UNDERSTANDING THE RELATION BETWEEN ROUTINES AND PROBLEM BEHAVIORS IN CHILDREN WITH CLINICAL DIAGNOSES

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PSYCHOLOGY

ABSTRACT

The current study investigated the impact of routines on problem behaviors in children with the clinical diagnoses of either PDD, ADHD, or depression/anxiety. Previous research has identified negative relations between externalizing behaviors and routines as well as a link between using routines and having positive parenting. The study extends these findings to children with these various diagnoses and also to internalizing symptoms. In our sample negative relations were found between routines, as measured by the Child Routines Inventory (CRI), and both internalizing and externalizing symptoms when all groups were examined together. Additionally routines were found to moderate the relation between diagnosis and internalizing symptoms such that those with depression had the least amount of symptoms when they also had the most routines while the PDD and ADHD groups had the least amount of symptoms when they had moderate levels of routines. With respect to externalizing symptoms, no moderating effect was detected; instead, it was the case that more routines were related to less symptoms for all groups. It was found that the subscales of household and homework routines from the CRI accounted for the most variability in symptoms when all groups were examined together. In addition to the assessing the relation of routines and problem behaviors, the predictors of routines were also considered. The mediating role of parental distress on the relation between diagnostic status and routines was tested using the Baron and Kenny model (1986) for each diagnostic group compared to control. Specifically it was found
that total parental distress, parental depression and parental anxiety were partial mediators in the depression group and that parental irascibility and parental depression were partial mediators in the ADHD group. In conclusion, it was found that clinically specific and appropriate use of routines is generally beneficial for a variety of children with clinical diagnoses. Additionally there are several possible models that are candidates for clinical intervention for distressed parents of children with depression and ADHD that may increase use of routine.

Keywords: Routines, Internalizing Symptoms, Externalizing Symptoms, ADHD, Depression, Autism
DEDICATION

I dedicate this work to my family, who persisted in routines with me throughout my growth as a child. Given the benefits of such and my distressing behavior at times, I really owe them one. It is routines with my family members, like sitting on Grandpipe’s knee while he played songs on the keyboard each time I arrived in Kansas, that have shaped my life experiences. Additionally, this work is also dedicated to Melissa, the love of my life, who is always available to encourage and listen, and who has learned a great deal about routines in the course of the preparation of this work.
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LIST OF ABBREVIATIONS

ADHD Attention Deficit Hyperactivity Disorder
ANOVA Analysis of Variance
ASD Autism Spectrum Disorder
CBCL Child Behavior Checklist
CRQ Child Routines Questionnaire
Dep/Anx Group of children in present investigation who had either depression or anxiety
FRI Family Routines Inventory
HSCL Hopkins Symptom Checklist
MANCOVA Multiple Analysis of Covariance
MANOVA Multiple Analysis of Variance
PDD Pervasive Developmental Disorder
PDD-NOS Pervasive Developmental Disorder-Not Otherwise Specified
SES Socioeconomic Status
TEACCH Treatment and Education of Autistic and Related Communication Handicapped Children
INTRODUCTION

Empirical research has consistently found that parental and environmental factors such as authoritative parenting or family conflict in the home are related to childhood adjustment. It fact, it has even been argued that this finding is so well established that we must move beyond studying parenting practices and begin instituting public policy to encourage authoritative parenting (Steinberg, 2001). For the skeptic, there are also recent research showing the importance of parenting practices and environmental influences on child adjustment outcomes including emotional or behavior problems, alcohol consumption, graduation rates, aggression, and other risky behaviors (Blondal & Adalbjarnardottir, 2009; Brotman et al., 2009; Latendresse et al., 2009; Reedtz, HandegÅRd, & MØRch, 2011; Taylor, Lopez, Budescu, & McGill, 2012). It is important to note that it has been found that positive parenting practices in the first year of life translate to better outcomes in adolescence (Washington & Dunham, 2011), and interventions targeting positive parenting in randomized controlled trials have also resulted in better outcomes post treatment (Brotman et al., 2009; Reedtz et al., 2011). Although it can be argued that there is extensive research on parenting practices with respect to child adjustment, one parenting practice that has received less attention and may also play an important role in outcomes for children and adolescents is routines. In fact one author found that routines were predictive of positive parenting practices (Jordan, 2004).
In the psychological literature, routines have typically been defined as predictable, having an order, and occurring at about the same time daily (Kennedy, 2001; Nelsen, Erwin, & Duffy, 1998). A better operational and more scientific definition of routines involving children was provided by Sytsma-Jordan in her research validating a measure of child routines called the Child Routines Questionnaire (CRQ). Sytsma-Jordan defines child routines as, “observable, repetitive behaviors which directly involve the same child and at least one adult acting in an interactive or supervisory role, and which occur with predictable regularity in the daily and/or weekly life of the child,” (Jordan, 2004). Therefore, they are events that occur at regular times and places and with the same people at each occurrence. Although the idea that routines are essential to daily life is pervasive, much of the literature about routines is in the popular literature and not systematically and/or analytically studied.

In the limited research that has been conducted to date, it has generally been found that when routines are appropriate they usually decrease emotional or behavioral problems. In addition, routines are important in times of stress or transition and have been found to be protective in high risk populations for various outcomes. Finally, there is some evidence to suggest that when routines are more common children with medical conditions manage their health better and have generally better health outcomes.

In sum, there is a great paucity of research on routines. Hence, there is a need for further research to illuminate the role that routines may play in developing new behaviors and influencing the expression of old behaviors. To set the stage for the proposed study, various theoretical frameworks that might be used to understand the nature and use of routines will be presented. More specifically, there are three theoretical models that
could provide explanations for understanding the importance and potential benefits that routines have in daily life. These include a developmental evolutionary perspective, implicit learning, and behavioral theory. Secondly, the scientific literature and empirical studies that focus on routines and specifically, how routines influence behavior will be reviewed. While the literature to date is limited, systematic research on routines suggests that they are influential across diverse aspects of human lives.

Review of Theoretical Models

There are three theoretical models that provide possible frameworks for understanding the potential benefits that daily routines may have on behavior. The first is developmental evolutionary theory. According to this theory, early identification of the qualities of routines (e.g. repetition, sequences, and predictability) is a process that mirrors the innate cognitive features of humans (Quinn, 2011). It has been argued that recognizing events as discrete and sequenced is a skill present as early as 10 months of age in typically developing children (Baldwin, Baird, Saylor, & Clark, 2001), thus supporting the importance of routines early in development. Further support for an evolutionary component to the development and maintenance of routines is provided by the finding that repeated experiences cause groups of synapses to fire together (Gazzaniga, 2004). Building upon the findings regarding the cognitive quality of repetition, it has been hypothesized that this skill lays the foundation for the next step in development which involves the understanding of intentions, a distinctly human quality. This developmental sequence highlights the importance of routines in the daily lives of humans as they develop and use social skills and processes (Strauss, Quinn, & American Anthropological Association; Westen, 2001). In this way it is also necessary to include
in our definition of evolutionary theory the perspective of developmental evolutionary psychology. Pivotal to this idea is that other primates and especially humans spend a great deal of time engaged in rearing of their young. Typically the longer that this rearing occurs the more socially adept the species is (Geary & Bjorklund, 2000). It is hypothesized that the benefits of spending large amounts of time rearing a child must outweigh the risks. Hence, it could also be that processes learned socially, such as how we interpret and map out our experiences with one another, of which routines are a major component, are an important adaptive process in developing social competence (Bjorklund & Pellegrini, 2002; Geary & Bjorklund, 2000). Furthermore, those activities that are adaptive or have a positive influence over our development are likely to increase in the frequency of which they are expressed, while those activities that are ineffective at accomplishing such goals as communication or understanding the intentions of others are lost (Bjorklund & Pellegrini, 2002). In this way only the most successful behaviors will survive to eventually become routines. Developmental evolutionary theory as an explanation for the importance of routines is best suited to describe social capacities, early feeding behavior and sleeping. Most importantly it gives an indication as to why people tend to have routines and that they tend to be beneficial or adaptive.

The next step in developing a cohesive theory of the benefits of routines may be rooted in findings based on neurological activity during implicit learning. Implicit learning is considered to be learning that occurs beyond our consciousness (Packard & Knowlton, 2002). In many ways we can think of implicit learning in terms of behaviors that are habitual, or things that we do over and over and do not think much about, rather it seems that these behaviors just come “naturally.” The often used example is tying your
shoes. Most everyone that is beyond the age of 6 years old can easily and efficiently tie their shoes without any thought about how to do it. On the other hand there are many people who would stumble helplessly for the words to explain exactly how to complete the task. This shows us the other type of learning that is known as explicit learning which requires conscious knowledge of what we are doing (Packard & Knowlton, 2002). With this dualism between these learning systems it makes sense that there would be distinct brain regions involved in each process; with the basal ganglia being important in the implicit learning and the medial temporal lobe being implicated in the function of explicit memory (Knowlton, Mangels, & Squire, 1996; Packard & Knowlton, 2002; Saint-Cyr, Taylor, & Lang, 1988).

The basal ganglia has long been known to have a profound role in movement, but neurodegenerative disorders such as Parkinson’s also lead to abnormalities in habit formation or implicit learning (Moody, Chang, Vanek, & Knowlton, 2010; Packard & Knowlton, 2002). Research conducted with both animals and humans suggest that during the course of learning a habit there are differences in the number of neurons in the basal ganglia that are activated when a habit is first being established versus after that habit has been acquired. For example, in an experiment recording the response of basal ganglia in rats during the acquisition of a habit, 89% of the responding neurons decreased their firing as the habit was acquired, while a much smaller percentage (11% of the responding neurons) increased their firing rate (Tang, Pawlak, Prokopenko, & West, 2007). In this way implicit learning or habit formation can be seen as an efficient way to use brain resources. The brain may be suited to react to repetition of information to form programs within the basal ganglia that are ever more efficient and require less brain resources.
Indeed the unconscious recognition of patterns and formations of habits seems to be a skill rooted in the biology of the brain. Therefore it seems that as the brain evolved it has developed and maintained the ability to form habits and routines which serve the adaptive purpose of making a complex world simpler and easier to process. However, this process, as mentioned earlier, is implicit and below conscious awareness. In contrast behavioral theories view routines as a more conscious and explicit process.

This model is better suited to explain more complex social processes and has the greatest amount of empirical support in the literature. According to this theory, routines are considered to be antecedents to behavior and hence, one way to improve predictability within one’s environment. It follows, therefore, that routines are considered to be part of the etiology of rule-governed behavior (Sytsma, Kelley, & Wymer, 2001). This theoretical perspective has been used effectively to argue for the importance of routines as a means by which to reduce problem behaviors in children and adolescents. As much of the literature showing the benefits of routines is based within a behavioral model, this theory will be the primary focus of the paper when reviewing the results of empirical studies on routines.

Throughout this paper, we will explore the literature on the benefits of routines and how a cohesive theory combining the contributions of evolution, implicit habit learning, and behaviorism may explain the various features of each finding. It is proposed that routines are rooted in our evolutionary past, have an unconscious neurological evolutionary basis, and that they are practiced behaviorally. This model provides theoretical basis for the common finding that will be investigated at length in this review; that routines are usually helpful in producing positive outcomes. Although
this may explain the relation between routines and behavior; we must also pause to understand how routines are empirically defined and measured.

**Measuring Routines**

To understand the pertinent research on routines, it is important to first examine common measures used to assess routines in the empirical literature. Sound empirical evidence often relies on measures that are developed for a specific purpose and are vetted for reliability and validity. The first such measure developed to assess routines was the Family Routines Inventory (FRI), which has demonstrated adequate reliability and validity (Jensen, James, Boyce, & Hartnet, 1983). It is a self-report measure that asks questions which assess the predictability of the family setting. This measure has adequate test-retest reliability, \( r = .79 \), (Jensen et al., 1983). The FRI has also been shown to retain its validity even when used across various cultures, races or individuals of different socio-economic status (SES). Although the FRI was the first measure to empirically assess routines, it has significant limitations. For example, it only measures familial routines and does not address specific child routines. It also tends to neglect antecedents such as changing clothes, finishing play, or beginning play; and does not address child functioning (Jordan, 2004).

