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The Relationship Between Maternal Distress and Adjustment Problems in Adolescents with Attention-Deficit/Hyperactivity Disorder: An Examination of Family Routines and Communication as Moderators

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**THE RELATIONSHIP BETWEEN MATERNAL DISTRESS AND
ADJUSTMENT PROBLEMS IN ADOLESCENTS WITH ATTENTION-
DEFICIT/HYPERACTIVITY DISORDER: AN EXAMINATION OF
FAMILY ROUTINES AND COMMUNICATION AS MODERATORS**

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Psychology

by
Ryan Nicole Cummins
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ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common disorder in youth. The presence of comorbid internalizing and externalizing symptoms is a frequent occurrence in ADHD youth; comorbid symptoms are associated with poor adjustment into adolescence and negative trajectories into adulthood. There are many contributing factors in the development of comorbid symptoms (e.g., parental distress and family environment). Thus, it is important to understand the relationship between contributing factors and the ways in which family consistency helps to manage problem behaviors in adolescents with ADHD. One way to increase consistency is through the use of routines and positive communication. The present study examined whether the association between maternal distress and adolescent internalizing and externalizing symptoms was predicted by the presence of routines, and whether mother-adolescent conflict functioned as a predictor among associations as well. The sample consisted of 83 mother-adolescent dyads ranging from ages 11- to 17-years in a clinical sample of ADHD adolescents.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a developmental disorder characterized by symptoms of inattention, impulsivity, and hyperactivity (American Psychiatric Association, 2013). According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, three types of ADHD are differentiated with each diagnosis requiring significant impairment in daily functioning. ADHD, inattentive presentation, is marked by difficulties in sustained attention for a given task as well as increased disorganization. The hyperactive/impulsive presentation entails symptoms of overactivity, fidgeting, or poor inhibition (Nigg, 2001). The final type combines the two aforementioned types (e.g., inattention with hyperactive/impulsive symptoms). Each ADHD diagnosis requires the individual to experience six or more of the listed symptoms at a developmentally inappropriate level, with symptoms presenting for at least six months (American Psychiatric Association, 2013).

The course of ADHD symptom presentation, pervasiveness, and severity varies significantly in youth with ADHD (Gomez, Vance, Rashika, & Gomez, 2016). Adolescents diagnosed with ADHD often are underachievers academically (Wilson & Marcotte, 1996), and have difficulty getting along with family members (Johnston & Mash, 2001) and peers (DuPaul, McGoey, Eckert, & VanBrakle, 2001). In addition, ADHD adolescents often experience low self-esteem (Harpin, Mazzone, Raynaud, Kahle, & Hodgkins, 2016) and inadequate self-sufficiency (Barkley et al., 2006).

There is often a shift in childhood symptoms of ADHD and those manifested in adolescence. For example, hyperactive symptoms typically decline during adolescence (Barkley, 2015; Laufer & Denhoff, 1957; Solomons, 1965; Wasserstein, 2005). However, adolescents typically continue to have significant difficulties maintaining sustained attention and exhibiting

age appropriate self-control. Furthermore, difficulties of executive functioning often become problematic in adolescents given adults' expectations of greater independent functioning. Specifically, some of the executive functioning deficits include self-regulation, accurate self-appraisal, planning and initiating tasks, and affect regulation (Wasserstein, 2005).

During adolescence, poor self-regulation is associated with a host of skills necessary for age appropriate independent functioning. For example, ADHD adolescents often experience difficulties with appropriate self-care, time and money management, staying organized, and completing tasks efficiently (Barkley, 1998; Hinshaw et al., 1993; Wolf & Wasserstein, 2001). Another characteristic associated with executive functioning is emotion regulation, which is often poorly developed in adolescents with ADHD. This includes adolescents exhibiting low frustration tolerance, temper outbursts and mood lability, quickness to anger, and overall impatience (Wasserstein, 2005).

Given the deficits in self-regulation often seen in ADHD adolescents, they are at risk for developing significant conduct problems such as academic underachievement, rule infractions, and defiance (Qian et al., 2016; Steinberg & Drabick, 2015; Wehmeier, Schacht, & Barkley, 2010). As a result, parents often adopt a highly emotional, and authoritarian style of parenting that incorporates the excessive use of ultimatums (Deault, 2010; Modesto-Lowe, Chaplin, Godsay & Soovajian, 2014; Robin, 1990) and loss of privileges (McClelland & McKinney, 2016). In turn, a coercive interaction cycle forms, increasing conflict amongst family members (Mash & Barkley, 2003).

Comorbid ADHD and Externalizing Problems

Research findings indicate that externalizing symptoms experienced in childhood and adolescence are predictive for subsequent maladjustment later in life (Harrington et al., 1991;

Loeber and Hay, 1997; Prelow et al., 2007). For example, youth who exhibit significant externalizing behavior problems are at risk for academic underachievement and social rejection (Hinshaw, 1992; Szekely et al., 2016). Furthermore, it is estimated that approximately 50% of adolescents with ADHD meet criteria for Conduct Disorder or Oppositional Defiant Disorder (Barkley, 1998; Barkley et al., 1990; Biederman, Faraone, & Lapey, 1992; Chronis et al., 2007; Lahey, McBurnett, & Loeber, 2000).

Externalizing symptoms include a variety of conduct and impulse control problems such as defiance, rule infractions, and disrespectful behavior toward authority figures (Weis, 2013). Children and adolescents with ADHD and comorbid externalizing symptoms tend to show an overall increase in motor activity, distractibility, excessive talking, and irritability in comparison to youth with ADHD alone (Barkley, 2015). Further, children (ages 18 and younger) diagnosed with ADHD and Oppositional Defiant Disorder or Conduct Disorder experience more negative outcomes, including delinquency, school failure, automobile accidents, and peer rejection compared to non-disordered peers (Becker, Luebbe, & Langberg, 2012; Biederman, Newcorn, & Sprich, 1991; Harris et al., 2014).

Comorbid Internalizing Behavior Problems

Internalizing problems can be defined as the disturbance in a child's emotional functioning, and include symptoms of anxiety, depression, and somatic complaints (Weis, 2013). Among adolescents diagnosed with ADHD, approximately 22% also meet criteria for a depressive disorder (Bauermeister et al., 2007; Robin, 1998) and 25% for an anxiety disorder (Fonagy, 2015). Internalizing problems, such as symptoms of depression and anxiety, have been linked to negative outcomes in ADHD adolescents, including disorganization, poor time management, forgetfulness, low self-esteem, poor problem solving and task avoidance that

continues into adulthood (Aronen and Soininen 2000; Barkley, 2015; Woodward and Fergusson, 2001).

Adolescents with ADHD who experience significant symptoms of anxiety are more likely to have difficulty with daily functioning (e.g., getting out of bed, completing homework, etc.), experience diminished friendships, and have more negative relationships with their parents compared to those without ADHD (Armstrong et al., 2015; Pfiffner & McBurnett, 2006; Sciberras et al., 2014). Likewise, parents of children who are diagnosed with ADHD and an internalizing disorder report more parental stress (Jensen, Shervette, Xenakis, & Richters, 1993), anxiety (Pfiffner & McBurnett, 2006), and depression (Humphreys, Mehta, & Lee, 2012).

Maternal Distress

The definition and measurement of maternal distress varies considerably across studies. Researchers often define maternal distress as including symptoms of depression (Dipietro et al., 2008; Saurel-Cubizolles et al., 2007), anxiety (Dipietro et al., 2008), and stress (Emmanuel & St. John, 2010; Grazioli & Terry, 2000; Saunders et al., 2006). Maternal distress may be particularly prevalent in mothers of children with ADHD. For example, Barkley and colleagues (2015) reported that parents of children and adolescents with ADHD had higher scores on the Depression, Hostility, Anxiety, and Interpersonal Difficulties subscales of the Symptom Checklist-90 (SCL-90) than parents of youth without ADHD (Barkley et al., 1991; Barkley, Anastopoulos, et al., 1992; Murphy & Barkley, 1996).

Few studies have evaluated the relationship between maternal distress and psychological outcomes in ADHD youth. Compared to parents of youth with ADHD alone, parents of adolescents who also are diagnosed with Oppositional Defiant Disorder interact more negatively with their children (Cunningham & Barkley, 1979; Danforth, Anderson, Barkley, & Stokes,

1991; Mash & Johnston, 1982), experience greater maternal stress (Fischer, 1990), and psychopathology (Chronis et al., 2003). In a Taiwanese study with children and adolescents diagnosed with ADHD, mothers reported greater psychological distress when they lacked support from their family members. These mothers also demonstrated less affection, but more protection towards their children than non-ADHD controls. ADHD children and adolescents in this study were also less likely to interact with their parents, but had more reported problem behavior at home (Gau, 2007). Thus, maternal distress and psychopathology are associated with significant negative outcomes for youth with comorbid ADHD and conduct problems (Johnston & Mash, 2001), which include inflated self-views (Menon, Tobin, Corby, Hodges, & Perry, 2007; Walen et al., 2011) and socio-emotional behavioral challenges (Kjobli et al., 2014; Prady et al., 2016).

A number of studies have examined maternal variables that reduce the distress associated with parenting a child with ADHD. Vitanza & Guarnaccia (1999), for example, found that greater maternal self-esteem and social support was associated with less distress in mothers of ADHD adolescents. Additionally, Lovell et al., (2012) concluded that it is important to increase caregivers' perceived social support in order to reduce the stress associated with parenting an ADHD child.

