) examined sex differences for different types of mental health treatment among Puerto Rican youth and found that being a male increased probability of receiving any type of service; compared to females, males were 1.85 times more likely to utilize mental health services. However, several studies also reported no sex

differences in service use (Banta et al., 2013; Breland et al., 2014; Mendenhall, 2012; Zwaanswijk, Van der Ende et al., 2003).

The effects of race/ethnicity are similarly diverse for both parents and children. While some evidence suggests significant differences in mental health service use by child and parent race/ethnicity (Merikangas et al., 2011), other evidence does not (Breland et al., 2014; Merikangas et al. 2010; Villagrana, 2012; Pffeferle & Spitznagel, 2009). Young (2012) found that minority parents were not less likely to seek services for children than White parents. However, there have been race/ethnic differences found for other factors that influence parental help-seeking, for example, parent-identified need for treatment and perception of the problem severity, marital status, insurance (Banta et al., 2013), and type of diagnosis (Merikangas et al., 2011).

While parental marital status is considered to have an influence on child mental health service use (Merikangas et al., 2011), it has not been examined by many recent studies. Some studies included parental marital status as a component of socio-economic status; in that case, marital status was not found to be significant (Thurston et al., 2014). Marital status has been found to be a significant predictor of mental health treatment for adolescents with mood and substance use disorders; adolescents whose parents were previously married had higher rates of treatment utilization than adolescents with currently married or cohabiting parents (Merikangas et al., 2011). The importance of marital status has also been found to differ by race/ethnicity; marital status has been significant for Hispanic and White parents, however, not for African-American and Asian parents (Banta et al, 2013). While single parent status is considered to be a risk factor and it increased odds of mental health service use for

Whites and Latinos, Banta et al. (2013) states that it is unclear why it did not affect the rates of utilization for Asian and African American children.

Multiple studies have examined the effects of parental education; some of them not finding any effect of education on child mental health service use (Mendenhall, 2012; Merikangas et al., 2011; Villagrana, 2010). Other studies have found a significant positive association between higher education and a reduced likelihood of mental health service use for White and African American children (Banta et al., 2013; Barksdale et al., 2009). Also, parental education has been found to significantly predict number of days children utilized a mental health service (Burnett-Zeigler & Lyons, 2010). Children whose parents had less than a high school education were found to have the highest mean days of service use and children whose parents completed high school or some college had the lowest mean days of service use (Burnett-Zeigler & Lyons, 2010). Moreover, Young (2012) reported that lower parental education predicted more parents' reports of stigma and stigma was negatively associated with mental health service use; therefore, pointing out that parental education has an influence on a perceived stigma attached to mental health treatment.

Multiple studies examined the influence of household income on child mental health service utilization (Banta et al., 2013; Burnett-Zeigler & Lyons, 2010; Mendenhall, 2012; Thurston et al., 2014; Pfefferle & Spitznagel, 2009; Young, 2012). Household income and health insurance are considered to be factors that either create barriers or enable access to mental health services. It is believed that low income families, that often lack insurance coverage, experience significant financial barriers in help-seeking, despite greater need for services (Barksdale et al., 2009). However, multiple studies did not find income to be a significant factor in help-seeking

(Mendenhall, 2012; Villagrana, 2010). Burnett-Zeigler and Lyons (2010) reported that income has been related to number of days a child used mental health services. An annual income of less than \$14,999 was reported by caregivers of children who had the highest mean days of service and caregivers with an annual income of \$15,000–\$25,000 had children that had the lowest mean days of service.

### **Parental Mental Health**

Parental perception of treatment need has been identified as an important indicator of utilization of mental health treatment (Banta et al., 2013; Mendenhall, 2012). There is evidence that the mental health of a parent influences a child's development and behavior (Bibou-Nikou, 2004; Hancock, Mitrou, Shipley, Lawrence, & Zubrick, 2013; Sellers et al., 2013). In the help-seeking literature, parental mental health is believed to be related to parental appraisal of a child's behavior (Godoy, Mian, Eisenhower, & Carter, 2014) and problem recognition (Zimmerman, 2005). There has been a strong association found between parental experience with mental health illness, recognition of child's symptoms, and increased mental health service use (Zimmerman, 2005; Breland et al., 2014). Also, the experiences of stressful and/or traumatic life events have been found to contribute to mental health professional visits (Briggs-Gowan, McCue-Horwitz, Schab-Stone, Leventhal, & Leaf, 2000). Moreover, there is evidence that parents' previous experiences with mental health service use predicted service use for children (Turner & Liew, 2010).

However, the mechanisms through which parental mental health influences help-seeking has been explained differently in the literature. Poor past maternal mental health was found to be associated with increased maternal aggravation, which in turn was associated with mental health service use (Pfefferle & Spitznagel, 2009). It is possible that parents become more sensitized to the burden of mental illness when

they experience it themselves and therefore seek treatment for their children, as it was suggested by Zimmerman (2005) who has found that children of mothers with depressive symptoms were more likely to receive services. Another explanation might be that parents who use mental health services report lower stigmatization and more positive help-seeking attitudes as reported by Turner and Liew (2010). On the contrary, it was reported that parental psychopathology was found to lower parents' threshold for seeing the child's behavior as problematic (Verhulst & Van der Ende, 1997), indicating that parents with mental health issues are less likely to seek treatment.

The variability in findings might, perhaps, be attributable to differences in operationalization and measurement of parental mental health; for example, some studies inquired whether the parent had a mental health diagnosis (Breland et al., 2014), while others asked about experiencing mental health symptoms, such as depressive symptoms, during a certain period of time (Pfefferle & Spitznagel, 2009).

### **Parent-child Relationship: Aggravation, Warmth, and Discipline**

To author's knowledge, few family-related factors such as relationship quality between the parent and the child have been considered when examining factors related to a child's mental health service use. Pfefferle and Spitznagel (2009) investigated the role of maternal aggravation in help-seeking and found that higher maternal aggravation was significantly correlated with the mother's rating of child's behavioral and emotional problems. Maternal aggravation was measured by questions addressing parent-child relationship, such as, whether the mother felt angry with child and whether the child did things that the mother found bothersome (Pfefferle & Spitznagel, 2009).

According to Richards et al. (2014), ADHD might contribute to conflicted parent-child relationships. Some studies found mothers expressed lower maternal warmth toward children with ADHD compared to their siblings (Cartwright et al., 2011). Similarly, Richards et al. (2014) reported a negative association between maternal warmth and ADHD severity, although this finding did not seem to hold true longitudinally. In general, low parental warmth has been related to externalizing (McKee et al., 2008) and internalizing problems (Yap & Jorm, 2015).