In an effort to address these limitations, a new measure, the Child Routines Questionnaire (CRQ) was developed (Sytsma et al., 2001). This measure identifies multiple situations and antecedents. Furthermore, it specifically assesses the routines of the child, so it does not focus on the family, but the individual. All of the situations and questions on the measure apply to a child, so it is not appropriate for use with adults. The CRQ has 36-items and is a parent-report questionnaire that has been found to be
moderately related to problem behaviors and to family routines as measured by the FRI (Sytsma et al., 2001). This measure has good test-retest reliability, \( r = .86 \), and high internal consistency, Cronbach \( \alpha = .90 \) (Sytsma et al., 2001). A number of studies have also used the CRQ to understand the link between various problem behaviors and child routines.

*Popular Parenting Resources*

Common routines reviewed in the popular literature and professional journals alike include, mealtime routines, departure/morning routines, and bedtime routines (Eisenberg, Murkoff, & Hathaway, 1994; Nelsen et al., 1998). An example of a mealtime routine as defined within the popular media could involve the preparation of the meal, followed by grace being said, turn-taking by family members in their discussion about their day, and finally being excused from the table and possibly cleaning up after the meal. This example of a routine demonstrates the repetitive and predictable nature of routines and provides good descriptive value in defining the important components of the routine. It also aids in identifying how these components may help a child in completing the functions of daily living. This is related to the definition of routines given earlier by Systma-Jordan (2004), where repeated behaviors were performed or completed in conjunction with the same adult who often has a supervisory role in accomplishing tasks.

By going to virtually any book store in the United States and looking up books written by professionals on parenting, one is likely to discover a strong prevailing perception that instituting predictable routines will encourage a better environment to raise children (Eisenberg et al., 1994; Kennedy, 2001). In addition to the professional opinions of many of these authors, anecdotal accounts of those who care for children
suggest it is important to have routines. For example, Eisenberg and colleagues (1994) devote an entire section to the benefits of routines and outlines guidelines for creating a number of different types of routines such as a hygiene routine or a morning routine. While this is a helpful resource for families that want to have the most advantageous environment for their developing child, it lacks any citations of systematic studies showing that the recommended routines are actually beneficial.

Another popular parenting resource advocates for a parenting style characterized by, “preventative discipline,” incorporating the use of routines into parenting behavior (Kennedy, 2001). This guide goes even further than simply recommending routines but also explains the possible positive outcomes associated with the use of routines. This resource goes on to make the assertion that by instituting routines problem behaviors can be prevented and decreases in acting out behavior can be expected. While this idea seems intuitive, the potential cause and effect relation between routines and child behavioral problems should be evaluated by a systematic review and no such investigations are cited by the author.

These examples of prominent parenting guides are a representation of what has been recommended to parents without citing scientific evidence. There is merit to each of these claims; however, much of the solid evidence we have for them has been born out using a measure of routines that was not developed until after many of these guides were published. In effect the authors of these books were suggesting beneficial practices with respect to routines but were doing it based on anecdotal evidence. One explanation provided to justify the paucity of systematic research on routines includes the relatively few methods or measures available to assess routines. When assessed, the methods used
have been inconsistent across studies (Fiese et al., 2002; Sara Sytsma Jordan, 2004). In fact, a review article encompassing 50 years of research identified only 32 articles in the scientific literature on routines. Of those 32, only 19 were empirical articles (Fiese et al., 2002).

*Common Problem Behaviors among Normally Developing Children: Behavioral Interventions*  

Many decades ago behavioral interventions that incorporate routines as a way to reduce problem behaviors provided the foundations for the modern study of routines. These interventions tended to focus on three specific times: mealtime, bedtime and morning/departure (Jordan, 2004). Various mealtime interventions have been developed, many of which include the use of predictable routines to decrease inappropriate mealtime behavior. One study examined a treatment that used routines as a way to reduce problem behaviors during meals and increase the amount of food consumed by children. The results suggested the treatment was effective, with 75% of the children showing increased behavioral compliance and 25% had an increase in food consumption (Dadds, Sanders, & Bor, 1984). Similarly, Bauman and colleagues (1983) developed a mealtime intervention that incorporated structuring antecedents prior to meals consumed in restaurants. The authors assigned participants to three groups, a control group, a group receiving an educational packet describing the routine procedure, and one group that received the educational packet along with instructions from a therapist. The use of a routine alone was so helpful that it decreased problem behaviors during meals in public even if the parents only received the information packet (Bauman et al., 1983). Thus, even without the assistance of a professional, the use of routines by parents can be
effective in reducing mealtime behavioral problems. These early accounts of the effectiveness of routines on changing problem behaviors at mealtime are interesting because they highlight the importance of behavioral mechanisms. In both instances routines were used as ways to structure the antecedents of a situation during a time of frequent non-compliant and tantruming behavior among the children.

Similar findings have been reported when looking specifically at bedtime routines. There is empirical support suggesting that the use of routines is superior in reducing problem behavior at bedtime than either no intervention (e.g., allowing the child to outgrow the problem) or other behavioral techniques such as extinction (Adams & Rickert, 1989). Extinction is the gradual weakening of a conditioned response once the reinforcer for that behavior has been removed. When this is applied to bedtime behavior, the reinforcer of delayed sleep is parental attention while awake or acting inappropriately. Consequently, the child does not go to sleep. In theory by simply ignoring the child’s tantrum behavior, eventually the child’s non-compliant or inappropriate behavior would cease, resulting in extinction of that behavior and decreased bedtime latency. Further research comparing the use of extinction and routines among children exhibiting tantrums at bedtime (Milan, Mitchell, Berger, & Pierson, 1981) found that when combining routines and extinction techniques not only did the children begin going to bed at the established and desired time, but that their tantrums were reduced to occurring infrequently. These results are in stark contrast to those found when using extinction alone (Adams & Rickert, 1989). Other research suggests that behavioral techniques such as routines are not only useful tools for reducing problem behaviors in children at bedtime, but their use also increases the total amount of time a child spends sleeping,
increases self-confidence, and decreases physical aggression and behavioral problems at school (Pressman & Imber, 2011; Sanders, Bor, & Dadds, 1984; Seymour, 1987). The benefits of establishing bedtime routines extends beyond the child as there is empirical evidence to suggest that parents who used bedtime routines report significantly higher marital satisfaction (Adams & Rickert, 1989). Still others have found that family or child routines are linked to less maternal depression (Dickstein, 2002; Ivanova & Israel, 2006; Patterson, DeGarmo, & Forgatch, 2004). Thus, the findings suggest that routines may have a “trickle-down effect” on other members of the family.

With respect to morning or departure problematic behaviors such as stalling and non-compliance, an effective intervention that incorporated routines, called “Beat the Buzzer,” was developed and found to be effective in reducing these types of behavioral problems (Drabman & Creedon, 1979). In this procedure parents are instructed to set a timer that dictates when certain portions of the morning routine are to be completed. One of its primary documented benefits is that it can be implemented with ease and in a variety of situations where the individual goals of a family can be integrated (Drabman & Creedon, 1979; Wolfe, Kelly, & Drabman, 1981). By implementing this procedure researchers found that there was a decrease in the time that was spent getting ready in the morning (Hudson, Vincent, Wilks, & Drabman, 1985). In addition, when clear consequences for not adhering to the time allotted for being ready were included there was a marked decrease in the amount of conflict between the parents and children as well as making the mornings a generally more positive experience for the families in the study (McGrath, Dorsett, Calhoun, & Drabman, 1987). This is clearly an example of a behavioral paradigm, whereby the clock is the antecedent to completing a morning
routine and a set of clearly defined consequences follow the buzzer going off before the child has completed their routine.

Taken together, these behaviorally based studies demonstrate that routines are an effective intervention strategy that can be used to decrease problem behaviors at meal times, bed time, and in morning routines for children. However, many of these studies include a small sample size or they do not address more severe behavioral problems exhibited by children with a diagnosed clinical condition. Thus, further research assessing the relation between routines and their influence on internalizing symptoms, externalizing symptoms, impulse-control disorders and developmental disorders is needed before the full impact of routines on improving the quality of life in families can be fully evaluated.

**Routines and Emotional/Behavioral Problems**

There is extensive research supporting a link between behavioral problems in children and various parenting behaviors (Bayer et al., 2011; Jones & Prinz, 2005; Steinberg, 2001). For example, Brenner and Fox (1998) found that parenting practices accounted for more variance than other demographic variables in child externalizing behavior. Consequently the use of routines as a part of a parent’s behavioral repertoire may be particularly influential on child adjustment. Positive parenting is linked to the use of routines (Jordan, 2004) and longitudinal research suggests that the relation between parenting behaviors and delinquent behaviors in youths is mediated by routines (Hair, Moore, Garrett, Ling, & Cleveland, 2008). Further extending this research to high-risk Latino youth, Loukas and Prelow (2004) found routines to be protective against the development of externalizing behaviors among females. The Moving to Opportunity
study (Newburger, Birch, & Wachter, 2011), a project performed in collaboration with a community housing lottery, evaluated risky behaviors among youth who moved from high poverty areas to those with greater affluence. The results suggest a link between neighborhood poverty level and avoiding risky behavior among females. Some examples of this were that females in lower poverty areas were less likely to smoke marijuana or cigarettes, drink alcohol, or be arrested for property crimes. One important variable that was found to serve as a protective factor for females was the amount of time spent engaged in family routines (Clampet-Lundquist, Edin, Kling, & Duncan, 2011). The relation between specific forms of risky behavior, such as early sexual activity, has also been examined in large-scale studies. Among a group of African-American or Latino families who were from predominantly low socioeconomic status, those with high levels of neighborhood disorder but also higher levels of routines and parental knowledge were less likely to engage in sexual activity than those without family routines (Roche & Leventhal, 2009).

Another example of routines being important in high risk situations was the impact of routines on problem behaviors in a subset of 99 8- to 12- year old inner city youth. This is high risk group was exposed to higher levels of stress than their suburban peers. The authors found that when families were more cohesive and had higher levels of routines, both internalizing and externalizing problems were reduced (Kliewer & Kung, 1998). In this way routines served as a protective component in this high risk population.

While these studies have focused predominantly on externalizing symptoms or risky behaviors among youths, other research has examined the impact of routines on behavioral problems among youths diagnosed with impulse control disorders. This
research has focused specifically on sleeping routines in children with symptoms of Attention Deficit Hyperactivity Disorder (ADHD). For instance it has been found that children with ADHD have more sleep disturbances than their typically developing peers (Noble, 2010). In addition it has also been found that there is a relation between sleeping habits and the expression of the symptoms of ADHD (Noble, 2010; Pressman & Imber, 2011). For example, Pressman and Imber (2011) suggested that when children lack sleep it may cause them to act like they have ADHD; for which this author coins the term “faux-attention deficit hyperactivity disorder.”

The research presented thus far has focused on internalizing symptoms, externalizing symptoms, and impulse control disorders. Over the past two decades, there has been mounting evidence supporting the usefulness of routines among children with Autism Spectrum Disorders (ASDs). These studies have focused on outcomes such as increasing compliance, learning new concepts/knowledge, and increasing social skills. ASD is an umbrella term used to describe the expression of a triad of behaviorally observed symptoms that are expressed on a continuum and are used to make clinical diagnoses. The triad of ASD symptoms include deficits in communication and social abilities, with increased stereotypic and repetitive behaviors (American Psychiatric, 2000). Children with ASDs have varying degrees of severity for the different symptoms, and thus symptoms are thought to be expressed on a continuum. Autism is at one extreme of the continuum of symptoms and is different from Asperger’s Disorder and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) because of differences in language and communication development as well as the severity of impairment across all three symptom clusters. Children with Asperger's Disorder usually
exhibit impairment within the social skills domain but do not tend to show impaired language or the severity of deficit observed in adaptive behaviors when compared to children with other ASD diagnoses. The types of challenges that children with an ASD face include difficulties understanding social cues, lacking social reciprocity, lacking pragmatic use of language, and theory of mind deficits (Frith, 1989; Leach & LaRocque, 2011; Senju, 2012; Sheth et al., 2011). Although it is not a diagnostic criteria of ASD, many of these children demonstrate higher than typical levels of anxiety (Guttmann-Steinmetz, Gadow, DeVincent, & Crowell, 2010; Sung et al., 2011). It is proposed that the adoption of routines may decrease anxiety and have a corresponding impact on behavior problems in these children.