Although many factors contribute to the development and maintenance of internalizing and externalizing behaviors in youth with ADHD, maternal distress and negative parenting practices have been linked to poor adolescent adjustment (Berg-Nielsen, Vikan, & Dahl, 2003; Bogels & Brechman-Toussaint, 2006; Ge, Best, Conger, & Simons 1996; Jones et al., 2008; Kim et al., 2003). Stability and consistency among families is important for adolescents with ADHD, especially those with comorbid behavior problems (Barry et al., 2009; Ivanova & Israel, 2006).

Intervention techniques, such as routines and positive communication, that help to manage behavior problems are, therefore, important to study and understand in relation to adolescent ADHD and comorbid symptomatology (Harris et al., 2014).

Routines

The presence of daily routines creates a predictable, structured environment for children and adolescents (Koblinsky, Kuvalanka, & Randolph, 2006). The literature attests to the importance of routines in youth with ADHD given the evident difficulties of self-regulation in these children. Routines can be defined as “observable, repetitive behaviors” occurring in the same order, at the same time or place, with direct involvement of the adolescent and an individual acting in a “supervisory role” (Systma, Kelley, and Wymer, 2001). Because routines increase familiarity of previous directives, the completion of an activity in the same time, place, and sequence is theorized to increase compliance (Systma et al., 2001). Examples of routines include morning and evening routines, completion of household chores, and homework (Systma et al., 2001).

The presence of routines has been associated with less internalizing and externalizing behavioral problems in children and adolescents (Harris et al., 2014; McLoyd, Toyokawa, & Kaplan, 2008). For example, Frick et al., (1999) reported that consistent parental discipline was negatively associated with the development of conduct problems in children. Routines also are associated with greater emotion regulation, compliance, and greater task completion (Pruit, 1998; Thompson & Meyer, 2009). Among inner-city adolescents with exposure to considerable community violence and other sources of stress, routines reduced the risk of developing externalizing behavior problems (Kliewer & Kung, 1998; Loukas & Prelow, 2004). Therefore, routines may create consistency that promotes healthier trajectories for adolescents.

The importance of household routines is well documented in the literature and is especially important for adolescents with ADHD. For example, Barkley (2015) discusses the difficulty for ADHD adolescents to exhibit age appropriate, rule-governed behavior and inhibition. Barkley and colleagues recommend that parents establish consistent routines in order to promote the development of rule-governed behavior (Barkley, 2015). In a longitudinal analysis, families of adolescents with problem behavior reported that more household routines were associated with positive outcomes. Such outcomes included improvements in interactions among the adolescent and associated family members, complex child behaviors such as showing a sense of humor, and a generalized reduction in problem behaviors in public places (Lucyshyn et al., 2015). Household routines help to establish better parent-adolescent interactions by increasing connectedness among family members, which is associated with greater self-esteem and perceived parental support (Day & Padilla-Walker, 2009; Sowislo & Orth, 2013).

ADHD has a strong biological influence (Barkley, 2006; Winstanley et al., 2006) in relation to externalizing symptoms (Eiraldi et al., 1997; Gadow et al., 2004). However, research supports numerous contextual factors that moderate this relationship. For example, Lanza & Drabick (2011) found that family routines moderated the externalizing symptoms exhibited by children and adolescents with hyperactive/impulsive symptomatology. Further, the authors found that children and adolescents who reported higher levels of family routines were rated as more compliant by their teachers, regardless of reported hyperactivity and impulsivity. Such research suggests a lack of family routines may increase the risk for developing ODD symptoms among children with ADHD (Lanza & Drabick, 2011).

Harris et al., (2014) hypothesized that family routines would moderate the relationship between parent distress and psychological symptoms in children with ADHD. Specifically,

Harris et al., (2014) evaluated the moderating effects of routines (e.g., household, homework, discipline, and daily living) on the relation between maternal distress and ADHD children's internalizing and externalizing symptoms.

In this study, participants included mothers of children ages 6-12 diagnosed with ADHD and hospitalized in an inpatient treatment program. Mothers completed questionnaires including the Child Behavior Checklist (CBCL), Child Routines Inventory (CRI), and the Hopkins Symptom Checklist (HSCL). Contrary to the hypothesis, the presence of routines did not moderate the relationship between maternal distress and child symptomatology. However, the authors found that more family routines were associated with fewer internalizing and externalizing symptoms. Specifically, household, homework, and discipline routine significantly predicted greater psychological adjustment, whereas daily living was not a significant predictor of symptomatology. A positive relation was found between parental and child adjustment (Harris et al., 2014). Although the study examined a clinical population of children with ADHD, the sample was likely skewed due to the necessity of hospitalization. Further, the study did not include adolescents, who are at greater risk than children for exhibiting psychological symptoms.

Communication

Family routines can be more effective when parents communicate positively with their children (Harris et al., 2014). Positive communication can be defined as talking openly and frequently, providing clear information, listening, and being responsive (Rodriguez, Nichols, Javdani, Emerson, & Donenberg, 2015). Positive parental communication is inversely related to adolescents' risky behavior, such as smoking, substance use, and unprotected sex (Blake et al., 2001; DiClemente et al., 2001). However, few studies have examined whether positive parent-adolescent communication is associated with decreased distress in parents of ADHD adolescents.

Negative, aversive parent-child interactions can exacerbate psychological distress, especially in parents of children and adolescents with ADHD (Ozturk et al., 2016; Dominick, Davis, Lainhard, Tager-Flusberg, & Folstein, 2007; Barkley, Anastopoulos, Guevremont, & Fletcher, 1992). Further, numerous studies have found that negative parent and adolescent communication is associated with conduct problems and depressive symptoms in ADHD adolescents (Edwards et al., 2001; Johnston, 1996; Nilsen et al., 2016). Wymbs et al., (2015) found that the parents of adolescents with comorbid ADHD and ODD symptoms reported more negative parenting and communication, especially when parents also exhibited ADHD symptoms. Similarly, Fletcher and colleagues (1996) found teenagers with comorbid ADHD/ODD had significantly higher rates of conflict with their mothers in comparison to teens with ADHD.

The Present Study

Research has documented the relationship between maternal distress, lack of family routines, and negative communication on children's internalizing and externalizing symptoms. However, relatively few studies have focused on the relationship between these variables and psychological outcomes in adolescence, especially those with ADHD. The current study extends the work of Harris et al. (2014) to include adolescents. Specifically, the study examines whether family routines and parent-adolescent communication moderate the relationship between maternal distress and internalizing and externalizing symptoms in adolescents with ADHD. Improving upon Harris et al., (2014), the study examines routines using the Adolescent Routines Questionnaire (ARQ), an empirically derived measure of routines specific to adolescents and, additionally, considers the impact of parent-adolescent communication.

In sum, the present study seeks to answer the following hypotheses:

1. The literature documents an association between maternal distress and child behavior problems (Jenkins & Curwen 2008; Kane & Garber, 2009; Pfiffner et al., 1999; Harris et al., 2014). Thus, it was hypothesized that maternal distress will be positively correlated with internalizing and externalizing behavior problems in adolescents with ADHD.
2. Consistent with Harris et al. (2014), it is hypothesized that more routines will be negatively correlated with psychological symptoms in adolescents with ADHD. In addition, the presence of poor communication and conflict will be positively correlated to internalizing/externalizing symptoms within this population.
3. Further, it is hypothesized that more routines will predict both internalizing and externalizing behavior. Specifically, routine subtypes (e.g., household routines) will serve as significant predictors of symptomatology in adolescents with ADHD (Harris et al., 2014).
4. The relationship between maternal distress and adolescent symptomatology will be moderated by routines. Similarly, maternal distress and adolescent internalizing and externalizing symptoms will be moderated by maternal-adolescent conflict.
5. Finally, it is hypothesized that the presence of routines and maternal-adolescent conflict will have an interaction effect on the relationship between maternal distress and behavior symptoms in adolescents with ADHD.

METHODS

Participants

The majority of study participants were recruited through siblings of undergraduate students seeking course credit within a university research system (N=86). Four additional participants were recruited based on a referral from primary care physicians or psychologists (N=4). To meet criteria for the study, participants were required to have a documented diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) (e.g., report). In addition, to be included in the study, adolescents had to be between the ages of 11 and 17 and have parent reported clinical elevations (T score of 65 or greater) on either Inattentive or Hyperactive/Impulsive scales of the Conners-3 as well as ratings of 6 or more inattentive and/or hyperactive/impulsive symptoms on the Disruptive Behavior Disorders Scale (DBD). Participants with Autism Spectrum Disorder (ASD) or intellectual disabilities were excluded from participation.

Of the initial sample including 87 mother-adolescent dyads, four participants were excluded due to incomplete data (over 10%). Expectation-maximization imputation was utilized for remaining participants whose data contained missing responses (Tabachnick & Fidell, 2012). Table 1 presents the demographic characteristics of the parent participants. As seen in Table 1, the final sample of participants included 83 mother-adolescent dyads. The mothers' mean age was 46.75 ($SD=5.13$) and ranged from 32 to 58. The majority of the respondents were Caucasian (92.87%), followed by African American (3.6%), and Hispanic/Latino (3.6%). Mothers' education level consisted of standard college graduate (54.2%), some college (28.9%), post-college advanced degree (12%), and high school graduate/GED (4.8%). Participants' mean household annual income was between \$75,000- \$99,999 ($SD=1.07$). The majority of parents were married (84%).