Maternal warmth was also found to moderate the link between harshness of parental discipline and child's externalizing behaviors (Deater-Deckard, Ivy, & Petrill, 2006). It was found that harsh parental discipline, whether verbal or physical, was associated with adverse mental health outcomes and behavioral problems in children (Larzelere, 2000; Teicher, Samson, Polcari, & McGreenery, 2006), regardless of whether conducted by a mother or a father (Mackenbach et al., 2014). Harsh discipline was found to be strongly associated with parental anxiety and the child internalizing problems (Laskey & Cartwright-Hatton, 2009). Also, both maternal and paternal harsh discipline predicted parent-reported behavioral and emotional problems in children (Mackenbach et al., 2014).

### **The Current Study**

Despite a large body of research, the factors contributing to parental help-seeking remain diverse, suggesting that more investigation is needed. Given that children do not make their own treatment decisions, parental variables need to be considered when attempting to understand child mental health service use (Horwitz et al., 2012). Thus, the current study focuses on maternal determinants that have been identified as salient in the process of help-seeking by previous studies (Banta et al., 2013; Mendenhall, 2012). More specifically, the Behavioral Model (Andersen, 2008)

provides the current study with a theoretical framework and guides the understanding of examined maternal determinants: maternal mental health, socio-demographic variables, mother-child relationship variables, and discipline variables are considered predisposing variables, household income is considered an enabling variable, and concern about overall behavior and concern about emotional symptoms are considered need variables.

The current study investigates the following research question:

Are socio-demographic variables, maternal mental health, maternal discipline, and mother-child relationship variables related to child therapy use?

In line with previous research, it is hypothesized that the socio-demographic variables, maternal mental health, maternal discipline, and parent-child relationship variables have direct and indirect effects on child therapy use.

## **Method**

### **Overview of Previously Used Large Datasets**

The absence of empirical data that would examine the magnitude, course, and treatment patterns of mental disorders in a nationally representative sample has been addressed by numerous authors (Achenbach, 2005; Merikangas et al., 2010).

While large datasets have been used in several studies (Banta et al., 2013; Breland et al., 2014; Girio-Herrera et al., 2013; Lindsey et al., 2010; Villagrana, 2010), to author's knowledge, a handful of studies utilized national datasets during the past six years. The data from the U.S. National Comorbidity Survey Adolescent Supplement were utilized by Green et al. (2013), Merikangas et al. (2011), and Tegethoff et al. (2014). Barksdale et al. (2009) employed data from the National Evaluation of the Comprehensive Community Mental Health Services for Children



and Their Families Program. Pfefferle and Spitznagel (2009) used the National Survey of America's Families, Cuffe, Moore, & McKeown (2009) the 2001 National Health Interview Survey; and the basis of Tan and Marn's (2013) study was the National Survey on Adoptive Parents.

Besides the National Health Interview Survey that was used to track health status, health care access, and progress toward achieving national health objectives, the datasets used in previous studies were fairly narrow in their scope, i.e., aiming to answer a particular research question. While collecting other data as well, the main focus of these datasets was on a specific topic, for example, the evaluation of a community-based program (National Evaluation of the Comprehensive Community Mental Health Services for Children and Their Families Program), estimating the lifetime and current prevalence, age-of-onset distributions, course, and comorbidity of DSM-IV disorders in the child and adolescent years (U.S. National Comorbidity Survey Adolescent Supplement), tracking the effects of recent federal policy changes decentralizing many social programs from the federal government to the states (National Survey of America's Families), and exploring adoption experiences of American families (National Survey on Adoptive Parents).

With the exception of U.S. National Comorbidity Survey Adolescent Supplement, none of the national datasets were longitudinal. Banta et al. (2013) used longitudinal data; however, the data were not national. Similarly, longitudinal, but not national data were used by international researchers, such as Amone-P'Olak et al., (2010) in the Netherlands.

The current study examines the determinants of maternal help-seeking using a national dataset, the Early Childhood Longitudinal Study (United States Department of Education, Institute of Education Sciences, National Center for Education

Statistics, 2007), that provides longitudinal data for children followed from kindergarten to the eighth grade. For the purposes of the current study, the national dataset was reduced to include children diagnosed with ADHD, ADD or hyperactivity who have or have not been seen by a mental health professional.

### **Early Childhood Longitudinal Study Design**

Early Childhood Longitudinal Study – Kindergarten Class (ECLS-K) (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007) is a large, nationally representative survey of U.S. children enrolled in public or private kindergarten during the school year of 1998-1999. The data for ECLS-K (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007) were collected at seven different time points from 1998 to 2007. The time points were:

- Round 1 Kindergarten – fall 1998,
- Round 2 Kindergarten - spring 1999,
- Round 3 First Grade - fall 1999,
- Round 4 First Grade - spring 2000,
- Round 5 Third Grade – spring 2002,
- Round 6 Fifth Grade – spring 2004,
- Round 7 Eighth Grade – spring 2007.

Round and year of data collection with sample criteria can be found in Appendix A. Nationally representative sample of children for ECLS-K was selected for the base year of the study using multistage probability sample design. The three stages for sampling units (PSUs) in the base year were: 1) geographic areas consisting of counties or groups of counties, 2) schools within sampled PSUs, and 3) children within schools (Tourangeau, Nord, Lê, Sorongon, Najarian, & Hausken, 2009).

All cases that completed child assessment or parent interview in fall- or spring-kindergarten were eligible for the first-grade data collection; however, fall-first grade collection was limited to a 30% subsample. In the spring-kindergarten data collection, the sample was freshened to include first-graders who did not attend kindergarten and therefore did not have a chance to participate in base-year kindergarten sample (Tourangeau et al., 2009).

Base-year respondents and children from freshened first-grade sample were eligible for third-grade data collection. A subsampling of movers was used in third grade; children who belonged to the language minority group because their home language was non-English were followed at 100% if they moved between kindergarten or first grade and third grade.

In the fifth grade, differential sampling rates were established for movers in different categories. Children who moved from their original schools and children whose home language was not English continued to be subsampled. Children who moved out of the country, were deceased, whose parents refused to cooperate and who were eligible for fifth-grade collection but had neither first-grade nor third-grade data were excluded (Tourangeau et al., 2009).

All children of the sample were eligible for the eighth-grade sample after fifth grade regardless of their fifth-grade response status. Children who moved out of the country, were deceased, or moved to another school, and were not subsampled for follow-up in fifth grade were not eligible. There was no subsampling of movers for follow-up since subsampling of movers would result in substantially reduced sample size and precision of the estimates for eighth grade (Tourangeau et al., 2009).

For the purposes of current study, the original ECLS-K dataset was reduced to include parent data only. Moreover, only data from last three time points – Round 5,

Round 6, and Round 7 – were utilized. The parent data were obtained using parent interview instruments. Most of the parent interviews were conducted by phone using a computer-assisted interview (CAI). About 2.2% of interviews were conducted in person (Tourangeau et al., 2009).