There is considerable evidence that the use of routines as a part of a behavioral intervention program for children with ASD is effective. When considering social skills deficits, one area of impairment often experienced by children with ASD is the use of appropriate social responses in social situations. Two studies in particular highlight possible mechanisms for these social deficits. First, Trillingsgaard (1999) demonstrated that children with Autism demonstrated deficits in their ability to generate scripts for common social routines. Children with ASD tended to have difficulty developing schemas and instead use more disorganized scripts. It was suggested that children with an ASD do not form or rely on schemas for negotiating social situations in the same way as their typically developing peers (Trillingsgaard, 1999). In a second study in which children with Autism were compared to typically developing peers on their ability to complete event schemas (Loth, Gómez, & Happé, 2008), those with Autism showed significant impairments on theory of mind tasks and demonstrated a poorer performance
than their typically developing peers when producing event schemas. Based on this knowledge, Laushley and colleagues (Laushley, Heflin, Shippen, Alberto, & Fredrick, 2009) used a multiple baseline technique to examine the efficacy of a social skills training program that incorporated concept mastery routines, as a strategy for teaching appropriate social responses to children with “high-functioning” Autism. Concept mastery routines include creating diagrams of concepts and doing so in an educational routine to learn social concepts (Bulgren & Scanlon, 1997). The finding was positive with all of the children diagnosed with high-functioning Autism demonstrating increases in their use of appropriate social behavior.

One important aspect of social functioning is the use of effective communication. As mentioned previously, children with ASD often experience deficits in their ability to use both verbal and non-verbal communication and to integrate these two forms of communication in social interactions. Recently, the use of routines has been incorporated into a behavioral program in which parents were taught to integrate strategies for teaching communication skills into the daily routines of their children with an ASD (Kashinath, Woods, & Goldstein, 2006). The results suggest that this method of teaching communication skills was effective for children with an ASD.

The use of routines as a way to increase skill acquisition and maintenance, whether that is communication skills or other academic skills, has also been evaluated in the literature. More specifically, the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) program was designed for use with individuals or in a classroom setting. A TEACCH classroom is highly structured and includes separate, defined areas for each task (e.g., individual work, group activities,
The children use schedules or routines made up of pictures and/or words to order their day or to provide order to an individual activity. This also helps increase predictability, thus improving smooth transitions between activities. Individually, a child or adolescent may sit at a work station and be required to complete certain activities, such as matching pictures or letters. The finished assignments are then placed in a container. Once a certain number of work tasks are completed, usually 1 to 3 tasks, the children are provided with time for play. All of this follows a strict and predictable routine so that the child learns what to expect when working at each station (Mesibov, Shea, & Schopler, 2005). The TEACCH program has shown greater efficacy for increasing adaptive behavior when compared to other non-specific school-based programs (Panerai et al., 2009). In addition, it has been found that highly structured learning environments also decrease the stereotypic behaviors of children with autism (Bennett, Reichow, & Wolery, 2011). More recently, a meta-analysis of treatments for autism found that the TEACCH program was also effective in improving motor skills and cognitive abilities among children with Autism (Warren, United States. Agency for Health Care, Research, Vanderbilt Evidence-based Practice, & Effective Health Care, 2011).

Increases in the ability to communicate are effective in helping to reduce frustration and consequently behavioral problems among children with ASD (Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011; Matson, Boisjoli, & Mahan, 2009). As noted earlier, children with an ASD often engage in non-compliant or disruptive behaviors because they perceive their environment as unpredictable. Thus, introducing a routine into stressful or unpredictable situations could result in decreases in behavioral
problems. For example, Kern and colleagues (2007) examined problem behaviors among children with an ASD as they were being dropped off at preschool each morning. A therapist was in the classroom and incorporated music, a relatively easy and natural way to help children transition from task to task, into a morning routine during this time period. The findings of Kern et al. (2007), suggested a link between the music routine and a reduction in problem behaviors during this transition to school each morning from pre to post treatment. Furthermore this approach may be a cost-effective way to treat non-compliance in children with ASD as the authors noted that once the songs were learned the teachers were effective at implementing the intervention without any further help from the therapist. The authors argue that using music routines is a relatively easy and natural way to help children with autism make transitions.

Although these studies demonstrate the potential importance of routines in managing and preventing problem behavior among youths, there are also important limitations to consider. For example, much of the research investigating the link between delinquency/risky behavior and routines used short 3 to 5 item scales of routines with limited reliability and validity (Hair et al., 2008). There is also recent research suggesting that routines may not be as beneficial among youths with an ASD as it is for typically developing children. In a comparison of children with an ASD and those without an ASD, Henderson and colleagues (Henderson, Barry, Bader, & Jordan, 2011) found that the negative relation between externalizing behaviors and routines was only present for typically developing children. However, it is important to note that this study only examined these behavioral problems in the specific context of bedtime, and not externalizing problems in general. Similarly, a curvilinear relation was found between
level of routines and behavioral problems among children diagnosed with conduct disorder. This finding suggests that those with the highest and lowest levels of routines exhibit higher levels of behavioral problems (Hill, 2007). Given the equivocal nature of the relation between child behavioral problems and routines, further empirical research is needed to help clarify when and to what extent routines are beneficial for children experiencing emotional and behavioral problems.

**Routines in Transition/Times of Stress**

It has long been accepted in the literature that routines can help reduce the subjective feelings of stress for individuals during times of transition, especially those that are stressful such as a death in the family, a divorce, or a cross country move (Wolin & Bennett, 1984). When examining the potential impact of routines on adjustment during life transitions/stressors, particular attention has been paid to the time periods of transition to school, becoming an adolescent and beginning a family. Routines change dramatically across the lifespan. In the preschool years routines are typically centered around bedtime, waking and getting dressed, whereas adolescents engage in routines at mealtime conversation, extracurricular activities and with their peers (Fiese, 2006)

A variety of methodologies have been used to investigate the Kindergarten transition; and rightly so, as it has been found that a smooth transition from preschool to the more academically focused kindergarten is a good predictor of later academic success (Hamre & Pianta, 2001). In general, research suggests that a disruption in the routines of children from pre-Kindergarten entry to post-Kindergarten entry is, in fact, the norm (Wildenger, McIntyre, Fiese, & Eckert, 2008). Furthermore, routines appear to be significantly related to biological measures of stress in both the child and parent during
this transition (DeCaro & Worthman, 2011; Quas, Murowchick, Bensadoun, & Boyce, 2002). For example, Quas and colleagues (2011) found that the two strongest predictors of increased morning cortisol levels, a biological indicator of stress, in children after their transition to Kindergarten were disrupted routines and limited preschool experience. Decaro and Wortham (2011) further extended these findings by examining cortisol among mothers of children entering Kindergarten. They found that higher levels of stress prior to entry was associated with fewer routines post-entry, and that post-entry routines were associated with increases in mean cortisol levels. Thus, these results suggest that routines are often disrupted in the transition to Kindergarten, and that maintaining and instituting routines during this important transition may limit stress in both the parent and the child.

Adolescence is considered a prominent time of transition in the developmental progression of an individual. In contrast to the stress experienced by Kindergarten children, which is characterized by stress due to the separation they experience from their family, adolescence is a time in which youths have a desire to separate and individuate from the family. The limited research to date investigating the benefits of routines among adolescents suggests that the time spent engaged in routines and rituals in the family from early to late adolescence can help decrease the stress and strain experienced by youths and their families (Dubas & Gerris, 2002). In fact, young adolescents who spent more time in routines had less conflict with their families when they reached late adolescence (Dubas & Gerris, 2002). This finding highlights the importance of routines during this transition and emphasizes the importance of the family and family routines in the life of adolescents. The benefits of routines extend to overall adjustment as well with
youths who spend time with their families in routines, such as family dinners, reporting better overall adjustment (Compañ, Moreno, Ruiz, & Pascual, 2002; M. E. Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004). Even though adolescence is a time of transition from dependence on the family to autonomy and is often characterized by “storm and stress” (Hall, 1904), providing stability for them through routines practiced within the family may be beneficial in this time of transition.

As adolescents make the transition to adulthood the next developmental step is to begin finding a mate and eventually becoming parents. The most common routines reported in couples was the “couple-time” routine which is characterized by the couple identifying enjoyable activities to complete with one another. These activities generally occur at the same time and place and are routinized (Bruess & Pearson, 1997). This definition, however, is strictly descriptive. Empirical investigations suggest a link between family routines and marital satisfaction among young families (i.e., families with children ≤ 2 years of age; Fiese, Hooker, Kotary, & Schwagler, 1993), and a link between bedtime routines specifically and greater marital satisfaction among families with older children. These findings demonstrate both the importance of routines to the family as a unit and emphasize the importance of routines throughout the lifespan.

**Academic Achievement**

One area that has received much attention from psychologists and educators alike is the influence of family and child routines on various academic outcomes. It is unclear if routines cause or are just a bi-product of families that emphasize education and academic achievement (Spagnola & Fiese, 2007). For example, parents who spend considerable time reading to their child at night before bedtime may be interested in
increasing their child’s literacy, or desire to spend quality time with their child, or they may be attempting to find opportunities for communication with their child. There is also empirical evidence supporting a link between shared family conversations at the dinner table and enhanced language understanding in children beyond that obtained in didactic situations. These interactions are an opportunity for children to learn important information about the organization and function of communication. Furthermore, dinnertime routines are a powerful time of reconnection, nurturance, and structured dialogue within a family (Blum-Kulka & Snow, 2002). Dinnertime conversation of children between the ages of 2 and 5 serves an educational purpose as well as a social purpose. That is, during these time consideration tends to focus on metalinguistic language, a part of language that is important in the early development of children as it helps them link the verbal responses of others to their own verbalizations (Ely, Gleason, MacGibbon, & Zaretsky, 2001).

Other research examining the literacy outcomes among children found that when there was a high amount of importance placed on reading routines, children demonstrated a stronger desire to read (Serpell, Sonnenschein, Baker, & Ganapathy, 2002). In a publication that was written as a synthesis of work on family interactions and intellectual development, shared book reading not only socializes the child to books, but the special interactions with children during book reading routines provide a narrative that enhances the child’s understanding of vocabulary (Hart & Risley, 1995). This has led to the widely held belief that joint book reading, and the routines that support this behavior in the family are important for children to excel in reading. There is also empirical support for this belief with longitudinal research suggesting that families who placed a higher value
in routines had children with higher academic achievement scores over a 4 year period (Spagnola & Fiese, 2007).

Studies examining routines and general academic skills among adolescents are generally supportive of a positive relation. For example, Lengyel (2011) found that routines provided structure in the learning environment of adolescents, and this was an important motivational factor leading to improved reading comprehension in adolescents. But evidence of the importance of routines in reading for adolescents does not stop here. It has also been found that within a high-risk group of adolescents in foster care, those that did better academically also had greater numbers of daily routines (Hedin, Höjer, & Brunnberg, 2011). These routines examined in the study did not necessarily rely on the interaction with the adoptive family but also included routines in extracurricular activities and with peers, further demonstrating the protective value of routines in the academic achievement of adolescents and children who are at high risk for underachieving.

Finally, routines in the classroom environment have also been evaluated to examine their impact on various academic outcomes. In a comparison study of different classroom settings for 3 and 4 year old children, two general patterns were observed: a “high-free choice” setting where the majority of the activities were child directed and routines were at a minimum, and a “structured-balanced” setting where relatively equal amounts of time were spent in the child directed and teacher directed routines (Fuligni, Howes, Huang, Hong, & Lara-Cinisomo, 2011). Comparisons of these two settings and their academic outcomes resulted in mixed findings. On the one hand, the structured-balanced settings provided increased opportunities to participate in language/literacy and
math activities. Furthermore these children scored higher on measures of language while the math and socioemotional behavior did not differ between groups. On the other hand, children in the high free-choice setting had more opportunities for gross motor development and fantasy play. This is not an isolated finding as others have suggested that adolescent girls in environments with high levels of routines in the scholastic setting were less likely to be creative (Dasgupta & Sarkar, 2011). Thus, consistent with the literature on child behavioral problems, it seems that the use of routines at inappropriate times or with too much rigidity may actually hinder rather than encourage healthy development (Fiese, 2006).

**Study Concept**

Based upon the comprehensive review of the literature presented thus far, routines appear to have positive effects on behavioral problems among children diagnosed with DSM-IV diagnoses such as ADHD and ASD. However, the equivocal findings and limited research with clinical populations suggests the need for further evaluation of these relations among children with clinical diagnoses. Much of the research reviewed focuses on externalizing behavioral problems; however further research among children with internalizing disorders such as depression or anxiety is also needed. Thus, the purpose of the study is to examine and compare the relations between externalizing and internalizing symptoms among children diagnosed with ADHD, ASD, and depression or anxiety. Furthermore, these relations will be compared within a control group of typically developing children and then further comparisons between those with and without a psychiatric diagnosis will be evaluated.
OBJECTIVES

Specific Aim 1: Identify and compare the relation between routines and problem behaviors in children with and without clinical diagnoses.