Demographic information for adolescent participants can be found in Table 2. As seen in Table 2, adolescent participants were between the ages of 11 to 17 ($M=14.54$, $SD=2.08$) and the

Table 1. Demographic characteristics of parent participants

	Total Sample	
	<i>N</i> = 83	
	Frequency/Mean	Percentage/(SD)
Age (years)		
Mean	46.75	(5.13)
Race/Ethnicity		
Caucasian/White	77	92.8%
African American/Black	3	3.6%
Hispanic/Latino	3	3.6%
Education Level		
High School Graduate/GED	4	4.8%
Some College	24	28.9%
Standard College Graduate	45	54.2%
Post-College Advanced Degree	10	12.0%
Household Annual Income		
\$25,000-\$34,999	3	3.6%
\$35,000-\$49,999	3	3.6%
\$50,000-\$74,999	10	12.0%
\$75,000-\$99,999	13	15.7%
\$100,000+	53	63.9%
Marital Status		
Married	70	84.3%
Divorced	6	7.2%
Widowed	2	2.4%
Single	1	1.2%
Separated	1	1.2%
Relation to Adolescent		
Biological Mother	81	97.6%
Adoptive Mother	2	2.4%
Number of Adults in Home		
Mean	2.11	(0.58)

majority were male (61%). Participants were racially and ethnically similar to their parents. The adolescent participants reported a grade point average of 2.92 for math ($SD=1.09$), 3.07 for

science ($SD=0.91$), and 3.04 for English ($SD=1.00$). At the time of data collection, 71% of participants were prescribed medication for ADHD symptoms.

Table 2. Demographic characteristics of adolescent participants

	Total Sample	
	<i>N</i> = 83	
	Frequency/Mean	Percentage/(<i>SD</i>)
Age in years		
Mean	14.54	(2.08)
Grade level in school		
Mean	9.20	(2.10)
Gender		
Male	51	61.4%
Female	32	38.6%
Race/Ethnicity		
Caucasian/White	76	91.6%
African American/Black	2	2.4%
Hispanic/Latino	3	3.6%
Mixed Race	2	2.4%
Average GPA		
Math	2.92	
Science	3.07	
English	3.04	
ADHD Medication		
Yes	59	71.1%
No	24	28.9%

Procedure

Following Institutional Review Board approval (IRB #3832), mother-adolescent dyads were recruited and briefed on the purpose of the study. Data collection occurred after obtaining parental consent and adolescent assent. The majority of the participants were recruited via their college-age siblings through an online research management system (SONA). Undergraduate students earned extra credit for recruiting their mother and ADHD sibling for participation. The additional four participants were recruited at an outpatient clinic and had been recently been diagnosed with ADHD. These participants were provided packets to take home and mail back.

All adolescent participants completed the Youth Self-Report (YSR), Adolescent Routines Questionnaire: Self-Report (ARQ:SR), and Conflict Behavior Questionnaire (CBQ-20). Mother participants completed a packet containing a demographic questionnaire, Disruptive Behavior Disorders Scale (DBD), Conners-3 Parent Short Form, Brief Symptom Inventory (BSI-18), Child Behavior Checklist (CBCL), Adolescent Routines Questionnaire: Parent Report (ARQ:PR), and Conflict Behavior Questionnaire (CBQ-20). Completion of questionnaires took approximately 25 minutes. For the 86 participants recruited from their sibling, all parent participants were called to verify participation.

Measures

Mother Questionnaires

Demographics Questionnaire. Mothers completed a demographic questionnaire regarding the age, occupation, race, marital status, household income, and education level for all adults living in the home. Mothers also provided information about the participating adolescent. Please refer to Appendix A to view the demographics questionnaire.

The Disruptive Behavior Disorders Rating Scale (DBD; Pelham et al., 1992). The DBD is a 45 item rating scale that assesses relative DSM-IV symptoms of ADHD, CD, and ODD. Parents completed the scale by indicating the degree to which each DSM-IV symptom of behavior problems are present. Symptoms of ADHD, ODD, and CD that are rated from “pretty much” or “very much” are considered present (Pelham et al., 1992). The scale has consistently been shown to have good reliability with coefficient alpha ranging from .80 to .91 (Lorna & Kamal, 2011; Pelham et al., 1992). The DBD served as a categorical measure of presence versus absence of symptom for diagnostic criteria of ADHD. To be included as a participant, the parent

must have endorsed at least 6 out of 9 inattentive and/or hyperactive/impulsive symptoms.

Coefficient alpha for the current study was .88.

Conners 3rd Edition Short Form: (Conners-3(S): Parent; Conners, 1997). Derived from the Conners' Rating Scales, the Conners-3 Short Form was used to measure symptom severity and serve as a secondary source of verification of the diagnosis of ADHD. The Conners Parent Report consists of 45 items, yielding five factors: Learning Problems, Aggression, Hyperactivity/Impulsivity, Peer Relations, and Executive Functioning. Inattention and Hyperactivity/Impulsivity scales were used in the study. These scales demonstrate good internal consistency with coefficient alpha of .93 and .94, respectively (Dunn, 2009). For the current study, coefficient alpha was .90 for the Inattention scale and .88 for the Hyperactivity/Impulsivity scale.

Achenbach System of Empirically Based Assessment; Child Behavior Checklist: (ASEBA: CBCL; Achenbach et al., 2003). The CBCL is a parent report measure that is an integrative part of the Achenbach System of Empirically Based Assessment. The CBCL is completed by parents regarding their children. The measure consists of 113 items and has broad band internalizing and externalizing problem scales, as well as the following factors: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking, and Aggressive Behavior. The CBCL demonstrates strong internal consistency with coefficient alpha ranging from .55 to .90 (Flanagan, 2004).

Brief Symptom Inventory 18 (BSI 18; Derogatis, 2001). Derived from the Symptom Checklist-90 (SCL-90; Derogatis, Rickels, & Rock, 1976), the BSI includes 18 items that measure psychological distress, based on the individual's self-report of symptoms. Mothers rated

their level of distress over the past week on a 5-point Likert-type scale ranging from 0 (not at all) to 4 (extremely). Three symptom dimensions are accounted for: Somatization, Depression, and Anxiety, as well as a Global Severity Index (GSI). The BSI 18 has acceptable internal consistency and reliability (Derogatis, 2001). The GSI served as the measure of maternal distress for the current study and the coefficient alpha was .93.

Adolescent Routines Questionnaire: Parent-Report (ARQ: PR; Piscitello, Cummins, Kelley, & Meyer 2017). The AQR:PR measures different routines that adolescents engage in, as well as how frequently those behaviors occur (“Never” to “Nearly Always”). The parent version of the ARQ consists of 49-items, a five-factor solution, and items paralleling an adolescent version. The ARQ:PR served as the measure of routines, and includes scales of Household, Time Management, Extracurricular, Communication, Hygiene routines and an overall total score. Specific scales used in the study were Household, Time Management, and Communication scales. The coefficient alpha for the five factors of the study was .82 and estimated reliability of the scales ranged from .58 to .80. For the current study, coefficient alpha for total routines was .91. In addition, coefficient alpha for Household, Time Management, and Communication scales were .74, .82, and .68, respectively.

Conflict Behavior Questionnaire Short Form. (CBQ-20; Prinz, Foster, Kent & O'Leary, 1979; Robin & Foster, 1989). The CBQ consists of 20-items measuring communication and conflict experienced within the context of a family. This measure was derived from a 75-item long form with two separate scores of high internal consistency: dyadic interactions and other's behaviors (Prinz et al., 1979). According to Prinz et al. (1979), items are first rated as either “true” or “false,” where a high score represents high levels of conflict. The

CBQ-20 yields a single score, that correlated at .95 with scores from the longer version.

Reliability of the CBQ of the current study includes coefficient alpha of .54.

Adolescent Questionnaires

Achenbach System of Empirically Based Assessment; Youth Self-Report: (ASEBA: YSR; Achenbach et al., 2003). The YSR is a self-report measure that functions as an integrative part of the Achenbach System of Empirically Based Assessment. The YSR is to be completed by adolescents ages 11-18. Containing 112 items, the YSR has broad band externalizing and internalizing problems, and the following subscales: Withdrawn/Depressed, Anxious/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, and Rule-breaking and Aggressive Behavior. The YSR demonstrates good internal consistency ($\alpha=.89$; De Los Reyes et al., 2011) for youth report (Flanagan, 2004).

Adolescent Routines Questionnaire: Self-Report (ARQ: SR; Piscitello, Cummins, & Kelley, 2017). The ARQ:SR measures different routines that adolescents engage in, as well as how frequently those behaviors occur from 0 (“Never”) to 4 (“Nearly Always”). Items are rated based on behaviors experienced by the adolescent in the last month. Examples of items include, “I leave for school on time” and “I eat a snack after school.” The ARQ:SR includes an adolescent version consisting of 49-items and a four-factor solution, including parallel items to the parent version. As mentioned above, initial validation of the measure demonstrated good internal consistency. For the current study, coefficient alpha for total routines was .92.

Conflict Behavior Questionnaire Short Form. (CBQ-20; Prinz, Foster, Kent & O’Leary, 1979; Robin & Foster, 1989). The CBQ consists of 20-items measuring communication and conflict experienced within the context of a family. Items include questions such as, “My mom doesn’t understand me.” As stated above, items are rated by the adolescent as

either “true” or “false,” where a high score represents high levels of conflict. The CBQ-20 yields a single score correlating at .94 with scores from the longer version. Test-retest reliability includes a range from .37 to .84 for adolescents (Soltys & Littlefield, 2008). The coefficient alpha for the current study was .51.

RESULTS

Descriptive Statistics

Descriptive statistics were examined using SPSS, Version 24. Tables 3 & 4 provide the means, standard deviations, and possible ranges of study variables completed by the mother and adolescent participants, respectively. Scores on the Internalizing and Externalizing scales were interpreted in terms of T scores, with subclinical scores ranging from 65-69 and clinical scores in the 70+ range. Raw scores were used in the analyses for the measures of distress, routines, and conflict. Possible ranges of variables were included in Tables 3 & 4 for ease of interpretation.