### **Sample**

**ECLS-K dataset.** ECLS-K (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007) is a multisource survey that combined data gathered from parents, teachers, school officials, school administrative records, and children themselves in order to study children's development from kindergarten through high school. The ECLS-K data were combined into one K-8 public-use data file and one restricted-use data file (Tourangeau et al., 2009). The parent data from the publicly available dataset were used for the purposes of the current study; their use was approved by the University of Kentucky's Office of Research Integrity.

ECLS-K dataset originally consisted of 21,260 cases in the base year of data collection (fall 1998, kindergarten class) and 149 children were from the first-grade freshening process. The full sample data file has 21,409 child records; 8,706 cases participated in all five years (Tourangeau et al., 2009). For the purposes of this study, the dataset was reduced to 824 cases from the original sample.

**Sample reduction.** From the original public ECLS-K dataset, parent data were selected, and further reduced in following steps:

Step 1 - The parent dataset was reduced to include solely the cases that were interviewed in Round 7 about receiving individual therapy for a child since 2004. After the first reduction, 1061 cases remained. According to the Eighth grade questionnaire specifications (U.S. Department of Education.

Institute of Education Sciences, National Center for Education Statistics, 2007), the questions about receiving therapy were asked in cases where diagnoses of ADD, ADHD, or hyperactivity was indicated for a child in current or any of the previous rounds. Therefore, the final sample consisted of focal children with an ADD, ADHD, or hyperactivity diagnosis. The prevalence of ADHD in the sample for the current study is approximately 5%, which is consistent with prevalence indicated in the DSM-5 (American Psychiatric Association, 2013).

Step 2- The positions of a respondent and a focal child in household roster of remaining cases were checked for consistency and recoded where necessary in order to place a respondent as a first person in the roster and a focal child as a second person in the roster. There were 68 cases (6.4%) recoded in Round 7.

Step 3- The cases that included a respondent other than a mother figure were dropped from the sample. The decision to drop the cases was twofold:

- In the data as it was collected, the mother figure was the first preference for a respondent to the parent interview, followed by another parent or guardian and some other adult household member. According to the User's manual for Eighth grade, in 88% of the cases the child's mother figure was the respondent, followed by the child's father figure (9%), and some other adult (3%) in the original ECLS-K dataset of Round 7 (Tourangeau et al., 2009).
- In the sample of 1,061 cases that remained after the first reduction, 985 cases (92.8%) had a mother figure as a respondent, followed by 35 cases (3.3%) with father figure respondents, 29 cases (2.7%)

with grandmothers as respondents, and 11 cases (1%) with other family relative (grandfathers, aunts, uncles, sisters) respondents.

After the second reduction, there were 985 mother figure respondents left in the sample. Further, steps 2 and 3 were repeated for Round 6 and Round 5. Other than mother figure respondents and missing cases on the dependent variable were dropped in Round 6 and Round 5, leaving the sample with 913 cases and 826 cases, respectively. There were 50 cases (5.3%) recoded in Round 6 and 35 cases (3.8%) recoded in Round 5. Moreover, the dataset was screened to include only those cases with the same mother across all three rounds of data. Two cases were found to have a change of mother type between Round 5 and Round 6, the birth mother changed to a foster mother; therefore these two cases were dropped. Altogether, from the sample of 1,061 cases that was created after screening for eligibility to respond to the dependent variable, 237 cases (22.3%) were dropped. The remaining 824 cases became the final sample for the current study.

**The final sample.** The final sample (N=824) consists of mother figures of children selected to participate in ECLS-Kindergarten Class. The mother figure respondents were birth mothers (94.2%), adoptive mothers (4.7%), step-mothers (0.8%), foster mothers (0.1%), and one respondent refused to specify her relationship type (0.1%). In Round 7, the mother figures' reported ages ranged from 26 to 66 years of age (M=42.04, SD=6.096) and they were predominantly White (78.9%), followed by Hispanic (9%), Black or African American (6.9%), Asian (1.6%), and other (3.6%).

In terms of education, 7.2% reported to have completed the 12<sup>th</sup> grade and below, 24% had high school diploma, 36.7% reported to have completed vocational program or some college, 19.1% reported to have a bachelor's degree, and 13%

attended graduate school but had no degree, completed master's degree or earned doctoral or professional degree. Most of mother figure respondents were married (71.4%) or divorced (16.1%) in Round 7. Some were separated from their partners (4.4%), widowed (1.5%), or they reported never being married (6.7%).

The focal children were 566 boys (68.7%) and 258 girls (31.3%) and their mean age was 13.03 years ( $SD=0.465$ ). In terms of types of parents in the household, 57.2% focal children had biological parents in the household, 16.4% had one biological parent and one other parent (step-, adoptive, foster), 21.6% had a biological mother only, 4.6% had either two adoptive parents or one adoptive parent only, and 0.2% resided with unrelated guardians.

The respondents and their children resided in households with total income below \$25,000 in 19.4% of cases; 26% had total income between \$25,001 and \$50,000, 19.4% between \$50,001 and \$75,000, and 35.2% had income above \$75,001.

## **Measures**

**Variables.** The variables for this study were selected from the Parent Interview of ECLS-K conducted in Rounds 5, 6, and 7 during years 2002, 2004, and 2007, respectively. The Parent Interview scales of interest inquired about maternal mental health, maternal concern about child's behavior and emotional symptoms, and mother-reported quality of mother-child relationship. The variable table describing variables included in the model can be found in Appendix B.

**Exogenous variables.** Socio-demographic and economic characteristics of the household, and maternal mental health were included in the empirical model as exogenous variables. Exogenous variables were selected from Round 5. Since the dependent variable inquired about receiving mental health services since 2004 (i.e.,

since Round 6), Round 5 demographic variables and the measure of a mother's mental health were collected temporally prior to the dependent variable and are assumed to be pre-existing measures given that exogenous variables are determined outside the model. Additionally, it is argued that exogenous variables included in the current study are relatively stable over time—alternative models using socio-demographic variables from Rounds 6 and 7 made no difference in the solution of the final model.

**Age.** Age of the respondent was measured as a continuous variable and ranged from 26 to 66 years of age.

**Race.** The respondents were asked to indicate the race of the child. Dummy variable was created and coded 1=White and 0=other. Other constituted of the following responses: Hispanic, American Indian or Alaska native, Asian, Black or African American, Native Hawaiian or other Pacific Islander.

**Current marital status.** Respondents were asked to indicate their current marital status. Their responses were recoded as 1=*married* and 0=*not married*. Not married constituted of four categories, namely, separated, divorced, widowed, or never married.