Hypothesis 1a. It is expected that the relation between externalizing behavior problems and routines will be negative across all 4 groups (i.e., ASD, ADHD, Depression/Anxiety, and control group). This is based upon the breadth of findings in the above review that tend to show that routines decrease externalizing behaviors in typically developing children (Hair et al., 2008; Jordan, 2004; Loukas & Prelow, 2004). However the relations between routines and externalizing behaviors are expected to be stronger for those in the diagnostic groups than those in the control group. This is hypothesized because children with a clinical diagnosis may be at higher risk for having these problems (Dick, Viken, Kaprio, Pulkkinen, & Rose, 2005; Kushner, Tackett, & Bagby, 2012; Martin, Sven, & Fritz, 2007; Mazurek & Kanne, 2010) and the above review suggests that routines are protective in high risk situations or in times of stress (Clampet-Lundquist et al., 2011; DeCaro & Worthman, 2011; Kliewer & Kung, 1998; Quas et al., 2002; Roche & Leventhal, 2009).

Hypothesis 1b. It is expected that the relation between internalizing problems and routines will be negative across all 4 groups. This is hypothesized because the findings of the review indicate that routines appear to have beneficial effects on emotional or behavior problems in children (Hair et al., 2008; Jordan, 2004; Noble, 2010; Pressman & Imber, 2011), and this may generalize to internalizing problems.
Hypothesis 1c. Group status (control, ADHD, ASD, and Depression/Anxiety) and externalizing/internalizing behavior problems are expected to be moderated by routines. This hypothesis is based on literature showing that children with an ASD may be helped by routines (Bennett et al., 2011; Kashinath et al., 2006; Kern et al., 2007; Laushey et al., 2009). In this way it is expected that children with an ASD who also have higher levels of routines are expected to have lower levels of externalizing behaviors than those with low levels of routines.

Specific Aim 2: Evaluate the role of parental distress on the relation between diagnostic status and routines.

Hypothesis 2a. Based on the idea that a child’s diagnosis may impact parental distress, and that this may lead to difficulties in adherence to routines, the Baron and Kenny model (1986), will be used to evaluate a mediation model. This will be shown by: 1) regressing routines (the criterion variable) on diagnostic status (the predictor variable), 2) Regressing parental distress (the mediator variable) on diagnostic status (the predictor variable), 3) regressing routines (the criterion variable) on diagnosis (the predictor variable) and parental distress (the mediator variable), 4) and by showing a decrease in the regression coefficient of diagnostic status (the predictor variable) when parental distress is included in the model.
RESEARCH DESIGN AND METHODS

Participants

The study included a sample of 184 children between the ages of 6 and 12 years ($M = 9.39, SD = 2.0$). For the total group, 80% were males. The sample was composed predominately of Caucasian (54%) and African American children (39%). The remaining children (7%) were biracial, Asian American, Hispanic American, or Native American. An existing database of children receiving inpatient psychiatric services that included children diagnosed with PDD ($n = 35$), ADHD ($n = 49$), and depression and anxiety ($n = 45$) was supplemented by prospective data collection in an outpatient setting for children with PDD ($n = 10$). In addition, a control group ($n = 45$) of typically developing children was collected through Shelby County Schools in the Birmingham area and added to the database to provide a control group of children without a diagnosis. This resulted in four groups: PDD, ADHD, Depression and Anxiety, and control. Please see table 1 for a description of all demographic factors for the groups.

In order to be included in the study for the three diagnostic groups, it was required that the child be accompanied by the parent to treatment. This parent served as the respondent on all measures. Additionally children were excluded from the diagnostic groups if they had disorders other than PDD, ADHD, or Dep/Anx. Other exclusionary criteria were ages less than 6 years and greater than 12 years. Similarly, for the control group, only parents were asked to complete the questionnaires. No children in the control
group were included if they were less than 6 or greater than 12. Finally, responses indicating any disorder from data collection in the control group were excluded.

Table 1. Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>PDD Freq. (%) (n=45)</th>
<th>ADHD Freq. (%) (n=49)</th>
<th>Dep./Anx. Freq. (%) (n=45)</th>
<th>Control Freq. (%) (n=45)</th>
<th>Total Freq. (%) (n=184)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>8 (17.8)</td>
<td>6 (12.2)</td>
<td>2 (4.4)</td>
<td>6 (13.3)</td>
<td>22 (12.0)</td>
</tr>
<tr>
<td>7</td>
<td>4 (8.9)</td>
<td>4 (8.1)</td>
<td>4 (8.9)</td>
<td>5 (11.1)</td>
<td>17 (9.2)</td>
</tr>
<tr>
<td>8</td>
<td>8 (17.8)</td>
<td>7 (14.2)</td>
<td>5 (11.1)</td>
<td>8 (17.8)</td>
<td>28 (15.2)</td>
</tr>
<tr>
<td>9</td>
<td>5 (11.1)</td>
<td>5 (10.2)</td>
<td>5 (11.1)</td>
<td>5 (11.1)</td>
<td>20 (10.9)</td>
</tr>
<tr>
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<td>7 (14.2)</td>
<td>6 (13.3)</td>
<td>4 (8.9)</td>
<td>23 (12.5)</td>
</tr>
<tr>
<td>11</td>
<td>7 (15.5)</td>
<td>11 (22.4)</td>
<td>12 (26.7)</td>
<td>15 (33)</td>
<td>45 (24.5)</td>
</tr>
<tr>
<td>12</td>
<td>7 (15.5)</td>
<td>9 (18.4)</td>
<td>11 (24.4)</td>
<td>2 (4.4)</td>
<td>29 (15.8)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>40 (88.9)</td>
<td>41 (83.7)</td>
<td>34 (75.6)</td>
<td>33 (73.3)</td>
<td>148 (80.4)</td>
</tr>
<tr>
<td>Female</td>
<td>5 (11.1)</td>
<td>8 (16.3)</td>
<td>11 (24.4)</td>
<td>12 (26.7)</td>
<td>36 (19.6)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>26 (57.8)</td>
<td>18 (36.7)</td>
<td>24 (53.3)</td>
<td>31 (68.9)</td>
<td>99 (53.8)</td>
</tr>
<tr>
<td>African Am.</td>
<td>16 (35.6)</td>
<td>28 (57.1)</td>
<td>17 (37.8)</td>
<td>11 (24.4)</td>
<td>72 (39.1)</td>
</tr>
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<td>1 (2.2)</td>
<td>0 (0.0)</td>
<td>2 (1.1)</td>
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<tr>
<td>Asian Am.</td>
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<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Biracial</td>
<td>1 (2.2)</td>
<td>2 (4.1)</td>
<td>1 (2.2)</td>
<td>3 (6.7)</td>
<td>7 (3.8)</td>
</tr>
<tr>
<td>Other</td>
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<td>1 (2.2)</td>
<td>0 (0.0)</td>
<td>2 (1.1)</td>
</tr>
</tbody>
</table>

Chi Squared tests were conducted to examine potential differences across groups for the demographic variables of age, gender, and race. There was no significant test for age, \( \chi^2(6, n=184) = 3.81, p = 0.70 \), gender, \( \chi^2(1, n=184) = 1.22, p = 0.27 \), or race, \( \chi^2(5, n=184) = 7.72, p = 0.17 \). This result showed that our groups were equivalent on these factors.
Because some data for the PDD group was collected in the inpatient setting and some was collected in the outpatient setting an ANOVA was used to test if there were any relations based on the setting for which the child was receiving services for all of the variables that were assessed in the study. There was not a significant main effect of: internalizing symptoms, $F(1, 44) = 0.24, p > 0.05$, externalizing symptoms, $F(1, 44) = 0.33, p > 0.05$, Hopkins Symptom Checklist, $F(1, 44) = 0.05, p > 0.05$, and Child Routines Inventory, $F(1, 44) = 0.15, p > 0.05$. This finding suggests no systematic effect of collecting data in two different settings.

**Measures**

Demographic variables were collected for all participants. A questionnaire was used to gather descriptive information about children and their families concerning: age, gender, race, and various family factors.

**Achenbach Child Behavior Checklist (CBCL)**

Child behavioral symptoms were assessed using caregiver reports on the CBCL (Achenbach & Rescorla, 2001). Of specific interest are the internalizing and externalizing symptom scales as they are the proxy for problem behaviors in the study. The internalizing symptoms subscale is comprised of 31 items including questions that ask about isolating from others or feeling sad or depressed. The externalizing symptoms subscale is comprised of 33 items including questions about being mean to others or arguing. Caregivers report on these questions using a three point scale (0 = not true, 1 = somewhat true, 2 = very true). This measure is reported to have test-retest reliability of $r = 0.84$ for behavior problems (Achenbach & Edelbrock, 1981). The one week stability
Coefficient for the externalizing symptoms score is .93, and .89 for the internalizing symptoms score (Achenbach, 1991)

**Child Routines Questionnaire, (CRQ)**

Child routines were assessed using the CRQ (Sytsma et al., 2001). This is also a parent report measure that is 39 items asking questions about routine behaviors that children commonly engage in. Responses range from 0 (child never does routine) to 4 (child always does the routine) Items are grouped into four components: daily living routines, household responsibilities, discipline routines, and homework routines. Examples of some of the questions on this measure are, “My child does the same thing each night before bed,” and, “My child straightens bedroom daily.” This measure has good test-retest reliability, $r = .86$, and high internal consistency, Cronbach $\alpha = .90$ (Sytsma et al., 2001).

**Hopkins Symptom Checklist, (HSCL)**

Parental distress was assed using the HSCL (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). This is a 58 item self report measure that is scored on five underlying symptom dimensions including: somatization, obsessive compulsive, irascibility, anxiety, and depression. There are 58 feelings or behaviors that are indicative of distress and respondents are asked to indicate their level of distress for each ranging from 0 (not at all distressed) to 3 (extremely distressed). This measure has good test-retest reliability with a range of between $r = .75$ and $r = .84$, depending on the symptom dimension. It has also demonstrated good internal consistency, Cronbach $\alpha = .84-.87$ (Derogatis et al., 1974).
Procedures

Inpatient

Data for the children admitted for psychiatric treatment were collected at the University of Mississippi Medical Center as part of the child’s routine clinical care. All children included in the study from the inpatient clinical setting were collected as consecutive admissions appointments and were entered into the database consecutively. As part of their routine clinical care the children received a diagnosis from either a child clinical psychologist or psychiatrist.

Outpatient

The prospective data collection of ASD participants was also completed as part of the child’s routine clinical care but was collected at an outpatient clinic for children receiving psychiatric services (Glenwood Autism and Behavioral Health Center) located in the greater Birmingham area. These data were also collected as consecutive appointments to the center. Parents of the children in the outpatient clinic complete these measures as part of their child’s assessment or treatment service. In addition, each of their diagnoses was determined as a result of an assessment from either a child clinical psychologist or psychiatrist.

School

For the collection of a control group a packet was sent home with children from two Shelby County Schools. The two schools were selected because of the racial diversity and diversity in ages of children that attended the schools. The packet included: a letter to the parents with detailed instructions and contact information of the principal investigator, a demographic form, and the parent report measures. A total of 375 packets
were distributed and a total of 82 were returned completed. This resulted in a response rate of 21.9%. Of these 82 individuals 45 were selected based on their demographic factors in order to have equivalency with the three treatment groups on age, gender and race. The selection of the control group participants was blind and random with the exception of the demographic variables mentioned.

Data Analysis

Preliminary analyses examining the relation between demographic variables and internalizing/externalizing symptoms were performed first using zero order correlations. All categorical demographic variables were dummy coded in order to be included in correlational analyses. These analyses were performed to determine if demographic variables should be included as covariates in the later MANCOVA analysis. To address hypotheses 1a and 1b, (there is a negative correlation between internalizing/externalizing symptoms and routines) correlations between internalizing or externalizing symptoms and routines were performed to examine the nature of relation among these variables. To examine differences in the strength of the relation across groups, a Fisher’s r to z transformation was performed.