Table 3. Descriptive statistics for mother variables

Variable	Mean	SD	Possible Range
1. CBCL Internalizing	53.47	13.48	0-100
2. CBCL Externalizing	54.75	12.07	0-100
3. GSI	8.67	11.18	0-72
4. ARQ Total	129.23	25.40	0-196
5. ARQ Household	5.51	3.21	0-16
6. ARQ Extracurricular	12.75	5.14	0-20
7. ARQ Hygiene	16.10	3.92	0-20
8. ARQ Time Management	20.29	6.99	0-36
9. ARQ Communication	8.80	2.99	0-12
10. CBQ Total	7.53	6.18	0-20

Higher scores are indicative of a higher degree of the continuous variable. Mothers' scores on the Global Severity Index (GSI) were spread across a wide range (0-52), with a mean of 8.67 ($SD=11.18$). As such, natural log transformation of the GSI was utilized to improve normality ($M=1.66$, $SD=1.15$).

Mother-Reported Variables

Table 3 presents descriptive statistics for mother-reported study variables. The majority of mother participants reported scores of adolescent internalizing ($M=53.47$, $SD=13.48$) and externalizing ($M=54.75$, $SD=12.07$) symptoms that were in the average range. Mother-reported

ARQ scores of total routines produced a mean score of 129.23 (SD=25.40). Further, mother's report of adolescent routine was broken down by household (M=5.51, SD=3.21), extracurricular (M=12.75, SD=5.14), hygiene (M=16.10, SD=3.92), time management (M=20.29, SD=6.99), and communication (M=8.80, SD=2.99) subscales. The mean of overall conflict reported by mothers was 7.53 (SD=6.18).

Table 4. Descriptive statistics for adolescent variables

Variable	Mean	SD	Possible Range
1. YSR Internalizing	51.74	13.23	0-100
2. YSR Externalizing	55.45	11.91	0-100
3. ARQ Total	131.72	25.70	0-196
4. ARQ Extracurricular	13.64	4.68	0-20
5. ARQ Hygiene	13.52	2.80	0-16
6. ARQ Time Management	17.55	6.10	0-32
7. ARQ Communication	8.48	2.87	0-12
8. CBQ Total	5.00	5.05	0-20

Adolescent-Reported Variables

Table 4 presents descriptive statistics for adolescent-reported study variables. Similar to mother informants, adolescents reported levels of internalizing (M=51.74, SD=13.23) and externalizing (M=54.75, SD=12.07; M=55.45, SD= 11.91) symptoms that were well within the average range. Adolescent report of routines included extracurricular (M=13.64, SD=4.68), hygiene (M=13.52, SD=2.80), time management (M=17.55, SD=6.10), and communication (M=8.48, SD=2.87) routines. Mean scores of total adolescent-reported routine was 131.72 (SD=25.70). Self-report scores of conflict with their mothers produced a mean score of 5.00 (SD=5.05) for the sample. This report is indicative of poor communication between adolescents and their mothers.

Correlational Analyses

Correlational analyses were performed to assess the relationship between all variables. Results of the bivariate correlational analyses are displayed in Table 5 & Table 6 for mother and adolescent participants, respectively. As seen below, gender was not significantly related to any other variable for either the adolescent or mother. Extracurricular and hygiene routines did not significantly correlate with either internalizing or externalizing symptoms and, therefore, were excluded from further analyses.

Maternal Correlational Analyses

As seen in Table 5, the mothers' internalizing and externalizing symptom scores were negatively correlated with total routines ($r = -.401, p < .01$; $r = -.464$, respectively: $p < .01$). These relationships indicate that increased adolescent internalizing and externalizing symptoms associated with fewer total routines. Maternal report of adolescent internalizing symptoms positively correlated with total conflict ($r = .431, p < .01$), and maternal distress ($r = .571, p < .01$). Additionally, mother report of adolescent externalizing symptoms correlated positively with conflict ($r = .681, p < .01$). This indicates that increased adolescent internalizing and externalizing symptoms associated with higher levels of total conflict and maternal distress. All other comparisons were not significant.

Adolescent Correlational Analyses

As seen in Table 6, adolescent age was significantly related to adolescent-reported internalizing ($r = .276, p < .05$) and externalizing ($r = .219, p < .05$) symptoms, suggesting that older adolescents reported more psychological distress. Adolescent report of internalizing and

externalizing symptoms were negatively correlated with total routines ($r = -.329, p < .01$; $r = -.376$, respectively: $p < .01$). This indicates that increased internalizing and externalizing symptoms were associated with decreased routines. Adolescent report of

Table 5. Bivariate correlations between mother-reported predictor variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender	-	.100	.070	.020	.056	-.014	.048	.134	.076	-.005	-.028	-.023
2. Age	-	-	.007	.037	.047	-.142	.170	.209	-.178	.203	.012	.063
3. Int	-	-	-	.716**	-.401**	-.231*	-.332**	-.209	-.382**	-.336**	.431**	.571**
4. Ext	-	-	-	-	-.464**	-.261*	-.155	-.286**	-.530**	-.364**	.681**	.374**
5. ARQ	-	-	-	-	-	.616**	.630**	.631**	.733**	.651**	-.562**	-.387**
6. HH	-	-	-	-	-	-	.192	.288**	.594**	.312**	-.513**	-.351**
7. ER	-	-	-	-	-	-	-	.371**	.102	.359**	-.078	-.262*
8. HR	-	-	-	-	-	-	-	-	.463**	.211	-.410**	-.236*
9. TM	-	-	-	-	-	-	-	-	-	.373**	-.653**	-.376**
10. CR	-	-	-	-	-	-	-	-	-	-	-.438**	-.176
11. CBQ	-	-	-	-	-	-	-	-	-	-	-	.323**
12. GSI	-	-	-	-	-	-	-	-	-	-	-	-

Note. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed); Gender = Adolescent Gender; Age = Adolescent Age; Int = CBCL Internalizing; Ext = CBCL Externalizing; ARQ = Total Routines; HH = ARQ Household; ER = ARQ Extracurricular; HR = ARQ Hygiene; TM = ARQ Time Management; CR = ARQ Communication; CBQ = Total Conflict; GSI = BSI Total Distress.

internalizing and externalizing symptoms was correlated positively with total conflict ($r = .269, p < .05$; $r = .610$, respectively: $p < .01$).

As such, higher levels of reported internalizing and externalizing symptoms associate with higher level of conflict among mothers and adolescents. However, only self-reported internalizing symptoms significantly correlated with maternal distress ($r = .320, p < .05$).

Regression Analyses

Separate hierarchical regression analyses were conducted to assess whether routines and conflict predicted adolescent internalizing and externalizing behavior problems. For all predictor variables, Variance Inflation Factor (VIF) and tolerance levels

Table 6. Bivariate correlations between adolescent-reported predictor variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Gender	-	.100	.107	.158	-.007	.050	.005	.089	.030	-.005	-.023
2. Age	-	-	.276*	.219*	-.113	.105	.100	-.208	-.112	.034	.063
3. Int	-	-	-	.557**	-.329**	-.273*	-.148	-.305**	-.239*	.269*	.320*
4. Ext	-	-	-	-	-.376**	-.063	-.316**	-.373**	-.442**	.610**	.181
5. ARQ	-	-	-	-	-	.642**	.716**	.796**	.788**	-.317**	-.206
6. ER	-	-	-	-	-	-	.491**	.267*	.442*	-.025	-.157
7. HR	-	-	-	-	-	-	-	.512**	.521**	-.291**	-.023
8. TM	-	-	-	-	-	-	-	-	.638**	-.354**	-.217*
9. CR	-	-	-	-	-	-	-	-	-	-.390**	-.137
10. CBQ	-	-	-	-	-	-	-	-	-	-	.091
11. GSI	-	-	-	-	-	-	-	-	-	-	-

Note. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed); Gender = Adolescent Gender; Age = Adolescent Age; Int = YSR Internalizing; Ext = YSR Externalizing; ARQ = Total Routines; ER = ARQ Extracurricular; HR = ARQ Hygiene; TM = ARQ Time Management; CR: ARQ Communication; CBQ= Total Conflict; GSI: BSI Total Distress.

were examined. To minimize the impact of multicollinearity, all predictor and moderator variables were centered before conducting analyses (Aiken & West, 1991).

For each regression model, gender, age, and maternal distress were added at Step 1 as these variables were significantly correlated with internalizing and externalizing symptoms (Harris et al., 2014). At Step 2, either total routines or the specific scales (household, time management, and communication routines) and conflict were entered as predictor variables. Interaction variables

were created by multiplying the centered predictor variables and were entered on the final step of the regression models to examine any potential moderating interactions among variables. This procedure was repeated for each hierarchical regression model and the results of these analyses are presented in Tables 7-11.

Results of the initial hierarchical regression analysis are presented in Table 7. As seen in Table 7, the model examined mother-reported predictors of adolescent internalizing symptoms and was significant at Step 1, $F(3,79)=13.24, p<.001, R^2=.33, p<.001$. At Step 1, maternal distress emerged as a significant predictor of internalizing symptoms ($\beta=.58, p<.001$). However, neither age nor gender was related to internalizing symptoms ($p>.05$). In Step 2, routines and conflict were entered and examined as predictors. Step 2 was significant, $F(5, 77)= 10.70, p<.001, R^2=.41, p<.01$, and accounted for 37% of the variance in internalizing symptoms. The change in R^2 between Step 1 and Step 2 was also significant, $F(2,77)=4.92, p<.05$.