**Education.** Education of the respondent was determined by asking the mother to indicate the highest completed grade or year of school. The level of education ranged from 1=*8th grade and below* to 9=*doctorate degree or professional degree*. Because of an apparent problem with missing data for mother's education, the dataset contained an imputed mother's education variable for each round of data (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007). The imputed mother's education variable for Round 5 was used in the study.



***Income.*** Income was derived from a question that assessed the total income of all persons in household over the past year, including salaries and other earnings ( $1 = \$5000$  and less to  $13 = \$200,000$  and more). Because of the inherent problem with missing data for income, the dataset contained an imputed household income variable for each round of data. The imputed household income variable for Round 5 was used in the study.

***Maternal mental health.*** Maternal mental health was assessed by a 12-item scale adapted from the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). The CES-D scale was developed to screen for depressive symptomatology in the general population. Maternal mental health measure consists of 12 items inquiring how parent felt about herself and her life during past week. The responses ranged from  $1 = \text{never}$  to  $4 = \text{most of the time}$ . An index, P5MOMMH, was created by summing the scores. Higher scores indicate more symptoms experienced during the past week. Examples of items are how often in the past week respondent “felt that you could not shake off the blues even with help from your family and friends” or “felt that everything you did was an effort “. The computed Cronbach’s Alpha for the measure was .894.

***Intervening variables.*** Intervening variables from Round 5 and Round 6 were used. Both Round 5 and Round 6 variables were collected prior to 2004, which is the point in time since when the mother indicated her child had received individual therapy.

***Mother-child relationship.*** The quality of mother-child relationship was assessed in Round 5 and it was measured using a self-report measure consisting of eight items. The measure was taken from the HOME Scale (Caldwell & Bradley, 1984) and it included items such as “Child and I often have warm, close times

together” and “I often feel angry with child“. Respondents’ responses were reverse coded and ranged from 1=*not at all true* to 4=*completely true*. Before factor analysis was conducted, the values for this variable were reverse-coded for the use. Factor analysis yielded two factors computed as P5MOMWRM ( $\alpha=.700$ ) for maternal warmth responses and as P5MOMAGGR ( $\alpha=.662$ ) for maternal aggravation responses.

***Maternal discipline.*** The maternal discipline measure, assessed in Round 5, inquired about what would the mother do to discipline the child if the child got so angry that he/she hit the mother. The measure was taken from the National Longitudinal Survey of Youth Cohort 79 (U.S. National Bureau of Labor Statistics, 1979). There were six items inquiring about appropriate methods of discipline, for example, take away a privilege or have child take a time out, and five items inquiring about harsh discipline methods, for example, yell at child or hit child back. The items were recoded as 1=*yes* and 0=*no* for the empirical model; appropriate discipline items and harsh discipline items were summed and there were two indices created, P5DISCIP and P5HARSH, respectively.

***Maternal concern.*** Two concern variables were used from Round 6. The respondents were asked to indicate whether they had any concerns about the child’s overall behavior and about the child’s overall emotional behavior. All respondents were asked about the child’s emotional symptoms; however, only respondents who indicated that the child does not behave as well as others on the previous item in the parent questionnaire were asked whether they were concerned about the child’s overall behavior. Therefore, if the mother indicated concern, the variable was coded as 1, and if no concern was indicated, the variable was coded as 0; in addition, when

the respondent reported in the previous variable a lack of need to be concerned, the variable about overall behavior was also coded as 0.

**Dependent variable.** The dependent variable was selected from the *Child Health and Well Being Scale* that is part of the Parent Interview Round 7 questionnaire. The dependent variable is dichotomous and indicate whether the child had received individual therapy since the 2004 round of data collection. The question was framed as follows:

“Individual therapy refers to a therapy/counseling situation where the focus of the treatment is on the individual. Therapy is likely to be provided by a mental health professional. Since spring 2004, has child received any individual therapy?”

The question was followed up by the inquiry about the location of mental health service provided, options being at school, out of school, or both, and about how many times has child seen the mental health professional.

## **Statistical Analysis**

### **Descriptive Characteristics**

Of 824 focal children in the sample, 253 children (30.7%), 182 boys and 71 girls (72% and 28%, respectively), were reported by their mothers to receive individual therapy. Twenty-seven children (10.7%) received therapy services at school, 140 children (55.3%) out of school, and 86 children (34%) were reported by mothers to receive therapy both at and out of school. Fifty-three children (21%) were reported to have five therapy sessions or less, 96 children (38%) had five to twenty sessions, 58 children (23%) had between twenty and fifty sessions, and 46 children (18%) had fifty sessions and more.

### **Bayesian Analysis**

Bayesian analysis using Amos 22.0 (Arbuckle, 2013) was employed to test the hypothesized direct and indirect effects of socio-demographic variables, maternal mental health, maternal discipline, and parent-child relationship variables on child's mental health service utilization, namely, on the child's use of therapy. In the Bayesian analysis, a path diagram is used to depict the hypothesized relationships among variables and the statistical significance of the coefficient associated with each path in the model is determined by statistical testing. The decision was made to use Bayesian analysis as an appropriate statistical method for testing of dichotomous dependent variables.

First, a longitudinal path model (Figure 1) was designed to depict the hypothesized relationships between exogenous variables (maternal mental health, respondent's age, child's race, respondent's current marital status, respondent's education, and household income), intervening variables (maternal aggravation, maternal warmth, harsh maternal discipline, adequate maternal discipline, concern

about behavior, and concern about emotional symptoms), and the dependent variable (utilization of child therapy services) across three time periods. The three points in time were Round 5 collected in 2002, Round 6 collected in 2004, and Round 7 collected in 2007. The full model represented all potential relationships between the variables of interest in order to test the hypotheses. The correlation of error terms for both concern variables was added to indicate that the unexplained variance for concern about overall behavior and concern about emotional symptoms of the child were correlated. Similarly, the correlation of error terms for maternal aggravation and harsh discipline as well as for maternal warmth and appropriate discipline were added.