Hypothesis 1c states that group status (control, ADHD, ASD, and Depression/Anxiety) and externalizing/internalizing behavior problems are expected to be moderated by routines. The MANCOVA analysis was performed with internalizing symptoms and externalizing symptoms entered as the dependent variables. Next, a quartile split was completed on the CRI total score, and this variable along with the diagnostic group of the child was entered as independent categorical variables. Finally, an interaction term of the CRI total score and diagnostic group was entered into the
analyses. A significant effect or the interaction term of the combination of routines and diagnostic group was followed up by a one-way ANOVA of the specific dependent variable for the interaction. To control for multiple comparisons, Fisher’s LSD test was used to follow up pair-wise comparisons. This test is indicated when type I error has been controlled for in an omnibus test and when there is exclusively one null hypothesis to test (Howell, 2002). Also, to understand the importance of the different types of routines on problem behaviors for the total group of children, a MANCOVA was also run with internalizing and externalizing symptoms as dependent variables with routines subscales of daily living, household responsibilities, discipline, and homework entered as the independent variable. Then separate MANCOVAs were run examining the subscales of the CRI for each diagnostic group to test main effects of different types of routines on internalizing or externalizing symptoms.

Follow up tests for the MANCOVA tests of differences in cell means for the interaction and differences between subtypes of routines were then analyzed using Fisher’s LSD (Fisher, 1966). Howell (2002) recommends the use of this test when it follows a significant omnibus test and is used to test exclusively one null hypothesis. In the present case this test will exclusively be used to follow up significant effects in the MANCOVA and will only be used to assess the cell differences in problem behaviors based on which quartile of routines are associated with that cell mean. As such, there is certainly only one null hypothesis, that problem behaviors are related to levels of routines.

To evaluate the second specific aim, which was understanding the role of parental distress on the relation between diagnostic status and routines, the mediating role of
HSCL scores on diagnosis and routines was tested as a three step progressive set of regression analyses according to the model proposed by Baron and Kenny (1986). According to this method, the first step is explored by showing that diagnostic status (predictor variable coded as; 0 = clinically diagnosed group, 1 = control group) predicts the level of routines (criterion variable). The second step involves regressing the HSCL score (mediation variable) onto diagnostic status. If steps 1 and 2 are significant the final step includes regressing routines (criterion variable) on diagnostic status (predictor variable) while including the HSCL (mediation variable) in the model. According to this method a meditational hypothesis is considered to be supported if all three equations are statistically significant and the relation between the diagnostic status and routines is less in the third equation when the HSCL score is included then in the first equation when the mediator was not included. Perfect mediation occurs if diagnostic status has no effect on level of routines. Finally, a Sobel test was used to determine if the change in the regression coefficient for the independent and dependent variable is significant from step 1 to step 3 (Sobel, 1982). This test has been recommended and is regarded as one of the most conservative approaches to testing the significance of the indirect effect (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).
RESULTS

Preliminary Analyses

Demographic variables were correlated with internalizing and externalizing symptoms to determine if any demographic variables should be included as covariates in further analyses. Race (0 = Caucasian, 1 = all other groups) and sex (0 = male, 1 = female) were dummy coded in order to be included in correlational analyses. This resulted in a significant correlation between internalizing symptoms and age, $r(182) = .18$, $p = 0.02$ (see table 2 for all correlations). Since age was the only significantly correlated variable, it will be included as a covariate in further analyses.

Table 2. Zero-order Correlations of Demographic Variables with Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Internalizing</th>
<th>Externalizing</th>
<th>Age</th>
<th>Race</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Externalizing</td>
<td>0.72**</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>0.18*</td>
<td>0.04</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Race</td>
<td>-0.08</td>
<td>-0.01</td>
<td>-0.22</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.05</td>
<td>-0.06</td>
<td>0.01</td>
<td>0.04</td>
<td>1</td>
</tr>
</tbody>
</table>

note: *$p < 0.02$, **$p < 0.001$

Correlational Analyses

Zero order correlations were also used to examine the relation between routines and problem behaviors. As hypothesized, there was a negative relation between the CRI total score and externalizing behaviors for the total group, $r(182) = -.32$, $p < 0.001$. Also
as hypothesized, there was a negative relation between the CRI total score and internalizing symptoms for the total group, $r(182) = -.24, p = 0.001$.

Further correlational analyses examining the relation between the CRI total score and internalizing/externalizing symptoms were also computed for each diagnostic group. The findings revealed only statistically significant relation between internalizing symptoms and routines for the depression/anxiety group, $r(43) = -.56, p < 0.001$. Additionally there were several relations that approached significance in the other clinical groups. The strongest of these relations was the relation between externalizing symptoms and the CRI total score for the ADHD group, $r(47) = -.26, p = 0.07$. The same relation also showed a trend in the PDD group, $r(43) = -.26, p = 0.08$. This is in stark contrast to the control group where the relation between both CRI total score and externalizing symptoms, $r(43) = -.05, p = .77$, and CRI total score and internalizing symptoms, $r(43) = -.05, p = 0.77$, did not approach significance.

It was hypothesized that the correlations between internalizing/externalizing symptoms and the CRI for the ADHD, PDD, and depression/anxiety groups would be higher than those of the control group. This prediction was partially supported by the analysis. The Fishers $r$ to $z$ transformation revealed that the correlations between the CRI and internalizing/externalizing symptoms for the depression/anxiety group were significantly higher than the control group for internalizing symptoms, $z(1, 88) = 2.75, p = 0.003$. Differences in the correlations between CRI total score and externalizing symptoms showed a trend towards significance (ADHD group, $z(1, 92) = 1.02, p = 0.15$, and the PDD group, $z(1, 88) = 1.03, p = 0.15$) when the ADHD or PDD groups were compared to the control group. For details of these relations see table 3.
Table 3. Comparisons of Diagnostic Groups to Control on the Relation of Routines and Problem Behaviors

<table>
<thead>
<tr>
<th></th>
<th>ADHD</th>
<th>Control</th>
<th>Z Score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>$r = -.08$</td>
<td>$r = -.05$</td>
<td>$-0.17$</td>
<td>0.458</td>
</tr>
<tr>
<td>Externalizing</td>
<td>$r = -.26$</td>
<td>$r = -.05$</td>
<td>$-1.02$</td>
<td>0.154</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PDD</th>
<th>Control</th>
<th>Z Score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>$r = .07$</td>
<td>$r = -.05$</td>
<td>$-0.1$</td>
<td>0.459</td>
</tr>
<tr>
<td>Externalizing</td>
<td>$r = -.26$</td>
<td>$r = -.05$</td>
<td>$-1.03$</td>
<td>0.152</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Dep/Anx</th>
<th>Control</th>
<th>Z Score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>$r = -.56$</td>
<td>$r = -.05$</td>
<td>$-2.71$</td>
<td>0.003*</td>
</tr>
<tr>
<td>Externalizing</td>
<td>$r = -.18$</td>
<td>$r = -.05$</td>
<td>$-0.64$</td>
<td>0.262</td>
</tr>
</tbody>
</table>

In addition to differences between diagnostic and control groups, it should also be noted that the negative relation between the CRI total score and internalizing symptoms was significantly greater for the depression/anxiety group than the PDD and ADHD groups. Details about these relations can be found in table 4. There were no other significant relations observed between any of the diagnostic groups.

Table 4. Comparisons of Relations between CRI and Internalizing/Externalizing Symptoms for Diagnostic Groups

<table>
<thead>
<tr>
<th></th>
<th>ADHD</th>
<th>Dep/Anx</th>
<th>Z Score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>$r = -.08$</td>
<td>$r = -.56$</td>
<td>2.601</td>
<td>0.009*</td>
</tr>
<tr>
<td>Externalizing</td>
<td>$r = -.26$</td>
<td>$r = -.18$</td>
<td>-0.37</td>
<td>0.712</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PDD</th>
<th>Dep/Anx</th>
<th>Z Score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>$r = .07$</td>
<td>$r = -.56$</td>
<td>3.23</td>
<td>0.001*</td>
</tr>
<tr>
<td>Externalizing</td>
<td>$r = -.26$</td>
<td>$r = -.18$</td>
<td>-0.4</td>
<td>0.696</td>
</tr>
</tbody>
</table>
Tests of Moderation

Prior to conducting the MANCOVA, correlations were performed between the dependent variables of internalizing and externalizing symptoms to test the MANCOVA assumption that the dependent variables should be correlated with each other. Indeed there was a strong positive correlation between these variables \( r(182) = .72, p < 0.001 \). Additionally the assumption that the covariance matrices between the groups are equal was tested. The Box’s M value of 57.591 was associated with a \( p \) value of .32, which was not significant. This suggests that this assumption was met as well.

When age was included as a covariate the resulting main effect of age was non-significant. Therefore a MANOVA was run to tests the hypothesis that routines would moderate the relation between child’s diagnosis and behavior problems. There was a significant main effect of the CRI total score, Pillai’s Trace = 0.11, \( F(6, 332) = 3.07, p < 0.001 \), and the interaction effect of diagnosis and CRI score, Pillai’s Trace = 0.208, \( F(18, 332) = 2.141, p = 0.005 \) was also significant. The multivariate effect size for the main effect of the CRI total score was estimated at 0.05, which implies that 5% of the variance in the canonically derived dependent variable was accounted for by the total score for measured routines. The multivariate effect size for the interaction effect of the CRI total score and diagnosis was estimated at 0.10, which implies that 10% of the variance in the canonically derived dependent variable was accounted for by the combination of total score for measured routines and the diagnosis of the child.

To explore the significant interaction effect separate ANOVAs for each of the internalizing and externalizing symptom variables were preformed on a new variable that was a pair-wise combination of the 32 cell means. Levene’s \( F \) test was first completed to
ensure that there was homogeneity of variance. This resulted in a significant \( p \) value of .001, however the ANOVA was assumed to be robust when it was observed that the smallest standard deviation (SD = 10.9) was not 4 times smaller than the largest standard deviation (SD = 16.6) (Howell, 2002). The results of these two ANOVAs and all related information can be found in table 5.

**Table 5.** Follow-up ANOVAs for the Interaction, or Moderating Effect of Routines on the Relation between Group Status and Behavior Problems

<table>
<thead>
<tr>
<th></th>
<th>Levene</th>
<th>ANOVA</th>
</tr>
</thead>
</table>
|                  | \( F(15, 168) \) | \( p \) | \( F(9, 168) \) | \( p \) | \( \eta^2 \) |\[
| Externalizing    | 2.34   | 0.005                      | 0.41 | 0.93 | 0.02  |
| Internalizing    | 2.69   | 0.001                      | 3.62 | < 0.001 | 0.16 |

Note: N = 184, \( \eta^2 \) = partial eta squared

The ANOVA for externalizing symptoms was nonsignificant, \( F(9, 168) = 0.41, p = 0.927 \), but the ANOVA for internalizing symptoms was significant, \( F(9, 168) = 3.63, p < 0.001 \). The effect size for the interaction effect of the CRI total score and diagnosis was estimated at 0.16, which implies that 16% of the variance in the dependent variable was accounted for by the two variables. To understand the pattern of the significant interaction the cell means (see table 6) were graphed with internalizing symptoms on the y-axis and CRI score by quartile on the x-axis (see figure 1).
Table 6. Cell Means of Internalizing Symptoms for the Moderating Effect of Routines on Groups

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>PDD*1</td>
<td>18</td>
<td>63.39</td>
<td>6.01</td>
<td>1.42</td>
<td>60.40</td>
</tr>
<tr>
<td>PDD*2</td>
<td>14</td>
<td>66.43</td>
<td>11.79</td>
<td>3.15</td>
<td>59.62</td>
</tr>
<tr>
<td>PDD*3</td>
<td>9</td>
<td>56.78</td>
<td>7.51</td>
<td>2.50</td>
<td>51.00</td>
</tr>
<tr>
<td>PDD*4</td>
<td>4</td>
<td>75.25</td>
<td>7.80</td>
<td>3.90</td>
<td>62.83</td>
</tr>
<tr>
<td>ADHD*1</td>
<td>14</td>
<td>69.86</td>
<td>6.04</td>
<td>1.61</td>
<td>66.37</td>
</tr>
<tr>
<td>ADHD*2</td>
<td>15</td>
<td>69.13</td>
<td>6.17</td>
<td>1.59</td>
<td>65.71</td>
</tr>
<tr>
<td>ADHD*3</td>
<td>12</td>
<td>61.83</td>
<td>10.99</td>
<td>3.17</td>
<td>54.85</td>
</tr>
<tr>
<td>ADHD*4</td>
<td>8</td>
<td>72.00</td>
<td>11.78</td>
<td>4.17</td>
<td>62.15</td>
</tr>
<tr>
<td>DepAnx*1</td>
<td>10</td>
<td>79.40</td>
<td>6.90</td>
<td>2.18</td>
<td>74.46</td>
</tr>
<tr>
<td>DepAnx*2</td>
<td>11</td>
<td>73.45</td>
<td>5.22</td>
<td>1.57</td>
<td>69.95</td>
</tr>
<tr>
<td>DepAnx*3</td>
<td>13</td>
<td>70.31</td>
<td>4.59</td>
<td>1.27</td>
<td>67.53</td>
</tr>
<tr>
<td>DepAnx*4</td>
<td>11</td>
<td>67.55</td>
<td>7.63</td>
<td>2.30</td>
<td>62.42</td>
</tr>
<tr>
<td>Control*1</td>
<td>3</td>
<td>44.00</td>
<td>10.54</td>
<td>6.08</td>
<td>17.83</td>
</tr>
<tr>
<td>Control*2</td>
<td>5</td>
<td>41.60</td>
<td>6.91</td>
<td>3.09</td>
<td>33.02</td>
</tr>
<tr>
<td>Control*3</td>
<td>15</td>
<td>48.47</td>
<td>10.76</td>
<td>2.78</td>
<td>42.51</td>
</tr>
<tr>
<td>Control*4</td>
<td>22</td>
<td>44.64</td>
<td>10.91</td>
<td>2.33</td>
<td>39.80</td>
</tr>
<tr>
<td>Total</td>
<td>184</td>
<td>62.63</td>
<td>13.67</td>
<td>1.01</td>
<td>60.64</td>
</tr>
</tbody>
</table>

Note: Qt. 1 = 0-76, Qt. 2 = 76-101, Qt. 3 = 102-119, Qt. 4 = 120+
Figure 1. Cell Means Showing the Moderating Effect of Routines on Group Status and Internalizing Symptoms: asterisks appear in pairs for significantly different cell means by group.