Table 7. Hierarchical regression for parent report of adolescent internalizing symptoms

Variable	Step One		Step Two		Step Three	
	β	Sig	β	Sig	β	Sig
Gender	.087	.346	.096	.278	.125	.171
Age	-.038	.680	-.030	.736	-.015	.864
lnGSI	.575	.000	.463	.000	.490	.000
ARQ Total	-	-	-.103	.353	-.109	.321
CBQ Total	-	-	.227	.037	.262	.019
GSIxRoutines	-	-	-	-	.107	.345
GSIxConflict	-	-	-	-	-.064	.583
R^2	.334	.000	.410	.010	.377	.277

Note. GSI = BSI Total Distress Score; GSIxRoutines= Interaction with ARQ Total; GSIxConflict= Interaction with CBQ Total.

Maternal distress ($\beta=.46, p<.001$) and mother-reported conflict ($\beta=.23, p<.05$) were significant predictors of adolescent internalizing symptoms at Step 2. Interaction terms were entered at Step 3 of the regression. However, none of the interactions were statistically

significant in predicting internalizing symptoms ($\beta = -.55$ to $.95$, all $p > .05$) and the change in R^2 was not statistically significant.

Table 8 presents the hierarchical regression for mother report of adolescent externalizing symptoms. The second regression analysis evaluated predictors of adolescent externalizing symptoms. At Step 1, the model was significant, $F(3, 79) = 4.33, p < .01, R^2 = .14, p < .01$, with maternal distress being the only significant predictor ($\beta = .37, p < .01$). Step 2 was significant, $F(5, 77) = 15.17, p < .001, R^2 = .50, p < .001$, and accounted for 46% of the variance. The change in R^2 between Step 1 and Step 2 was significant, $F(2, 77) = 27.14, p < .001$. Specifically, conflict ($\beta = .59, p < .001$) was the only significant predictor of externalizing symptoms at Step 2. The interactions between maternal distress and mother-reported conflict and routine were examined in Step 3. None of the interactions emerged as statistically significant ($\beta = -.10$ and $.04, p > .05$) and there was no statistically significant change in R^2 . As seen in Table 8, these results suggest that higher levels of mother-reported conflict was associated with higher levels of externalizing symptoms.

Table 8. Hierarchical regression for parent report of adolescent externalizing symptoms

Variable	Step One		Step Two		Step Three	
	β	Sig	β	Sig	β	Sig
Gender	.028	.789	.043	.597	.070	.406
Age	.010	.923	.019	.817	.027	.741
lnGSI	.374	.001	.154	.085	.175	.056
ARQ Total	-	-	-.079	.437	-.087	.392
CBQ Total	-	-	.588	.000	.620	.000
GSIxRoutines	-	-	-	-	.041	.695
GSIxConflict	-	-	-	-	-.100	.355
R^2	.141	.007	.496	.000	.510	.357

Note. GSI = BSI Total Distress Score; GSIxRoutines= Interaction with Total Routine; GSIxConflict= Interaction with Total Conflict.

Table 9 presents the third regression model examining whether specific scales of mother-reported adolescent routines were effective in moderating adolescent internalizing symptoms.

Step 1 of the regression was significant, $F(3, 79) = 13.24, p < .001, R^2 = .33, p < .001$, and maternal

distress was the only significant predictor ($\beta = .58, p < .001$). Step 2 of the analysis was significant, $F(7,75)=8.42, p < .001, R^2=.44, p < .05$, and accounted for 39% of the variance. The change in R^2 between Step 1 and Step 2 was significant, $F(4,75)=3.53, p < .05$, and maternal distress remained significant ($\beta = .50, p < .001$) at Step 2. At Step 3, the overall model was significant, $F(4,71)=6.79, p < .05, R^2=.51, p < .05$, and accounted for 44% of the variance. The change in R^2 for Step 3 was significant, $F(11,71)=6.79, p < .001$, and the interaction between maternal distress and time management routines emerged as a significant predictor ($\beta = .40, p < .01$), as seen in Figure 1. However, time management routines alone were not predictive of internalizing symptoms ($\beta = -.22, p > .05$) at Step 3. No additional interactions were statistically significant (all $p > .05$).

Table 9. Hierarchical regression for parent report of adolescent internalizing symptoms and specific routine scales

Variable	Step One		Step Two		Step Three	
	β	Sig	β	Sig	β	Sig
Gender	.087	.346	.096	.276	.135	.126
Age	-.038	.680	.005	.955	.001	.995
GSI	.575	.000	.495	.000	.498	.000
HH	-	-	.168	.137	.129	.247
TM	-	-	-.091	.485	-.216	.115
CR	-	-	-.170	.098	-.171	.094
CBQ Total	-	-	.226	.066	.209	.087
GSIxHH	-	-	-	-	-.223	.107
GSIxTM	-	-	-	-	.401	.007
GSIxCR	-	-	-	-	-.115	.289
GSIxConflict	-	-	-	-	-.112	.400
R^2	.334	.000	.440	.011	.513	.041

Note. HH= Household Routines; TM= Time Management Routines; CR= Communication Routines.

Table 10 presents a fourth hierarchical regression examining adolescent-reported total routines, conflict, and maternal distress as predictors of internalizing symptoms. Step 1 of the regression was significant, $F(3,79)=5.62, p < .01, R^2=.18, p < .01$, with maternal distress being a

significant predictor ($\beta=.31, p<.01$). At step 2, the model was significant, $F(5, 77)= 5.50, p<.01$, $R^2=.26, p<.05$, and accounted for 22% of the variance. The change in R^2 between Step 1 and

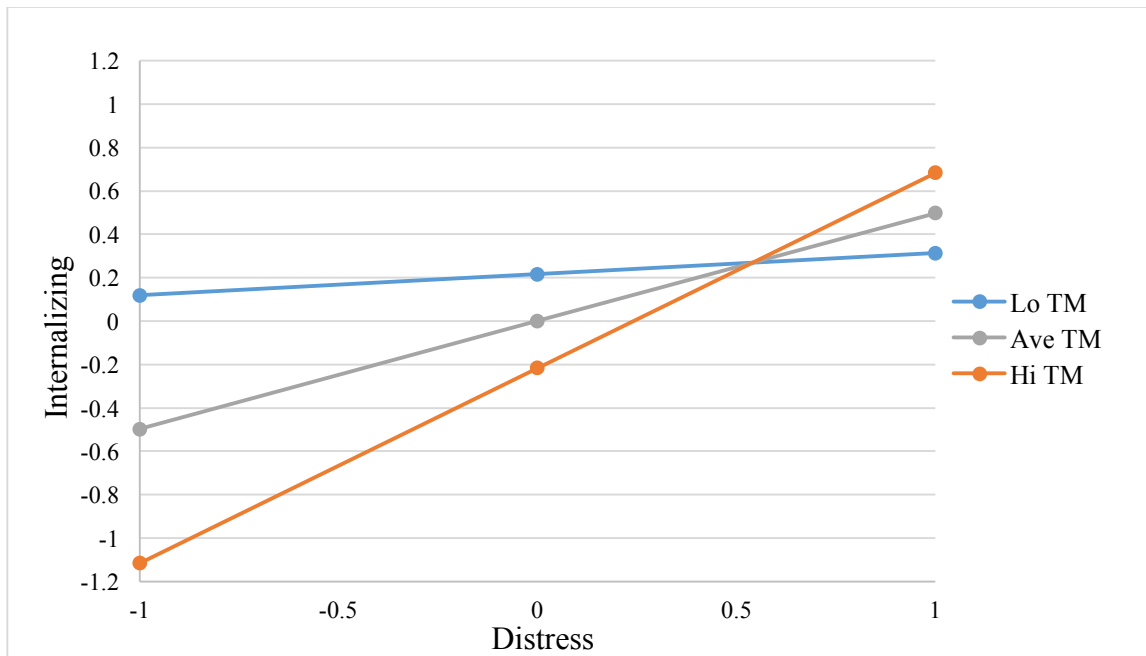


Figure 1. Time management and maternal distress as predictors of parent-reported internalizing symptoms in adolescents with ADHD

Step 2 was significant, $F(2,77)=4.57, p<.05$, and age ($\beta =.22, p<.05$) and maternal distress ($\beta =.25, p<.05$) were significant predictors at Step 2. Step 3 was also significant, $F(7,75)=5.60, p<.05, R^2=.34, p<.05$, and accounted for 28% of the variance. The change in R^2 for Step 3 was significant, $F(2,75)=4.56, p<.05$, and maternal distress ($\beta = .30, p>.01$), adolescent-reported conflict ($\beta = .21, p>.01$), and the interaction between distress and conflict ($\beta = -.31, p<.01$) were significant predictors at Step 3. Figure 2 presents the significant interaction between maternal distress and adolescent-reported conflict in predicting internalizing symptoms.

Table 11 depicts the final regression model examining maternal distress, total adolescent routines, and conflict as predictors of adolescent-reported externalizing symptoms. Step 1 of the regression model was significant, $F(3,79) = 2.79, p <.05, R^2=.10, p<.05$. At Step 2, the analysis was also significant, $F(5,77)=13.59, p >.001, R^2=.47, p<.001$, and the model accounted for 43%

of the variance. The change in R^2 between Step 1 and Step 2 was significant, $F(2,77)=27.02$, $p<.001$, and conflict was the only significant predictor ($\beta = .54$, $p>.001$). Step 3 of the regression

Table 10. Hierarchical regression analysis for adolescent-reported internalizing symptoms

Variable	Step One		Step Two		Step Three	
	β	Sig	β	Sig	β	Sig
Gender	.089	.388	.090	.364	.102	.291
Age	.248	.018	.223	.027	.193	.054
lnGSI	.306	.004	.251	.014	.295	.004
ARQ Total	-	-	-.195	.068	-.177	.084
CBQ Total	-	-	.177	.091	.205	.043
GSIxRoutines	-	-	-	-	-.107	.321
GSIxConflict	-	-	-	-	-.307	.003
R^2	.176	.002	.263	.013	.343	.013

Note. GSI = BSI Total Distress Score; GSIxRoutines= Interaction with Total Routine; GSIxConflict= Interaction with Total Conflict.