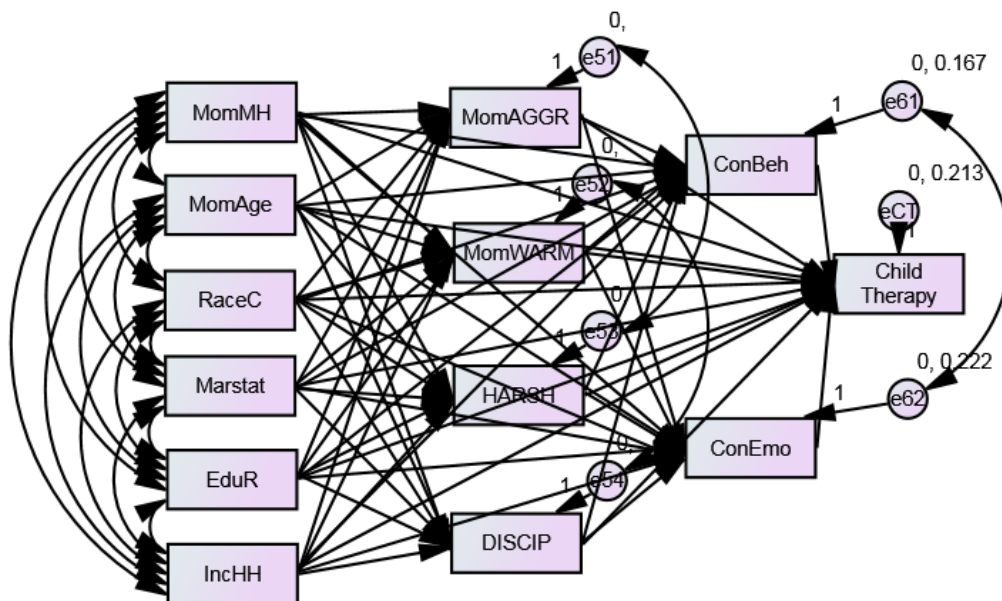


Figure 1. Full child therapy model.

Second, marital status, maternal education, and household income variables were used from Round 5. Additionally, these measures from Round 6 and Round 7 were tested in the full model to determine whether changes in these variables over

time had any effect on significant paths in the model. There were minimal differences between the variable frequencies over time (Appendix C) and no differences in tested models were found.

Third, the full model was reduced; the non-significant paths were removed from the model, as suggested by Byrne (2010), to determine the model that better describe the sample data. For the reduced model (Figure 2), maternal mental health remained as an exogenous variable, and maternal aggravation, concern about overall behavior, and concern about emotional symptoms remained as intervening variables.

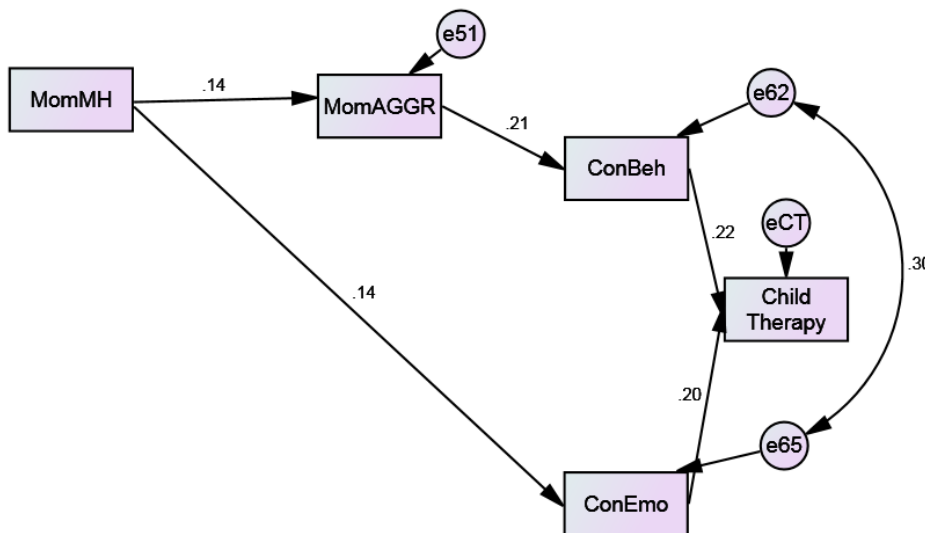


Figure 2. Reduced model with standardized paths.

## Results

In the full model, it was hypothesized that the paths from exogenous variables lead to intervening variables and paths from both exogenous and intervening variables lead to the dependent variable. Contrary to the hypothesis, data did not support hypothesized relationships for any of the exogenous socio-demographic variables, namely mother’s age, child’s race, mother’s current marital status, mother’s

education, and household income. Maternal mental health was the only exogenous variable that remained in the final model. Moreover, no significant direct paths were found for maternal warmth, harsh discipline, and appropriate discipline variables. The full model was reduced; only significant paths remained in the reduced model (Figure 2). The path from maternal mental health to harsh discipline was statistically significant; however, no paths from harsh discipline to other variables of interest remained in the model. Therefore, harsh discipline was dropped from the model.

Bayesian analysis was conducted to determine if the variables in the reduced model were significantly related to the child therapy use measure through direct or indirect paths. The standardized direct, indirect, and total effects found in the reduced model are presented in Table 1.

The findings showed that the largest direct effect on child therapy use was concern about overall behavior ( $\beta=.217$ ,  $p<0.05$ ), closely followed by the effect of maternal concern about emotional symptoms ( $\beta=.200$ ,  $p<0.05$ ). Both maternal concern about overall behavior and maternal concern about emotional symptoms were positively associated with child therapy use.

Only maternal mental health, as an exogenous variable, was found to have direct effects on intervening variables. Mental health had a positive direct effect on maternal aggravation ( $\beta = .140$ ,  $p<0.05$ ), suggesting that mothers that reported more depressive symptoms also reported higher aggravation in the mother-child relationship. Positive direct effect was found for mental health on concern about emotional symptoms ( $\beta = .139$ ,  $p<0.05$ ). Therefore, mothers with more depressive symptoms reported concern about the child's emotional symptoms.

From the intervening variables that remained in the reduced model, maternal aggravation had a positive direct effect on concern about overall behavior ( $\beta = .207$ ,

p<0.05). Mothers that reported feeling more aggravated in the mother-child relationship also reported having a concern about child’s overall behavior.

Two indirect effects of maternal mental health on child therapy use were found. The direct effect of mental health on maternal aggravation and the direct effect of maternal aggravation on concern about the child’s overall behavior resulted in the indirect effect of maternal mental health, through the mediating variables, on child therapy use (.029). Additionally, the direct effect of maternal mental health on concern about the child’s emotional symptoms resulted in indirect effect of maternal mental health on child therapy use (.034).

Table 1

*Direct, Indirect, and Total Effects for Reduced Child Therapy Model*

Outcome	Determinant	Causal Effects		
		Direct	Indirect	Total
MomAGGR	MomMH	0.140	-	0.140
ConBeh	MomMH	-	0.029	0.029
	MomAGGR	0.207	-	0.207
ConEmo	MomMH	0.139	-	0.139
Child therapy	MomMH	-	0.034	0.034
	MomAGGR	-	0.045	0.045
	ConBeh	0.217	-	0.217
	ConEmo	0.200	-	0.200



## Discussion

This study examined maternal determinants of mental health service use, namely individual child therapy, in a sample of ADHD children. There were 824 children diagnosed with ADHD; out of which 253 children (30.7%) were reported to have received individual therapy. Such treatment rate is lower than treatment rates commonly reported; Merikangas et al. (2010) stated treatment rate for ADHD children to be approximately 50%, while the CDC (“Attention Deficit/Hyperactivity Disorder, Data & Statistics,” 2015) estimated that 82.5% of children diagnosed with ADHD received treatment. However, treatment rates for ADHD usually do not differentiate between pharmacotherapy and behavior therapy, and it is unclear how many children from the current sample have been receiving pharmacotherapy as a sole form of treatment. The treatment ratio for boys and girls in this study was approximately 2.5:1, which corresponded with the ratio of boys and girls in the current sample.