Follow up comparisons were made using Fisher’s least significant difference (LSD) test to control for multiple comparisons for the significant differences at each level for both CRI score and diagnosis. This test has been criticized for not sufficiently controlling for type I error, however it is used here because it is following up a significant omnibus test, therefore making type I errors unlikely. Furthermore the design of the present experiment used MANOVA to control for type I error by including all dependent variables in one test. Of special importance were the significant differences between quartile three (CRI = 102-119) and four (CRI = 120+) for the PDD and ADHD groups which there were significantly lower levels of internalizing symptoms for the third
quartile than for the fourth, highest quartile. Additionally the significant difference between the first quartile (CRI = 0-76) and the fourth quartile (CRI = 120+) for the depression/anxiety group showed that there was significantly less internalizing symptoms in children with depression and anxiety for increasing amounts of routines. It is also interesting that the difference between internalizing symptoms scores were significantly higher in the depression/anxiety group than for the ADHD and PDD groups.

Because of the significant result for the interaction of the MANOVA, the main effect of CRI total score was not interpreted and no follow up ANOVAs were conducted. However, to further evaluate the specific types of routines that may influence symptomology, follow up tests were performed with the different subtypes of routines from the CRI, leaving interaction effects out of the model. These include daily living routines, household responsibilities, discipline routines and homework routines. The box’s M was calculated at 115.19, \( p = 0.005 \). According to one source this is equivalent to the cut off for the Box’s M procedure, as a significant result would need to exceed the 0.005 level to be significant (Tinsley & Brown, 2000). Again a MANCOVA was first run with the covariate of age. In this initial test there was no main effect of age, and so a MANOVA was run with the dependent variables of internalizing and externalizing symptoms and only the four previously mentioned of the CRI entered as the independent variable. Additionally the model was specified to only include main effects and the interactions between subtypes of routines were excluded. The strongest main effect was for homework routines, Pillai’s Trace = 0.12, \( F(6, 342) = 3.53, p = 0.002 \). The multivariate effect size for the main effect of homework routines was estimated at 0.06, which implies that 6% of the variance in the canonically derived dependent variable was
accounted for by measured homework routines. Also significant was the effect of household responsibilities, Pillai’s Trace = 0.10, $F(6, 342) = 3.01$, $p = 0.007$. The multivariate effect size for the main effect of household responsibilities was estimated at 0.05, which implies that 5% of the variance in the canonically derived dependent variable was accounted for by household responsibilities. Taken together these results suggest that the two types of routines that were the most strongly related to behavioral problems when all groups were combined together were homework routines and household responsibilities.

To follow up significant results of the MANOVA, ANOVAs were separately run for internalizing and externalizing symptoms, testing significant differences between types of routines. In both cases the Levene’s test was not significant, and so the assumption of homogeneity of variance was assumed (see table 5 for results of Levene’s test). There were significant differences for externalizing symptoms, $F(3, 171) = 5.63$, $p = 0.001$, and internalizing symptoms, $F(3, 171) = 3.56$, $p = 0.016$, based on homework routines. The effect size was estimated at 0.09 for externalizing symptoms and 0.06 for internalizing symptoms, which implies that 9% and 6% of the variance in the dependent variable was accounted for by homework routines, respectively. There were also significant differences in externalizing symptoms, $F(3, 171) = 3.50$, $p = 0.017$, and internalizing symptoms, $F(3, 171) = 4.87$, $p = 0.003$, based on household responsibilities. The effect size was estimated at 0.06 for externalizing symptoms and 0.08 for internalizing symptoms, which implies that 6% of the variance in externalizing behaviors was accounted for by household responsibilities and 8% of the variance in internalizing symptoms behaviors was accounted for by household responsibilities (see table 7 for the
results of these ANOVAs and figure 2 for graphical representation of cell means for quartile difference among ANOVAs).

**Table 7.** Follow up ANOVAs for Internalizing and Externalizing Symptoms Scores for Type of Routine

<table>
<thead>
<tr>
<th>Type of Routine</th>
<th>Levene F(3, 180)</th>
<th>p</th>
<th>ANOVA F(3, 171)</th>
<th>p</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ext. 2</td>
<td>1.08</td>
<td>0.25</td>
<td>3.5</td>
<td>0.017</td>
<td>0.06</td>
</tr>
<tr>
<td>Int. 2</td>
<td>1.36</td>
<td>0.08</td>
<td>4.87</td>
<td>0.003</td>
<td>0.08</td>
</tr>
<tr>
<td>Ext. 4</td>
<td>1.08</td>
<td>0.25</td>
<td>5.63</td>
<td>0.001</td>
<td>0.09</td>
</tr>
<tr>
<td>Int. 4</td>
<td>1.36</td>
<td>0.08</td>
<td>3.56</td>
<td>0.016</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Note: N = 184, 2 = Household Responsibilities, 4 = Homework Routines, $\eta^2$ = partial eta squared
Again Fisher’s LSD was used to follow up comparisons of differences based on differences between quartile for each oneway ANOVA because type I error has been corrected for by the design of the omnibus MANOVA. An examination of the difference between quartiles for the homework routines and household responsibilities reveals that in nearly every case quartiles 1 and 2 were associated with significantly greater internalizing and externalizing symptoms than quartiles 3 and 4. Because quartiles 1 and 2 are indicative of fewer routine behaviors this result indicates that having more routines in these two domains is associated with less problem behaviors. For details of all comparisons including effect sizes see table 8.

**Figure 1.** Cell Means of Internalizing/Externalizing Symptoms for Significant Follow-up ANOVAs
Table 8. All Possible Pair-wise Comparisons for Homework Routines and Household Responsibilities

<table>
<thead>
<tr>
<th></th>
<th>Externalizing</th>
<th>Internalizing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>Sig.</td>
</tr>
<tr>
<td>Homework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 &gt; Q2</td>
<td>1.6</td>
<td>0.517</td>
</tr>
<tr>
<td>Q1 &gt; Q3</td>
<td>8.92</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q1 &gt; Q4</td>
<td>15.09</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q2 &gt; Q3</td>
<td>7.32</td>
<td>0.003</td>
</tr>
<tr>
<td>Q2 &gt; Q4</td>
<td>13.49</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q3 &gt; Q4</td>
<td>6.17</td>
<td>0.011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Externalizing</th>
<th>Internalizing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>Sig.</td>
</tr>
<tr>
<td>Household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 &gt; Q2</td>
<td>0.25</td>
<td>0.918</td>
</tr>
<tr>
<td>Q1 &gt; Q3</td>
<td>11.85</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q1 &gt; Q4</td>
<td>10.3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q2 &gt; Q3</td>
<td>11.6</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q2 &gt; Q4</td>
<td>10.05</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Q3 &gt; Q4</td>
<td>-1.55</td>
<td>0.533</td>
</tr>
</tbody>
</table>

Follow up analyses for each diagnostic group was then performed using regression analyses with internalizing and externalizing symptoms entered as the dependent variable and the four subtypes of routines entered as the independent variables. For the PDD group the models for both externalizing and internalizing symptoms were significant. When the four subtypes of routines were used to predict internalizing symptoms a significant proportion of variance was accounted for, $R^2 = .26$, $F(4, 40) =$.
3.58, \( p = .014 \). Additionally, a significant amount of variance in externalizing symptoms was accounted for by the four subtypes of routines, \( R^2 = .23, F(4, 40) = 2.98, p = .03 \). Only the discipline routines and homework routines emerged as significant predictors of externalizing symptoms suggesting that more homework routines and less discipline routines were related to less externalizing symptoms in this group. Only discipline routines were significant in predicting internalizing symptoms suggesting that again, less discipline routines were related to less internalizing symptoms in the PDD group. For a detailed look at the results of this analysis please see table 9.

**Table 9.** Regression Analysis Examining the Importance of Type of Routines for Problem Behaviors in Children with PDD

<table>
<thead>
<tr>
<th>Type of Routine</th>
<th>Externalizing</th>
<th></th>
<th>Internalizing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>( \beta )</td>
<td>B</td>
</tr>
<tr>
<td>Daily Living</td>
<td>-0.33</td>
<td>0.27</td>
<td>-0.25</td>
<td>-0.39</td>
</tr>
<tr>
<td>Household</td>
<td>-0.19</td>
<td>0.22</td>
<td>-0.19</td>
<td>-0.41</td>
</tr>
<tr>
<td>Discipline</td>
<td>0.43</td>
<td>0.19</td>
<td>0.52*</td>
<td>0.68</td>
</tr>
<tr>
<td>Homework</td>
<td>-0.54</td>
<td>0.23</td>
<td>-0.45*</td>
<td>-0.06</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.23</td>
<td></td>
<td></td>
<td>0.26</td>
</tr>
<tr>
<td>( F )</td>
<td>2.99*</td>
<td></td>
<td></td>
<td>3.58**</td>
</tr>
</tbody>
</table>

*\( p < .05 \). **\( p < .01 \).

The models predicting internalizing and externalizing symptoms for the ADHD group were not significant. However the models predicting both internalizing and externalizing symptoms in the depression/anxiety group were significant. There was a significant amount of variance in both internalizing and externalizing symptoms accounted for by the four subtypes of routines (\( R^2 = .35, F(4, 40) = 5.41, p = .001; R^2 = .30, F(4, 40) = 4.27, p = .006, \) respectively) In both models household routines emerged
as a significant predictor with higher levels of routines being related to fewer symptoms. Additionally there was a significant relation between more discipline routines and fewer externalizing symptoms for this group. For a detailed description of these analyses please see table 10.

**Table 10. Regression Analysis Examining the Importance of Type of Routines for Problem Behaviors in Children with Dep/Anx**

<table>
<thead>
<tr>
<th>Type of Routine</th>
<th>Externalizing</th>
<th>Internalizing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Daily Living</td>
<td>0.31</td>
<td>0.30</td>
</tr>
<tr>
<td>Household</td>
<td>-0.47</td>
<td>0.24</td>
</tr>
<tr>
<td>Discipline</td>
<td>-0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>Homework</td>
<td>-0.05</td>
<td>0.29</td>
</tr>
</tbody>
</table>

*R² = 0.30, F(4, 40) = 4.27**, p < .05.  **p < .01.

Finally, the model predicting externalizing behaviors but not internalizing symptoms was significant for the control group. A significant amount of variance in externalizing symptoms was accounted for by the four subtypes of routines, *R² = 0.22, F*(4, 40) = 2.81, *p = .038. All four of the subtypes of routines were either significant or approached significance. It is interesting to note that increases in both daily living and discipline routines were related to more externalizing symptoms while household responsibilities and homework routines were in the opposite direction. For the details of this analysis, please see table 11.
Table 11. Regression Analysis Examining the Importance of Type of Routines for Problem Behaviors in Typically Developing Children

<table>
<thead>
<tr>
<th>Type of Routine</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Living</td>
<td>0.61</td>
<td>0.30</td>
<td>0.58**</td>
</tr>
<tr>
<td>Household</td>
<td>-0.91</td>
<td>0.34</td>
<td>-0.73***</td>
</tr>
<tr>
<td>Discipline</td>
<td>0.57</td>
<td>0.30</td>
<td>0.56*</td>
</tr>
<tr>
<td>Homework</td>
<td>-1.04</td>
<td>0.56</td>
<td>-0.50*</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td></td>
<td>2.81**</td>
<td></td>
</tr>
</tbody>
</table>

*p < .07.  **p < .05.  ***p < .01.