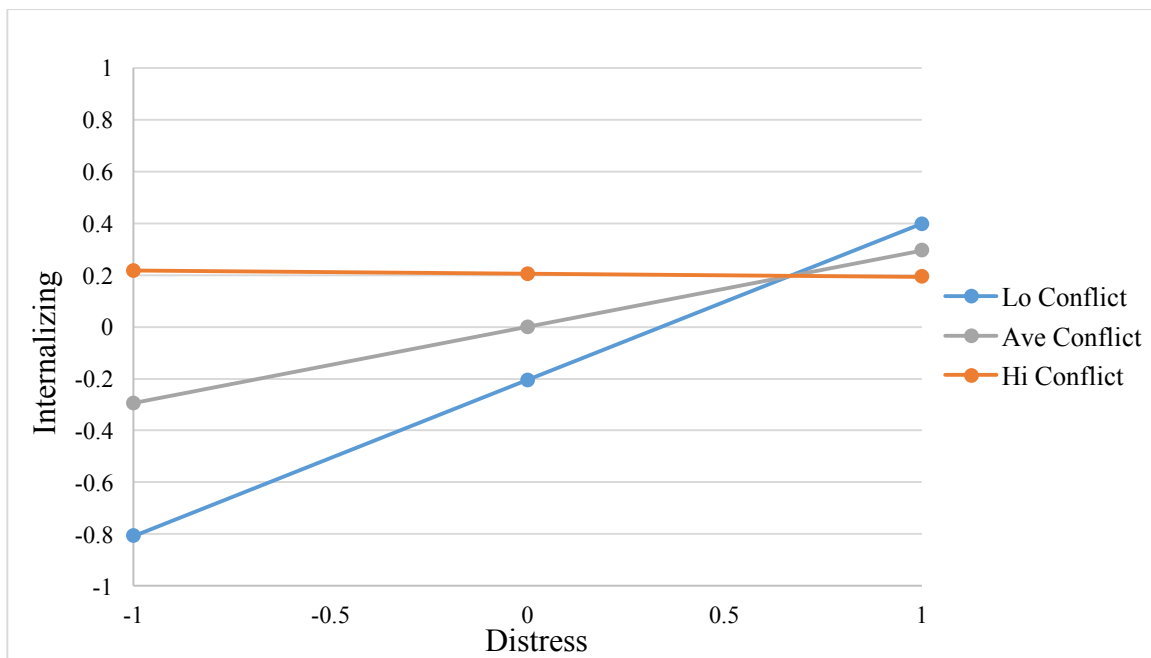


Figure 2. Total level of conflict and maternal distress as predictors of adolescent internalizing symptoms

model was significant, $F(7,75)=12.56$, $p<.001$, $R^2=.54$, $p<.01$, and accounted for 50% of the variance. The change in R^2 for Step 3 was significant, $F(2,75)=5.79$, $p<.01$, with conflict

($\beta = .57, p > .001$) and the interaction between distress and conflict ($\beta = -.29, p < .01$) as significant predictors of adolescent-reported externalizing symptoms. Figure 3 presents the significant

Table 11. Hierarchical regression analysis for adolescent-reported externalizing symptoms

Variable	Step One		Step Two		Step Three	
	β	Sig	β	Sig	β	Sig
Gender	.142	.189	.145	.086	.150	.067
Age	.193	.076	.161	.059	.124	.136
lnGSI	.172	.113	.091	.290	.125	.135
ARQ Total	-	-	-.165	.069	-.147	.086
CBQ Total	-	-	.544	.000	.571	.000
GSIxRoutines	-	-	-	-	-.135	.135
GSIxConflict	-	-	-	-	-.286	.001
R^2	.096	.046	.469	.000	.540	.005

Note. ARQ Total = Adolescent-Report Total Routines; CBQ Total = Adolescent-Report Total Conflict.

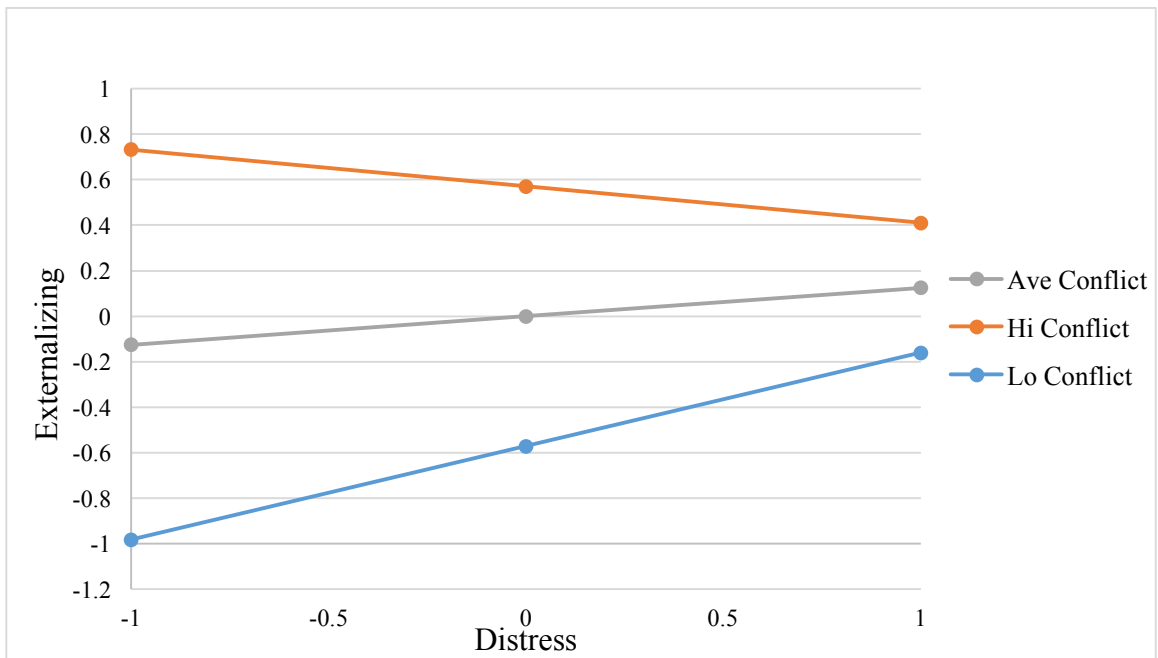


Figure 3. Total level of conflict and maternal distress as predictors of adolescent externalizing symptoms

interaction between maternal distress and adolescent-reported conflict in predicting adolescent externalizing symptoms.

DISCUSSION

The presence of comorbid internalizing and externalizing symptoms greatly impacts the adjustment of adolescents with ADHD (Harrington et al., 1991; Loeber and Hay, 1997; Prelow et al., 2007). As such, it is critical to understand these comorbid symptoms as well as the ways in which specific environmental factors work to moderate or predict their severity. Previous literature suggests that specific behavioral problems can be decreased by the incorporation of routine interventions (McLoyd, Toyokawa, & Kaplan, 2008).

Research supports the examination of moderating affects of specific routines on internalizing and externalizing behaviors among children (Harris et al., 2014). Further, negative parent-child communication can exacerbate psychological distress in parents (Ozturk et al., 2016; Dominick, Davis, Lainhard, Tager-Flusberg, & Folstein, 2007) and is associated with increased comorbid problems in adolescents with ADHD (Edwards et al., 2001; Johnston, 1996; Nilsen et al., 2016). As such, studying relationships among influential factors may guide the ways in which specific interventions or assessment techniques can help manage common comorbid symptoms more effectively (Escamilla, 2013).

The present study aimed to expand upon the existing literature through the examination of moderating factors in a population of adolescents with ADHD. Initial hypotheses were partially supported across mother and adolescent informants. Major findings of the present study support mother report of adolescent time management and adolescent report of conflict interactions as moderators of comorbid symptoms at low levels of maternal distress. However, at higher levels of maternal distress, predictor variables were not statistically significant in predicting adolescent internalizing and externalizing symptoms. This lack of association suggests that high maternal distress overshadows the effects of moderating variables as the child

experiences an increase in comorbid symptoms. Additionally, similar to research done by Human, Dirks, DeLongis, & Chen (2016), results of the present study show both congruence and incongruence in adolescent-parent perceptions related to adolescent adjustment, with strong links between adolescent perception of family and their own comorbid symptoms.

As hypothesized, internalizing and externalizing symptoms positively correlated with ratings of maternal distress, with the exception of adolescent ratings of externalizing symptoms. Additionally, all measures of adolescent routines (e.g., Time Management, Extracurricular, Hygiene, Communication, and Household routines) were negatively associated with internalizing and externalizing symptoms. This relationship was expected, as the literature supports a bidirectional relationship between comorbid symptoms and maternal distress (Barbot, Crossman, Hunter, Grigorenko, & Luthar, 2014; Hastings, Daley, Burns, & Beck, 2006).

Consistent with Harris et al., (2014), the examination of total routines was insufficient in predicting adolescent symptom severity. As such, it was necessary to further examine specific routine scales, including Household, Time Management, and Communication routines, since overall scores of routines were not found to be significant. Further analyses of specific routines revealed that mother reports of adolescent time management interacted with maternal distress to significantly predict adolescent internalizing symptoms. Specifically, at lower ratings of maternal distress, time management routines, as reported by mothers, predicted symptoms. Fewer time management routines predicted higher internalizing symptoms at low levels of maternal distress. In addition, greater time management routines predicted lower internalizing symptoms at low levels of maternal distress.