Bayesian analysis was employed to test the hypothesized relationships in a longitudinal model; and non-significant paths were removed from the reduced model. In the reduced model, maternal mental health, maternal aggravation, concern about overall behavior, and concern about emotional symptoms were found to be the determinants of individual therapy for children. Two indirect paths leading to the child therapy measure were found; the effect of mental health on child therapy was mediated by maternal aggravation and concern about overall behavior in one path and by concern about emotional symptoms in another path.

Maternal mental health has been believed to influence a mother's perception of a child's behavioral and emotional problems (Pfefferle & Spitznagel, 2009). In this study, maternal mental health, operationalized as self-reported experiencing of past

week's symptoms of depression, was found to have an indirect effect on child therapy utilization. Negative outcomes of maternal depressive symptoms have been documented in the literature, with maternal depression being linked to externalizing and internalizing behaviors of children, such as anxiety, depression, attention deficit disorder, and oppositional defiant disorder (Meadows & McLanahan, 2007; Turney, 2011). In the current study, maternal depressive symptoms were associated with greater aggravation in the mother-child relationship, which is consistent with findings of Pfefferle and Spitznagel (2009). The symptoms of depression, that are often experienced as irritability, feeling of sadness, negative thoughts, loss of energy, insomnia, psychomotor agitation, indecisiveness, and diminished ability to think or concentrate (American Psychiatric Association, 2013), might contribute to a mother having lowered tolerance when it comes to a child's behavior; this might be especially true for children with ADHD who are more likely to be hyperactive, to have problems concentrating, and to act impulsively, and whose behavior is more often considered disturbing (Merikangas et al., 2011). A mother experiencing depressive symptoms might feel less energy to deal with her child's behavior, might find it more aggravating, and overall consider a child to be harder to care for. Maternal aggravation was further found to have a direct effect on maternal concern about overall behavior, suggesting that aggravation was linked with a child's externalizing behaviors. Maternal aggravation was also found to mediate the effect of mental health on child therapy. The ways in which aggravation influences concern deserves further study; however, it is possible that maternal aggravation is not necessarily related only to negative outcomes. If a child behaves in a disturbing way, a mother becomes aggravated, and she might recognize her feelings of aggravation towards child as a warning sign that a child's behavior is outside the norm, and therefore she might

become concerned. Pfefferle and Spitznagel (2009) suggest further exploring of specific components on maternal distress, not only to identify the means by which aggravation influences concern, but also to design a possible therapeutic intervention addressing mothers' aggravation. Related to this, a potential link to examine in future research would be the link between parental conflict, aggravation, and concern about child's behavior/need for mental health services, since depression has been associated with heightened risk of parental conflict and subsequent negative impact on children's emotional development (Du Rocher Schudlich, Papp, & Cummings, 2011).

Further, this study found that maternal concern about emotional symptoms was associated with child therapy; and there was a direct effect of maternal mental health on concern about emotional symptoms. As mentioned before, mothers that reported depressive symptoms are likely to experience significant emotional distress (American Psychiatric Association, 2013). Emotional distress might interfere with a mother's functioning and her emotional engagement with a child, leading a mother to worry about the possible impact of her depression on the child. Alternatively, mothers who experience depressive symptoms might be more sensitized to their children's emotional symptoms, as suggested by Zimmerman (2005) who has found that children of mothers with depressive symptoms were more likely to receive services.

The largest direct effects on child therapy were found to be concern about overall behavior and concern about emotional symptoms, respectively. It seems that regardless of whether it was the child's behavior or emotional symptoms that the mother worried about, the children received therapy treatment. Such finding confirms the consensus in the help-seeking literature that parents are gatekeepers to their children's treatment (Girio-Herrera et al., 2013). It is important to note that concern about a child, as it was operationalized in this study, is of a subjective nature, and

solely depends on a mother's perception and evaluation. This study examined maternal concern; several other studies investigated similar influences when researching parental perception of need, perceived strain, impacted functioning, or parental problem recognition (Banta et al., 2013; Pfefferle & Spitznagel, 2009; Thurston et al., 2014; Zimmerman, 2005). The link between parental concern and these other parental variables should be the subject of further research; however, it is likely that parental concern is present when there is a perceived need for services or when parents recognize their child's behavior or emotional experiencing as problematic.

The data utilized in this study did not support several hypothesized paths. Even though mothers suffering from depression have been described in the literature as failing to provide positive feedback and being less affectionate (Letourneau et al. 2012), the current study did not find any direct or indirect effects for maternal warmth. One possible reason might be that maternal expressed emotions towards children with ADHD, including maternal warmth, have been found to fluctuate over time (Richards et al., 2014). Similarly, there were no effects found for appropriate discipline. It seems that the lack of positive feelings towards child and the lack of warmth being present in mother-child relationship as well as the lack of appropriate discipline methods might not be sufficient to raise maternal concern; negative events must be present such as a child behaving in a way that a mother finds bothersome or worrisome.

Furthermore, despite previous findings that depression in parents might lead to parenting deficits (Lovejoy, Graczyk, O'Hare, & Neuman, 2000), such link was not confirmed by the current study, and harsh discipline methods were found to have no effect on child therapy. One possible explanation might be that harsh discipline has

been found to moderate the association between maternal warmth and externalizing behaviors (Lansford et al., 2015); a link that the statistical analysis employed in this study did not permit to test. There was also no effect found of harsh discipline methods on any of the concern variables in the current study, suggesting that a mother might be satisfied with the effects of her discipline methods on a child's behavior or that a mother's choice of harsh discipline methods is unrelated to the severity of a child's problem behavior.

Contrary to the expectations, none of the socio-demographic variables were found to have an effect on child therapy use. Previous findings considering socio-demographic determinants have been diverse; however, multiple studies reported significance of at least one socio-demographic factor when several were examined (Banta et al., 2013; Burnett-Zeigler & Lyons, 2010; Mendenhall, 2012; Merikangas et al., 2010; Pfefferle & Spitznagel, 2009). Sample characteristics of the current study might have influenced current results, since respondents in the current sample were predominantly White, higher educated, married females. However, the current results might also suggest that other factors, related more closely to actual interactions between the mother and the child, such as the mother reporting the child does things that really bother her (maternal aggravation) and the child behaving in a way that raises maternal concern, need to be considered more when attempting to understand child mental health service use determinants.