Tests of Mediation

It was hypothesized that the child’s diagnosis would have an impact on the levels of routines used and that this relation would be mediated by parental distress. In order to test this hypothesis, each diagnostic group was individually compared to the control group in a three step mediation analysis following the methods of Baron and Kenny (1986). For the ADHD group, there were several relations where partial mediation may exist. In step 1 diagnosis (a categorical variable of either control, 2, or ADHD, 1) significantly predicted CRI score, suggesting that the control group had higher levels of routines. In step 2 it was observed that the relation of HSCL depression and irascibility subscales and diagnostic status was significant. Finally, for step 3, when HSCL depression or irascibility subscales were included in the model with diagnosis predicting CRI total score, there was a significant decrease in the relation between diagnosis and CRI total score. A sobel test for the indirect effect of the mediating relation between HSCL depression and irascibility for the relation of diagnosis and CRI total score was
also significant. The results of all three tests and the significant sobel statistic for the indirect effect can be found in table 12.

**Table 12.** Regression Analyses for Testing Parental Distress as a Mediating Variable for the Negative Relation Between Diagnosis of ADHD and Amount Routines

<table>
<thead>
<tr>
<th>Equation</th>
<th>Predictor</th>
<th>Criterion</th>
<th>F</th>
<th>Sig.</th>
<th>R²</th>
<th>β</th>
<th>Sobel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>13.82</td>
<td>&lt; 0.001</td>
<td>0.13</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diagnosis</td>
<td>HSCL Depression</td>
<td>31.09</td>
<td>&lt; 0.001</td>
<td>0.24</td>
<td>-0.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>7.19</td>
<td>0.001</td>
<td>0.14</td>
<td>0.32</td>
<td>2.31*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSCL Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation</th>
<th>Predictor</th>
<th>Criterion</th>
<th>F</th>
<th>Sig.</th>
<th>R²</th>
<th>β</th>
<th>Sobel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>13.82</td>
<td>&lt; 0.001</td>
<td>0.13</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diagnosis</td>
<td>HSCL Irascibility</td>
<td>42.23</td>
<td>&lt; 0.001</td>
<td>0.31</td>
<td>-0.56</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>7.28</td>
<td>0.001</td>
<td>0.13</td>
<td>0.3</td>
<td>2.52**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSCL Irascibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.1</td>
</tr>
</tbody>
</table>

**Note:** * < 0.05, ** < 0.01

Partial mediation was also supported when the depression/anxiety group was included in analyses, as investigated by the Baron and Kenny model (1986). The first step of the model was to examine the relation between diagnostic status (a categorical variable of either control, 1, or depression/anxiety, 0) and the CRI Total score. The regression was significant, suggesting that the control group had more routines. Three subscales of the HSCL including; total score, depression, and anxiety were also shown to individually be significantly related to diagnostic status in step 2 of the meditational analyses. Finally when HSCL total score, depression, and anxiety subscales were included in the model with diagnosis predicting CRI total score (step 3); there was a significant decrease in the relation between diagnosis and CRI total score. A sobel test examining the mediating effect of the HSCL subscales on the relation between diagnosis and the CRI total score was also significant. Please see table 13 for a full description of these three step models and Sobel test values.
### Table 13. Regression Analyses for Testing Parental Distress as a Mediating Variable for the Negative Relation between Diagnosis of Depression/Anxiety and Amount of Routines

<table>
<thead>
<tr>
<th>Equation</th>
<th>Predictor</th>
<th>Criterion</th>
<th>F</th>
<th>Sig.</th>
<th>$R^2$</th>
<th>$\beta$</th>
<th>Sobel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>3.71</td>
<td>0.057</td>
<td>0.04</td>
<td>0.201</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diagnosis</td>
<td>HSCL Total</td>
<td>8.04</td>
<td>&lt; .001</td>
<td>0.21</td>
<td>-0.46</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>4.27</td>
<td>0.017</td>
<td>0.09</td>
<td>0.085</td>
<td>2.46**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSCL Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.25</td>
</tr>
<tr>
<td>1</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>3.71</td>
<td>0.057</td>
<td>0.04</td>
<td>0.201</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diagnosis</td>
<td>HSCL Depression</td>
<td>6.51</td>
<td>&lt; .001</td>
<td>0.25</td>
<td>-0.51</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>3.53</td>
<td>0.034</td>
<td>0.08</td>
<td>0.09</td>
<td>2.32*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSCL Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equation</th>
<th>Predictor</th>
<th>Criterion</th>
<th>F</th>
<th>Sig.</th>
<th>$R^2$</th>
<th>$\beta$</th>
<th>Sobel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>3.71</td>
<td>0.057</td>
<td>0.04</td>
<td>0.201</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diagnosis</td>
<td>HSCL Anxiety</td>
<td>14.32</td>
<td>&lt; .001</td>
<td>0.13</td>
<td>-0.37</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>CRI Total Score</td>
<td>3.9</td>
<td>0.024</td>
<td>0.08</td>
<td>0.12</td>
<td>2.54**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSCL Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.22</td>
</tr>
</tbody>
</table>

**Note:** * < 0.05, ** < 0.01

The same series of analyses were performed with the PDD group but there were no indications of mediation. In step 1 the diagnostic status was used to predict level of the CRI total score, and this was found to be significant. However, in step 2, diagnosis did not predict any of the HSCL subscales, and so the mediation model was therefore not significant for this group and the final step of mediation was not examined.
DISCUSSION

The results of this study extend some common findings concerning the importance of routines among typically developing children to children with psychiatric disorders. It also extends the current literature by examining the potential benefits of subtypes of routines within both a clinical and nonclinical population of children. As predicted there was a strong negative relationship between internalizing symptoms and routines for the depression group as well as a trend for the negative relation between routines and externalizing symptoms to be stronger in the PDD and ADHD groups than the control group. This suggests that routines may be especially important for these groups. Furthermore, routines have specific and differential effects across diagnoses. For example, routines were found to moderate the relation between group status and internalizing symptoms in the groups with clinical diagnoses and not for externalizing. This is in contrast to the finding that routines were especially important at reducing externalizing behaviors for typically developing child, but not for children with and ASD (Henderson et al., 2011). In addition to examining the role routines may play in predicting problem behaviors, this study also examined the predictors of routines themselves, including parental distress and diagnostic status. It was found that parental distress partially mediated the relation between diagnostic status and routines for the ADHD and depression groups when they were compared to the control group. Taken together these results provide support for the hypothesis that routines likely impact comorbid problem behaviors among children who have a clinical diagnosis. In addition,
relations between routines and internalizing behaviors, an area that has been relatively neglected in the current research on routines in children, was evaluated.

*Correlational Analyses*

Both hypothesis 1a, which states that the relation between externalizing behavior problems and routines would be negative across all 4 groups and that relations between routines and externalizing behaviors were expected to be stronger for those in the diagnostic groups than those in the control group, and hypothesis 1b, which stated the relation between internalizing problems and routines will be negative across all 4 groups, were fully or partially supported in the present investigation. For both internalizing an externalizing symptoms there was a strong negative relation between routines and these problem behaviors, suggesting that like typically developing children, children with clinical diagnoses may benefit from having routines. However, it was surprising that the relation between the CRI and externalizing symptoms was not significant for the individual diagnostic groups. Nevertheless the relation between the CRI and externalizing symptoms was significant for the total group when combined. The disparate findings may be because, by separating the groups the sample size was decreased by approximately 75% and there may not have been enough power within each diagnostic group to detect significant relations.

When examining the relation between the CRI total score and internalizing symptoms, the depression/anxiety group showed a strong negative relation for the total group. Furthermore when the diagnostic groups were compared to the control group and to each other, the relation between the CRI total and internalizing symptoms was significantly stronger for the depression/anxiety group than the other groups. With the
relation being especially strong for the depression/anxiety group it may be that routines are particularly important in reducing internalizing symptoms. This finding is especially important because it demonstrates the importance of investigating the relation between routines and internalizing symptoms. There is a great paucity of research in this area, with the preponderance of empirical evidence focusing on externalizing behaviors. The present investigation seems to demonstrate the importance of routines for children who are experiencing disorders such as anxiety and depression, which are characteristic of internalizing symptoms.

This relation is also important in terms of parenting recommendations that may help to effectively reduce and alleviate the symptoms of depression and anxiety. Additionally, the same can be said of the trend in the negative relation between the CRI total score and externalizing behaviors that was found for the PDD and ADHD groups. For all of these results, the symptoms that are associated with each of these disorders are either diagnostic of the disorder or are strongly associated features. Therefore finding that routines were related to these symptoms in these groups gives practitioners reason to make recommendations about including routines for children diagnosed with these disorders to reduce symptoms and associated problem behaviors for these children.

*Routines as a Moderator of Group Status and Problem Behaviors*

Hypothesis 1c (group status and externalizing/internalizing behavior problems are expected to be moderated by routines) was partially supported in the present analysis. It was however very surprising in the way that the hypothesis was supported, in that it was not the externalizing symptoms that were driving the moderation effect between groups. In the literature it has been found that children with ASD did not respond to high levels
of routine by reducing their externalizing behaviors at the same rate this effect occurred in typically developing children (Henderson et al., 2011). In our ANOVA for externalizing symptoms both the main effect of diagnosis and routines, were significant but the interaction was not, suggesting that lower levels of externalizing symptoms were associated with more routines (main effect of routines), but routines did not moderate the relation between group status and externalizing symptoms (non-significant interaction effect). This finding is consistent with the current literature which suggests routines are generally helpful in reducing externalizing behaviors among children with autism, typically developing children, and children with ADHD (Henderson et al., 2011; Sara Sytsma Jordan, 2004; Kliewer & Kung, 1998; Pressman & Imber, 2011). The present findings also extend the current literature to include children with depression/anxiety.

In contrast to the findings for externalizing behaviors, the finding that routines were a moderator of the relation between group status and internalizing symptoms was among the most important and clinically relevant of the study. By identifying routines as a moderator, specific relations between levels of routines and internalizing behaviors can be understood and more specific recommendations about what level of routine is most helpful for preventing internalizing symptoms across various diagnoses was evaluated. Additionally the fact that there was apparently no difference between the groups for the externalizing symptoms was also an important finding. For the externalizing symptoms diagnostic status it did not seem to matter; it was consistently found that decreases in externalizing symptoms were associated with increases in routines. In contrast, the highest quartile of routines was associated with the highest levels of internalizing behaviors for the PDD and ADHD groups, while the third quartile, representing a
moderate level of routines was associated with the least number of internalizing symptoms. This suggests that for children with either of these diagnoses and comorbid internalizing symptoms, it is possible that the parent should receive recommendations about the appropriate and moderate use of routines. It is important that routines are still utilized, as the lowest levels of internalizing symptoms were associated with a moderate level of routines as measured by the CRI.

There are many possible explanations why this pattern of findings for children with PDD or ADHD may have been observed in this sample. First, the features of these disorders may impact the findings. Restricted and repetitive interests are one of the diagnostic features of PDD and these behaviors are known to increase in anxiety-provoking situations. Therefore, it is possible that when a measure of routines that was developed for typically developing children is used on a clinical sample that has repetitive behaviors as a diagnostic feature, routines become a representation of anxiety (Rodgers, Glod, Connolly, & McConachie, 2012). In fact, it has recently been found that children with an autism spectrum disorder who are anxious display significantly more repetitive behaviors than their less anxious peers with autism (Rodgers et al., 2012). Nevertheless, it is possible that those who were more anxious and had more repetitive behaviors had more internalizing symptoms and scored higher on the CRI because they lead highly routinized lifestyles. This is a very interesting question for future research but a certain answer was not possible to attain in our sample as we did not manipulate any of the variables under study. That being said from the standpoint of the clinician, the recommendation to limit routines to moderate levels for this group does not change based on the competing explanations for this relation.
With respect to children with ADHD it may be that very high levels of routines are indicative of parents who are very involved with their child’s daily activities and may be highly engaged in the direction of what the child is doing. This is consistent with seeing routines as a mid level family systems approach described by Fiese (2006). It is no secret that impulsive and inattentive symptoms are exhibited by children with ADHD do not do well in highly structured environments. This is evidenced by teachers commonly becoming concerned about children with ADHD in the classroom. It may be that children with ADHD are stressed by a highly structured approach to parenting and may experience distress in response to this manifested as an increase in internalizing symptoms. The clinician of a child with ADHD must therefore balance the benefits high levels of routines that are related to less externalizing behaviors with the finding that too many routines could lead to internalizing behavior problems. Therefore parents of children who are struggling with internalizing symptoms could be counseled to have moderate levels of routines, while those with problems relating to externalizing symptoms may wish to have very high levels of routines while monitoring internalizing symptoms.