These results support previous findings (Harris et al., 2014) that suggest it is important to examine specific types of routines when studying factors associated with comorbid symptoms in

adolescents with ADHD. Conversely, mother-reported time management routines were the only significant predictor of adolescent internalizing symptoms for the sample. This may suggest that in an adolescent population, parental perception of their adolescent's structure and routine consistency may be helpful in moderating adolescent internalizing problems (Prelow, Loukas, & Jordan-Green, 2007). Specific items within the Time Management scale include those related to the ability to independently balance various life factors, such as family, homework, chores, bedtime, and consistently preparing for the next day. Given the transitional nature of adolescence, marked by a desire to achieve independence (Baumrind, 1991; Whitmire, 2000), an adolescent struggling to grasp time management concepts on their own may contribute to the stress of the mother, thus impacting comorbid symptoms (Krueger & Kendall, 2001; Prelow, Loukas, & Jordan-Green, 2007). Specifically, ADHD adolescents who lack such time management skills may experience lower self-esteem or express behavioral problems (Barkley, 2015; Woodward and Fergusson, 2001). Similarly, adolescents who have mastered time management routines may inherently show less comorbid symptoms (Harris et al., 2014), while also experiencing more successful adjustment (Fiese et al., 2002), thereby mitigating distress for the mother.

Expanding upon the research conducted by Harris et al., (2014), the present study provides evidence supporting the hypothesis that parent-adolescent conflict interaction is an important variable in moderating the presence of comorbid symptoms in adolescents with ADHD. This finding was particularly prevalent in adolescent report of study variables predicting internalizing and externalizing symptoms. At low levels of maternal distress, adolescents reported increased conflict with their mothers, which significantly predicted their internalizing and externalizing symptoms. Specifically, at low levels of maternal distress, higher adolescent-

reported conflict predicts higher internalizing symptoms. These findings are consistent with the literature documenting that family conflict disrupts child and adolescent development (Buehler et al., 1997; Repetti, Taylor, & Seeman, 2002) and is associated with adjustment problems in adolescents (Grych, Jouriles, Swank, McDonald, & Norwood, 2000; Schlomer et al., 2015).

Limitations

Findings of the current study should be considered in light of several limitations. One limitation of the study was the weak correlation of the GSI measure of maternal distress with adolescent externalizing ratings on the YSR. Additionally, many mothers who reported on the BSI did not report much distress overall. Since the study was given via questionnaire data, it is possible that mothers did not feel comfortable sharing sensitive information. During administration, the BSI measure of distress was also given as one of the last questionnaires in the mother's packet and could have been influenced by participant fatigue.

Harris et al., (2014) collected data in an inpatient setting. In the current study, data was collected through a university and clinic setting. As such, it is plausible that mother's distress may have already been heightened at that point of questionnaire completion in the Harris et al., (2014) sample. Mean scores on internalizing and externalizing scales used within the study did not reach the subclinical threshold. Rather, the scores were well within the average range. However, this limitation may also serve as support that findings may reveal stronger relationships in more severe diagnoses of adolescent ADHD.

The sample's demographic composition of the current study was fairly homogeneous and lacked diversity among participants. As such, findings have limited generalizability and should be replicated in a more heterogeneous sample of adolescents. Additionally, majority of the sample was recruited through undergraduate students utilizing questionnaire data. Though

practical, such formatting is susceptible to dishonesty, differences in interpretation of questions, and biased responding depending on the person's mood at the time of participation. Majority of mothers indicated that their child was prescribed medication for management of ADHD symptoms. Since questionnaires were completed off site, mothers may have interpreted questionnaires (e.g., items on the CBCL) in the context of a medicated child. Several parental respondents indicated their ratings on questions regarding symptoms were influenced by the effects of medication.

Implications and Future Directions

Future studies should consider the combination of cross-informant data while analyzing the relationship between symptoms, distress, and moderating factors in adolescents with ADHD. As such, it would be beneficial to run further analyses with the inclusion of both mother and adolescent information to explore the interplay of this relationship. Additionally, statistical analyses were conducted in accordance with the proposed analyses. However, since the broader literature has established a bidirectional relationship between maternal distress and comorbid symptoms (Barbot, Crossman, Hunter, Grigorenko, & Luthar, 2014; Hastings, Daley, Burns, & Beck, 2006), future studies may also consider the contributing factors that moderate or predict maternal distress or the involvement of other family factors (i.e., paternal involvement).

Future directions should also consider examining style and quality of communication between parents and adolescents. The present study examined both elements of conflict communication styles and routines that centered around the frequency of informative communication between mother and adolescent. However, Communication Routines did not appear to be significant across regression analyses in predicting internalizing and externalizing symptoms. Therefore, consideration of conflict communication styles among parents and

adolescents with ADHD may be important to evaluate in a clinical setting. Since greater conflict among mothers and adolescents, as reported by adolescents, interacted with maternal distress to predict symptom severity, it is important to assess environmental factors that may contribute to either the mother's distress or conflict, within the context of mother-adolescent communication. Additionally, environmental factors affecting ADHD adolescents should also be considered within the context of communication styles.

Summary

The present study aimed to understand predictors that underlie comorbid internalizing and externalizing symptoms in adolescents with ADHD. Harris et al., (2014) examined the impact of adolescent routines as moderating factors on the relationship between maternal distress and comorbid symptoms. However, this is the first study to investigate specific routines and poor communication as they relate to maternal factors and comorbidities of adolescents with ADHD. Findings emphasize significant associations between predictor and outcome variables of mother and adolescent respondents. Specifically, results further examine differences of multiple informants as it relates to family factors (i.e., mother's distress) and the contribution of comorbid internalizing and externalizing symptoms. Taken with the findings of previous literature such as Harris et al., (2014), this research can help to inform assessment and treatment outcomes regarding comorbid symptoms in adolescents with ADHD.

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APPENDIX A CONSENT FORM

1. **Study Title:** The Relationship Between Maternal Distress and Adjustment Problems in Adolescents with Attention-Deficit/Hyperactivity Disorder: An Examination of Family Routines and Communication as Moderators
2. **Data Collection:** Data for this study will be collected through referrals from primary care physicians, psychologists, or self-referral to advertisements as well as from LSU students.
3. **Investigators:** If you have any questions about the study you can reach the investigators, M-F, 8:00 a.m.-4:30 p.m.: Mary Lou Kelley, Ph.D. at (225) 578-4113; Ryan N. Cummins, Graduate Student at (225) 578-6731.
4. **Purpose of the Study:** The purpose of the study is to look at how routines and communication may impact the relationship between mothers and the adjustment of their teenager with ADHD.
5. **Who is involved?** 80+ teenagers (ages 11-17) and their mothers.
6. **What is involved?** Mothers and teenagers will be asked if they would like to participate in the study. Once they have both agreed and signed consent and assent forms, they will be asked to answer some questions about themselves, their types of communication, and daily routines. Researchers will help anyone who has difficulty reading the forms.
7. **Benefits:** There is no direct benefit to you for taking part in this study. However, the results of the study may help professionals to provide better health care and services to teenagers with ADHD and their families.
8. **Risks:** There are no known risks to taking part in this study. Should you feel discomfort at any time during the study, researchers can provide community health care resources to you.
9. **Participation is Voluntary:** This study is not required. If you choose to take part in this study, you have the right to refuse any question or stop participation at any time.
10. **Privacy:** All information that you provide is for research only and will be kept private and anonymous. Your name will not go on any of the research data and only trained research staff will have access to your information. Your name will only go on the consent form, which will be stored separately from your data. When the study is finished, a report will be written about the results and your name will not be used in any way.
11. **Cost:** There is no cost for taking part in this study.
12. **Right to Refuse:** You may refuse to take part in or withdraw from the study at any time. If you decide to leave the study, it will not impact your treatment by your clinician, or standings with LSU at the present time or in the future.

This study has been explained to me and all my questions have been answered. If I have additional questions, I will contact the study investigators. If I have questions about my rights as a research participant or any other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb.

I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form.

Signature of Participant

Date

The study participant has informed me that he/she is unable to read. I certify that I have read this consent form to the participant and explained that by completing the signature line above, the participant has agreed to participate.

Signature of Reader

Date

**APPENDIX B
DEMOGRAPHIC QUESTIONNAIRE**

ID: _____

Date: _____

Relation to Child (ex. Biological, Step-mother, etc.): _____

Age: _____ **Occupation:** _____ **Race/Ethnicity:** _____

Marital Status: _____

Education Level: Please select the *highest* level of education that YOU have completed.

- ___ Less than Junior High School
- ___ Junior High School (6th, 7th, 8th grade)
- ___ Some High School (9th, 10th, 11th, 12th grade)/Did Not Graduate
- ___ High School Graduate/GED
- ___ Some College (at least 1 year) or specialized training
- ___ Standard College Graduate (B.A., B.S.)
- ___ Post-College Advanced Degree (Masters or Doctorate)

Household Income: Please select the CURRENT total annual income of your household (income of all people in the home, including government assistance).

- ___ Below \$5,000
- ___ \$5,000-14,999
- ___ \$15,000-24,999
- ___ \$25,000-34,999
- ___ \$35,000-49,999
- ___ \$50,000-74,999
- ___ \$75,000-99,999
- ___ \$100,000 and up

Relationship status with spouse? (please circle one) *Excellent* *Good* *Fair* *Poor*

How many adults live in the home? _____

How many children exhibit behavioral problems? _____

CHILD: Please complete the following information regarding your *child*.