When considering the Behavioral Model of Health Care Utilization (Andersen, 2008) that guided the identification and understanding of potential child mental health service use determinants in this study, only maternal mental health and maternal aggravation were found to be significant as predisposing variables. Concern about behavior and emotional symptoms were found to be significant as need variables.

Income as the only enabling variable was not found to be significant. Such findings suggest that factors that predispose the use of therapy and perceived need of mental health services might play a bigger role in the decision to get help than potential enabling factors.

Results of the current study might have therapeutic implications. Notably, the indirect paths leading from maternal mental health to child therapy utilization may inform therapeutic practices of child mental health professionals by helping to understand the indirect effects that are not obvious when a child is brought to therapy by a mother. Child mental health professionals sometimes struggle to engage parents in the process of child's therapy treatment; the knowledge of the path that precedes parental help-seeking might provide a professional with cues of how to approach parents. Since parental concern was found to be important for child therapy utilization, focusing on parental concern might prove useful in dealing with parents in therapy. Since it was found that maternal aggravation leads to concern, focusing on maternal aggravation and targeting its source might help mothers to regain their feeling of competent parenting. Moreover, addressing maternal aggravation and possible maternal issues such as depression might help to improve mother-child relationship.

### **Limitations and Direction for Future Research**

This study is not without limitations. Sample in the current study consisted of mothers whose children were diagnosed with ADHD, ADD, or hyperactivity, therefore no generalizations to general population can be made. Moreover, the sample was predominantly White, better educated (approximately 70% reported to have completed some college or more) females that reported to be mostly married at the time of final round. Further research with more diverse sample is needed. Moreover,

the data used were based on self-report of mothers; the data did not include independent ratings of maternal mental health or parent-child relationship. The nature of the longitudinal data that did not provide the same question items in each of the investigated rounds and the statistical analysis used limited the current study to investigate linear links between variables. Further, the current study operationalized mental health as past week's experiencing of depressive symptoms; ideally, long-term measure of mental health symptoms would be used.

### **Conclusion**

Findings of the current study showed that maternal mental health, maternal aggravation, and concern about child's behavior and emotional symptoms are important determinants when it comes to mental health service use, namely child therapy, among children with ADHD. Notably, both concern about child's overall behavior and concern about emotional symptoms are of utmost importance; and these concerns are based on the mother's subjective perception of the child. Mental health was found to directly influence both maternal aggravation and concern about emotional symptoms and indirectly influence concern about overall behavior, suggesting that maternal mental health needs to be considered when attempting to understand child service use. However, more research is needed as to how exactly mental health and maternal aggravation influence concerns about the child's behavior and emotional symptoms and, ultimately, child therapy.

## CHAPTER THREE

This study investigated maternal determinants of mental health service use, more specifically, individual child therapy, among preadolescent children diagnosed with ADHD. The Behavioral Model (Andersen, 2008) was used to guide the theoretical framework of this study, and based on previous research, socio-demographic variables and maternal mental health were examined as possible exogenous variables. Moreover, the current study explored mother-child relationship variables, discipline variables, and perceived maternal concern about a child's overall behavior and about a child's emotional symptoms as possible intervening variables.

Data from the three points in time, 2002, 2004, and 2007, from ECLS-Kindergarten class dataset (United States Department of Education, Institute of Education Sciences, National Center for Education, 2007) were utilized in the current study; longitudinal nature of the data allowed to design a longitudinal model using Amos 22.0 (Arbuckle, 2013) and Bayesian analysis was employed to test the hypothesis.

The results showed that only maternal mental health remained in the model as an exogenous variable. The effect of mental health on child therapy was mediated by maternal aggravation and maternal concern about overall behavior in one path and by maternal concern about emotional symptoms in another path, suggesting that maternal mental health needs to be considered when attempting to understand help-seeking determinants. Both concern about the child's behavior and concern about the child's emotional symptoms were found to have large direct effects on child therapy.

The results of the current study showed the importance of maternal mental health in a mother's decision to seek help for a child, suggesting that maternal mental health influences how a mother feels about her child and whether she is concerned



about her child's emotional symptoms. Self-reported symptoms of depression, experienced for example as feeling lonely, sad, and like everything was an effort, were found to have a direct effect on maternal aggravation; mothers felt more bothered by their child's behavior when they experienced more depressive symptoms. Depressive symptoms are also likely to sensitize a mother to recognize a child's emotional symptoms as concern-worthy, which is in line with previous study by Zimmerman (2005). The mediation of mental health and maternal aggravation by concern about the child's behavior deserves further study. Furthermore, both concern about the child's behavior and concern about the child's emotional symptoms were found to be important determinants of child therapy, which supports previous findings that perceived need is an important determinant of mental health service use (Thurston et al., 2014).

Determinants that were not found to be significant are of equal importance. Socio-demographic measures were found to have no effect on child therapy by this study; therefore, other variables related to mother-child relationship need to be considered more when attempting to understand child mental health service use. Similarly, this study found significant predisposing and need variables, according to the Behavioral Model (Andersen, 2008), however, income as an enabling variable did not show any effect on service use, suggesting that perhaps predisposing and need variables need to become a focus for future study.

This study's limitations include a sample that is not representative of general population; measures that are based on self-report, mental health variable that captured only experiencing in past seven days, and statistical analysis that permitted to test only linear relationships.

This study contributes to the current knowledge by highlighting the importance of factors that are subjectively perceived by parents, such as mental health symptoms, aggravation with a child, and concerns about a child's behavior and emotional symptoms, compared to objective socio-demographic measures, as determinants of child mental health service use.

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APPENDIX A

Round and Year of Data Collection with Sample Criteria

Table A1

*Round and Year of Data Collection with Sample Criteria ("ECLS-K Study Overview", n.d., Tourangeau et al., 2009)*

Round	Grade / Year	Eligible Sample
Round 1 (Base year)	Kindergarten, Fall 1998	Full original sample (21,260) obtained using multistage probability sample design. In general, the target number of children sampled at any one school was 24.
Round 2	Kindergarten, Spring 1999	All base-year students plus an additional 1,426 children who were selected but did not participate in Round 1.
Round 3	First grade, Fall 1999	Subsample of schools selected by staged probability sampling at the regional and school levels. All participating children in selected schools were eligible for this round. A 50% subset of "movers" from these schools was also included.
Round 4	First grade, Spring 2000	All base-year students freshened with a sample of first graders (165) from the population of children who did not attend kindergarten in the U.S. during the 1998-1999 school year. 50% of base-year "movers" are included in this round of data collection.
Round 5	Third grade, Spring 2002	All students included in the first grade-spring sample.
Round 6	Fifth grade, Spring 2004	All students included in the third grade-spring sample. Children who moved between third and fifth grades were subsampled at a lower rate than earlier rounds. Sample size for Round 6 is 11,820 students.
Round 7	Eighth grade, Spring 2007	All students included in the fifth grade-spring sample.