Age: _____ **Grade Level:** _____ **Race/Ethnicity:** _____ **Sex:** _____

Current Grade Average for each subject (Ex. A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F):

Math: _____ English: _____ Science: _____

Has your child had any previous psychological treatment? _____ **If so, when?** _____

Diagnoses? _____

Current Medications: _____

APPENDIX C

ADOLESCENT ROUTINES QUESTIONNAIRE: PARENT REPORT

Routines are events that occur regularly: at about the same time, in the same order, or in the same way every time. Please rate how often your teenager engages in each routine by circling a number ranging from 0 (never) to 4 (nearly always). Rate *how often* your child engaged in this routine *in the last month*. If an item does not apply to your child, please mark "N/A".

My Teenager:	How often does it occur at about the same time or in the same way? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable					
1. Wakes up on time	0	1	2	3	4	N/A
2. Comes home on time	0	1	2	3	4	N/A
3. Washes his/her face daily	0	1	2	3	4	N/A
4. Attends religious services	0	1	2	3	4	N/A
5. Exercises	0	1	2	3	4	N/A
6. Organizes his or her things for the next day	0	1	2	3	4	N/A
7. Uses deodorant	0	1	2	3	4	N/A
8. Leaves for school on time	0	1	2	3	4	N/A
9. Eats a snack after school	0	1	2	3	4	N/A
10. Takes a nap after school	0	1	2	3	4	N/A
11. Attends after school activities (e.g., clubs/organizations)	0	1	2	3	4	N/A
12. Completes homework in the same place and time	0	1	2	3	4	N/A
13. Helps fix/prepare meals	0	1	2	3	4	N/A
14. Spends time doing fun activities with family	0	1	2	3	4	N/A
15. Showers/bathes daily	0	1	2	3	4	N/A
16. Spends time outside	0	1	2	3	4	N/A
17. Prays before meals	0	1	2	3	4	N/A
18. Goes to bed at the same time	0	1	2	3	4	N/A
19. Eats dinner with family at dinner table	0	1	2	3	4	N/A
20. Completes chores regularly	0	1	2	3	4	N/A
21. Talks with family about his/her day	0	1	2	3	4	N/A
22. Completes all homework	0	1	2	3	4	N/A
23. Talks/texts with friends on the phone	0	1	2	3	4	N/A
24. Uses good manners	0	1	2	3	4	N/A
25. Participates in extracurricular activities (e.g., sports, volunteer work)	0	1	2	3	4	N/A
26. Arrives at work/volunteer commitments on time	0	1	2	3	4	N/A
27. Eats breakfast	0	1	2	3	4	N/A
28. Study/reviews for tests regularly	0	1	2	3	4	N/A
29. Spends time with friends on the weekend	0	1	2	3	4	N/A
30. Tells parents before leaving home for school or other activities	0	1	2	3	4	N/A

My Teenager:	How often does it occur at about the same time or in the same way? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable
31. Spends time doing fun activities (e.g., use the computer, play video games, watch T.V.) after chores/homework are completed	0 1 2 3 4 N/A
32. Brushes/fixes his/her hair daily	0 1 2 3 4 N/A
33. Asks for permission before going somewhere	0 1 2 3 4 N/A
34. Brushes his/her teeth daily	0 1 2 3 4 N/A
35. Spends time with friends after school	0 1 2 3 4 N/A
36. Makes his/her bed	0 1 2 3 4 N/A
37. Visits relatives	0 1 2 3 4 N/A
38. Cleans up after meals	0 1 2 3 4 N/A
39. Talks to friends on the Internet (e.g., social media)	0 1 2 3 4 N/A
40. Gets ready for bed on time	0 1 2 3 4 N/A
41. Take prescribed over-the-counter medication on time (including vitamins)	0 1 2 3 4 N/A
42. Gets dressed on time	0 1 2 3 4 N/A
43. Follows special instructions given by his/her doctor	0 1 2 3 4 N/A
I....	How often does it occur? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable
44. Know where my teenager is	0 1 2 3 4 N/A
45. Know my teenager's friends	0 1 2 3 4 N/A
46. Enforce household rules consistently	0 1 2 3 4 N/A
47. Give my teenager praise when he/she does good things	0 1 2 3 4 N/A
48. Provides specific and regular consequences for misbehavior	0 1 2 3 4 N/A
49. Tell my adolescent what time to be home	0 1 2 3 4 N/A

**APPENDIX D
ASSENT FORM**

I, _____, agree to be in a study to find ways to help teenagers with ADHD, and their mothers, to better adjust at home and school. I will be filling out questionnaires with information about myself as well as my daily routine and style of communication with my family. I can decide not to answer any questions in the study or stop being in the study at any time without getting in trouble.

Child's Signature: _____ Age: _____ Date: _____

Witness* _____ Date: _____

* (Witness must be present for the entire assent process, not just the signature by the minor)

APPENDIX E

ADOLESCENT ROUTINES QUESTIONNAIRE: SELF-REPORT

Routines are events that occur regularly: at about the same time, in the same order, or in the same way every time. Please rate how often you engage in each routine by circling a number ranging from 0 (never) to 4 (nearly always) of *how often* you engaged in this routine based on your behavior during *the last month*. If an item does not apply to you, please mark “N/A”.

I...	How often does it occur at about the same time or in the same way? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable					
1. Wake up on time	0	1	2	3	4	N/A
2. Come home on time	0	1	2	3	4	N/A
3. Wash my face daily	0	1	2	3	4	N/A
4. Attends religious services	0	1	2	3	4	N/A
5. Exercise	0	1	2	3	4	N/A
6. Organizes my things for the next day	0	1	2	3	4	N/A
7. Use deodorant	0	1	2	3	4	N/A
8. Leave for school on time	0	1	2	3	4	N/A
9. Eat a snack after school	0	1	2	3	4	N/A
10. Take a nap after school	0	1	2	3	4	N/A
11. Attend after school activities (e.g., clubs/organizations)	0	1	2	3	4	N/A
12. Complete homework in the same place and time	0	1	2	3	4	N/A
13. Help fix/prepare meals	0	1	2	3	4	N/A
14. Spend time doing fun activities with my family	0	1	2	3	4	N/A
15. Shower/bathe daily	0	1	2	3	4	N/A
16. Spend time outside	0	1	2	3	4	N/A
17. Pray before meals	0	1	2	3	4	N/A
18. Go to bed at the same time	0	1	2	3	4	N/A
19. Eat dinner with family at dinner table	0	1	2	3	4	N/A
20. Complete chores regularly	0	1	2	3	4	N/A
21. Talk with family about his/her day	0	1	2	3	4	N/A
22. Completes all homework	0	1	2	3	4	N/A
23. Talk/text with friends on the phone	0	1	2	3	4	N/A
24. Use good manners	0	1	2	3	4	N/A
25. Participate in extracurricular activities (e.g., sports, volunteer work)	0	1	2	3	4	N/A
26. Arrive at work/volunteer commitments on time	0	1	2	3	4	N/A
27. Eat breakfast	0	1	2	3	4	N/A
28. Study/review for tests regularly	0	1	2	3	4	N/A
29. Spend time with friends on the weekend	0	1	2	3	4	N/A
30. Tell my parents before I leave home for school or other activities	0	1	2	3	4	N/A

I...	How often does it occur at about the same time or in the same way? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable
31. Spend time doing fun activities (e.g., use the computer, play video games, watch T.V.) after chores/homework are completed	0 1 2 3 4 N/A
32. Brushes/fixes my hair daily	0 1 2 3 4 N/A
33. Ask for permission before going somewhere	0 1 2 3 4 N/A
34. Brush my teeth daily	0 1 2 3 4 N/A
35. Spend time with friends after school	0 1 2 3 4 N/A
36. Make my bed	0 1 2 3 4 N/A
37. Visit my relatives	0 1 2 3 4 N/A
38. Clean up after meals	0 1 2 3 4 N/A
39. Talk to friends on the Internet (e.g., social media)	0 1 2 3 4 N/A
40. Get ready for bed on time	0 1 2 3 4 N/A
41. Take prescribed over-the-counter medication on time (including vitamins)	0 1 2 3 4 N/A
42. Get dressed on time	0 1 2 3 4 N/A
43. Follow special instructions given by my doctor	0 1 2 3 4 N/A
My parent....	How often does it occur? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always N/A= Not Applicable
44. Knows where I am	0 1 2 3 4 N/A
45. Knows my friends	0 1 2 3 4 N/A
46. Enforces household rules consistently	0 1 2 3 4 N/A
47. Gives me praise when I do good things	0 1 2 3 4 N/A
48. Provides specific and regular consequences when I misbehave	0 1 2 3 4 N/A
49. Tells me what time to be home	0 1 2 3 4 N/A

APPENDIX F IRB APPROVAL

ACTION ON PROTOCOL APPROVAL REQUEST



Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

TO: Mary Lou Kelley
Psychology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: February 15, 2017

RE: IRB# 3832

TITLE: The Relationship Between Maternal Distress and Adjustment Problems in Adolescents with Attention-Deficit/Hyperactivity Disorder: An Examination of Family Routines and Communication as Moderators

New Protocol/Modification/Continuation: New Protocol

Review type: Full Expedited **Review date:** 2/9/2017

Risk Factor: Minimal Uncertain Greater Than Minimal

Approved **Disapproved**

Approval Date: 2/14/2017 **Approval Expiration Date:** 2/13/2018

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 80

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:**

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc.**

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

VITA

Ryan N. Cummins was born and raised in Chicago, Illinois. She received her Bachelor of Science degree in Psychology with a minor in Biology from the University of Alabama in 2014. She is currently a third-year graduate student working as part of Dr. Mary Lou Kelley's *Building Functional Families* Lab in the Clinical Psychology Program. Ryan's research interests broadly include the assessment and treatment of externalizing disorders from a biopsychosocial perspective. More specifically, she is interested in the utilization of interventions for academic success in at-risk populations, and the impact of parental involvement amongst children with ADHD.