APPENDIX B  
The Variable Table

Table B1.1

*Description of Exogenous Variables*

<b>Variables</b>	<b>Round</b>	<b>Description</b>	<b>Measure</b>
MomAge (P5HMAGE)	5	Respondent's age	26 – 66 (Actual age of respondent in years)
RaceC (RACEW)	5	Race of the child	1=White 0= Other (Black or African American, Hispanic, Asian, Native Hawaiian, other Pacific Islander, American Indian or Alaska native, more than one race)
Marstat (P5CURMrc)	5	Respondent's current marital status	1 = Married 0 = Not married (separated, divorced, widowed, never married)
EduR (W3MOMED)	5	Mother's highest education level	1=8th grade and below 2=9th to 12th grade 3=High school diploma or equivalent 4=Voc/tech program 5=Some college 6=Bachelor's degree 7=Graduate or professional school but no degree 8=Master's degree 9=Doctorate degree or professional degree

Table B1.1 (Continued)

<b>Variables</b>	<b>Round</b>	<b>Description</b>	<b>Measure</b>
IncHH (W3INCCAT)	5	Total household income over past year	1 = \$5,000 or less 2 = \$5,001 to \$10,000 3 = \$10,001 to \$15,000 4 = \$15,001 to \$20,000 5 = \$20,001 to \$25,000 6 = \$25,001 to \$30,000 7 = \$30,001 to \$35,000 8 = \$35,001 to \$40,000 9 = \$40,001 to \$50,000 10 = \$50,001 to \$75,000 11 = \$75,001 to \$100,000 12 = \$100,001 to \$200,000 13 = \$200,001 or more
Maternal mental health_ MomMH (P5MOMMH)	5	Respondent feels unusually bothered past 7 days Respondent has poor appetite Respondent can't shake blues Respondent has trouble focusing Respondent felt depressed Respondent felt like everything was an effort Respondent felt fearful Respondent's sleep is restless Respondent talked less than usual Respondent felt lonely Respondent felt sad Respondent could not get going	1 = Never 2 = Some of the time 3 = A moderate amount of the time 4 = Most of the time

Table B1.2  
*Description of Intervening Variables*

<b>Variables</b>	<b>Round</b>	<b>Description</b>	<b>Measure</b>
Maternal Warmth_MomWARM (P5MOMWRM)	5	<p>Child and I often have warm, close times together.</p> <p>Most of the time I feel that child likes me and wants to be near me.</p> <p>Even when I'm in a bad mood, I show child a lot of love.</p> <p>I express affection by hugging, kissing and praising child.</p>	<p>1=Not at all true</p> <p>2=Somewhat true</p> <p>3=Mostly true</p> <p>4=Completely true</p>
Maternal Aggravation_MomAGGR (P5MOMAGGR)	5	<p>Child does things that really bother me.</p> <p>I find myself giving up more of my life to meet child's needs than I ever expected.</p> <p>I often feel angry with child.</p> <p>Child seems harder to care for than most.</p>	<p>1=Not at all true</p> <p>2=Somewhat true</p> <p>3=Mostly true</p> <p>4=Completely true</p>

Table B1.2

<b>Variables</b>	<b>Round</b>	<b>Description</b>	<b>Measure</b>
Maternal Discipline (P5DISCIP)	5	Most children get angry with their parents from time to time. If child got so angry that (he/she) hit you, what would you do? Would you... ...have child take a time out? ...talk to child about what child did wrong? ...make child do some work around the house? ...make child apologize? ...take away a privilege? ...give a warning?	1=Yes 0=No
Harsh Discipline (P5HARSH)	5	Most children get angry with their parents from time to time. If child got so angry that (he/she) hit you, what would you do? Would you... ...spank child? ...hit child back? ...ignore child? ...make fun of child? ...yell at child or threaten child?	1=Yes 0=No
ConBeh (P6CONBrc)	6	“Do you have any concerns about child's overall behavior and relations to other children and adults?”	1=Yes 0=No
ConEmo (P6CONERC)	6	“Do you have any concerns about child's overall emotional behavior, such as anxiety or depression?”	1=Yes 0=No

Table B1.3

*Description of Dependent Variable of Interest from Round 7*

<b>Dependent Variable</b>		
<b>Variables</b>	<b>Description</b>	<b>Measure</b>
<b>Individual Therapy Indicator:</b>		
P7INDTHRc	“Since spring 2004, has child received any individual therapy?”	1 = Yes 0 = No

APPENDIX C

Mother's Education and Household Income Differences Across Rounds

Table C1

*Mother's Education*

Mother's highest education level	Percent			Difference in Percent (Max-Min Value)
	Round 5 (2002)	Round 6 (2004)	Round 7 (2007)	
8th grade or below	2,7	2,5	2,5	0.2
9th – 12th grade	5,3	5,1	4,7	0.6
High School				
Diploma/Equivalent	25,8	25,5	24,0	1.8
Voc/Tech program	6,2	5,9	6,1	0.3
Some college	30,1	30,0	30,6	0.6
Bachelor's degree	18,8	19,2	19,1	0.4
Graduate/professiona				
l school-no degree	2,7	2,9	3,4	0.7
Master's degree (MA, MS)	6,6	6,9	7,4	0.8
Doctorate or professional degree	1,8	1,9	2,2	0.4

Table C2

*Household Income*

Total household income over past year	Percent			Difference in Percent (Max-Min Value)
	Round 5 (2002)	Round 6 (2004)	Round 7 (2007)	
\$5,000 or less	2,1	2,1	1,5	0.6
\$5,001 to \$10,000	3,4	4,0	2,7	1.3
\$10,001 to \$15,000	4,9	5,5	5,1	0.6
\$15,001 to \$20,000	5,9	4,5	4,2	1.7
\$20,001 to \$25,000	5,8	4,7	5,9	1.2
\$25,001 to \$30,000	6,8	6,6	5,3	1.5
\$30,001 to \$35,000	4,6	7,4	5,0	2.8
\$35,001 to \$40,000	7,9	4,6	6,4	3.3
\$40,001 to \$50,000	10,4	10,7	9,2	1.5
\$50,001 to \$75,000	21,0	19,3	19,4	1.7
\$75,001 to \$100,000	13,7	14,9	16,3	2.5
\$100,001 to \$200,000	10,2	12,3	14,4	2.2
\$200,001 or more	3,3	3,5	4,5	1.2

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