Finally it must be stated that while there are some special features for the PDD and ADHD groups, it was observed in this sample that more routines were consistently associated with less internalizing symptoms in the depression group. This is important because it suggests that instead of being detrimental, the highly structured and involved parenting style indicated by high CRI scores is helpful in this population. Therefore children with depression may benefit from more routines with their internalizing symptoms, as well as externalizing symptoms.
**Effects of Different Types of Routines**

When all groups were analyzed together it was generally found that high levels of homework routines and household responsibilities were associated with fewer problem behaviors. It should not be interpreted that the other routines are not important, but rather these type of routines accounted for the majority of the variability in problem behaviors when the groups were combined. When you compare this result to the initial psychometrics of the CRI, it was daily living routines that account for the most variability and homework routines that accounted for the least (Sytsma et al., 2001). The difference may lie in the features of homework and household responsibilities relative to children with psychopathology. It may be that these types of routines may be less prioritized by parents who are raising children with clinical diagnoses and that those who persist in them are the ones who are more likely to see fewer problem behaviors.

Also very interesting, were the regression analyses showing the specific relationships for each subtype of routines within each group. Similar to the findings for the moderation hypothesis, more routines are not always better. This was true for the PDD group with respect to discipline routines. In fact, more discipline routines were related to more internalizing and externalizing symptoms. This finding is clinically relevant because it suggests that parents of children with PDD may need to moderate the amount and manner of discipline routines for their children with PDD in order to reduce internalizing and externalizing symptoms. Certainly this must be wisely administered, with special care to be given to how to discipline a child with PDD, not that a child with PDD should not be disciplined. For example children with PDD may have trouble understanding a set of rules because they may not be able to see how a rule applies in
different situations. Therefore the parent of a child with PDD may need to spend extra
time explaining how rules apply in different situations. In this respect some additional
social skills and situational training for the child with PDD may be necessary to have
discipline routines not be a detriment to problem behaviors. It is also important to note
that a review of interventions for reducing problem behaviors in children with an ASD
found that ignoring problem behaviors in order to extinguish the behavior as well as
avoiding situations that are related to problem behaviors are generally the most successful
strategies (Horner, Carr, Strain, Todd, & Reed, 2002). This contrasts with the
development in the CRI for typically developing children, which uses questions about
amount and level of punishment for bad behavior as well as participation in structured
family activities to account for large amounts of variability in the measure (Sytsma et al.,
2001). It may be that the routines which make up the discipline scale are helpful in
typical children, but may not be the best course of action for a child with and ASD in
terms of reducing internalizing and externalizing symptoms.

We must also consider alternative hypotheses which have not been ruled out as
result of the design of the study with respect to the positive relation between discipline
routines and problem behaviors in the PDD group. It may be that children with PDD
have more problem behaviors in general and so parents of these children are required to
have more discipline routines in order to deal with these large numbers of problem
behaviors.

In contrast, the findings with the depression/anxiety group suggest that higher
levels of discipline routines were related to fewer symptoms. Parents of children with
depression or anxiety should be especially aware of having good routines regarding
discipline and household responsibilities. More specifically, discipline routines were related to less externalizing symptoms and this may be because routines act as an antecedent and reduces acting out behaviors in children with depression or anxiety. Further for both internalizing and externalizing symptoms, engaging in household responsibilities may be helpful. In depression and anxiety it may be helpful to have some structure for activities such as keeping the house clean or getting things done around the house as this may lead to a sense of mastery or accomplishment which is consistent with behavioral activation theory. Randomized controlled clinical trials have found that behavioral activation therapy, a method where activities are reinforced and promoted to reduce depressive affect, has been found to be effective at reducing depression (Dimidjian et al., 2006; Hopko, Lejuez, LePage, Hopko, & McNeil, 2003)

Mediating Role of Parental Distress

The second specific aim of the study was to evaluate the role of parental distress on the relation between diagnostic status and routines. It was hypothesized that a child’s diagnosis may impact parental distress, and that this may lead to difficulties in adherence to routines. Parental distress, especially maternal depression is dominate in the literature as playing a reciprocal role in various child adjustment problems (Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004). And indeed we did find that measures of parental distress were partially mediating the role between diagnosis and level of routines in two of the clinical groups; depression/anxiety and ADHD. Specifically it was found that total HSCL, HSCL depression and HSCL anxiety were important in the depression group and that HSCL irascibility and HSCL depression were important in the ADHD group.
For children with depression, it may be especially important for clinicians to address the problems of maternal depression and anxiety specifically. Additionally for these children it should also be addressed that the total scores for parental distress was a significant mediator of the relation between group status and routines. Therefore, in this group where lower levels of internalizing symptoms were associated with increased routines it may be helpful to treat the mother within the clinical setting in addition to the child for the indirect purpose of increasing routines. This is certainly an interesting indicator, but this result must be approached with caution as the present investigation did not include a manipulation of the independent variable.

Within the ADHD group the parental distress factor of irascibility was found to mediate the relation between ADHD diagnosis and routines. It seems plausible that mothers who are easily angered or irritated by their children who have ADHD may be discouraged from engaging in a parenting practice like routines. These parents may have lost the patience to do the very thing that could provide them with some relief from their child’s expression of externalizing behaviors. Interventions that help the parents with addressing their anger response, both generally as well as towards their child’s problem behaviors, may be helpful in ultimately increasing routines. Similar to the depression/anxiety group, parental depression partially mediated the relation between diagnosis and routines for the ADHD group. Thus addressing parental depressive symptoms could be helpful in increasing routines for these children.

With respect to the PDD group, the second step of the mediation model found that diagnostic status did not predict any of the HSCL subscales. It may be that for the PDD group, there are other factors aside from parental distress that act as an antecedent to the
presence of routines. Additionally, the fact that mediation was not supported in the PDD group, may suggest that further research on antecedents to routines for children with this diagnosis could be explored.

**Limitations**

As mentioned previously, the primary limitation of this study was that there was no manipulation of the independent variables. This leads to some ambiguity of the direction of our relations. Examples of this from the present investigation include the interpretation of the PDD group with comorbid internalizing symptoms having the lowest levels of symptoms related to moderate use of routines. It is unknown if the features of the disorder caused this relation, such that those with high levels of routines were also more anxious. Also this group also demonstrated greater levels of problem behaviors relative to discipline routine increasing. This result seems counter-intuitive, and again, it may not be the case that routine caused problem behaviors. Nevertheless, the current study addresses two important topics that have received relatively little attention in the literature: the role of routines among a clinical population of children and potential predictors of routines.

In addition, it must also be noted that this study relied solely on parent report measures and these measure may be limited in terms of social desirability and accurateness of child or parent behaviors. However, the measures used are widely recognized as reliable and valid measures of child and parent behavior and adjustment. The value of assessing such a variety of variables in a way that is cost effective cannot be understated. While multi-informant and multi-method assessment is ideal, the methodology in the current study is consistent with other research in this area (Henderson
et al., 2011; Ivanova & Israel, 2006; Sara Systma Jordan, 2003). Furthermore, it is more cost and time effective than other methods of assessment, thus increasing the probability of participation by individuals. Additionally while routine behavior would be best assessed through direct observations, obtaining accurate data would be challenging due to the influence that the presence of researcher is likely to have on an individual’s behaviors.

Additionally as routines have previously been shown to be related to positive parenting and we have interpreted our results based on this concept, the ethnic or socioeconomic factors of parenting behaviors and their relation to problem behaviors through the lens of routines was not examined. It is traditionally conceptualized that there are differences based on ethnicity or other cultural factors such as socioeconomic status (SES), around the impact of parenting style (Baumrind, 1972). Still others argue that various factors such as ethnicity or SES matter very little with respect to parenting practices (Knight & Virdin, 1994; Mason & Cauce, 1996; Steinberg, Mounts, Lamborn, & Dornbusch, 1991), or that authoritarian parenting is simply less harmful to minority children or those of low SES than it is for their higher SES or Caucasian peers (Steinberg, 2001). Nonetheless, because of the nature of the database, we are unable to analyze such factors, as SES factors are not included in the database, nor was our number of children enough to compare groups of children with different ethnicities within groups.

The generalizability of the study is also limited in terms of the much larger proportion of males in the groups compared to females; with about 80% of the sample being male. The reason that the sample was not more representative of females was rooted in the much greater occurrence of males having PDD, which is commonly found
to be at a rate of about 4:1 (Ehlers, Gillberg, & Wing, 1999). Our sample reflects this ratio and we gave preference to using equivalent groups over representing females at greater rates.

**Future Research**

There are several directions for the progression of our understanding of routines and their influences on child behavior based on this study. To begin with, it would be exceedingly interesting to assess routine behaviors in a true experimental design, with a manipulation of routines and assess the impact on problem behaviors. In this same right it would also be interesting to test the partial mediation relationship found in the depression/anxiety and ADHD groups in an experimental way with manipulation of the independent variable. Additionally, a deeper understanding of the diagnosis specific impact of routines on problems behaviors could be examined in a true experimental design using a continuous measure of clinical diagnosis. In this way it could be investigated with manipulation of the independent variable and with respect to the severity of the child’s diagnosis in terms of diagnostic indicators of the child’s symptoms.

In keeping with the limitations of the study, it is exceedingly interesting to understand the multiple effects of SES and ethnicity on children with clinical diagnoses. This investigation would enlighten the debate around the different effects of these factors in parenting practices in general, as well as lead to clinically relevant indicators for helping children with clinical diagnoses.

With respect to generalizing the results of the study to females, future research may aim to investigate these relations in terms of the ratios that each of these individual clinically diagnosed groups is known to have. The current study is generalizable to
children with an ASD, but not as much to children with a disorder like depression, which typically manifests in equal numbers for prepubescent boys and girls (Egger & Angold, 2006). In this way it may be necessary to examine each disorder in terms of its ethnographic presentation in order for the results to generalize to other diagnoses more conclusively.

Another interesting avenue to pursue would be the way that routines are a part of positive youth development. The literature to date, as well as the present investigation, focuses on problem behaviors. It is also interesting to know the relation of routines in the development of children with respect to qualities other than problem behaviors. It is quite likely that routines play a role in positive youth development and may relate to behaviors that are very beneficial as well as reducing problem behaviors.

Conclusions

An exhaustive review of the existing body of literature on routines has exposed evidence supporting a meta-theory of routines; including developmental evolutionary, implicit habit formation, and behavioral perspectives. In this way and through the above work it seems that routines are rooted in our evolutionary past, have a neurological basis, and are practiced and mechanized behaviorally. Therefore, a new theoretical perspective incorporating these perspectives to view and understand routines is proposed. This view encompasses the best knowledge of what we know about routines and works in many ways explain the multifaceted nature of routines.

This meta-theory is difficult to find support in the present investigation because the measures and methods used did not specifically address developmental evolutionary theory and implicit learning components of the theory. Further research targeting these
components and utilizing new measures or methodologies are needed to advance this meta-theory in terms the aforementioned theoretical components. However, there were confirmations of some of the behavioral components of the theory; which are by design much easier to identify through the present methods. For example, the finding that there was a negative relation between problem behaviors and routines suggests that routines could act as an antecedent to rule governed behavior. Additionally, it was found that for the PDD group the highest levels of routines were associated with more internalizing behavior problems. This may suggest that practicing more routines exacerbates these children’s anxiety.

The present investigation reiterated the generally beneficial effects of routines on typically developing children and extended this to children with ADHD, PDD and depression/anxiety. Additionally some of the most robust findings in the study were found when internalizing symptoms were investigated. Clinicians should further investigate with experimental manipulations the patterns seen in the different diagnostic groups regarding these symptoms as it could prove to be especially helpful in reducing the very destructive effects that result from the presence of internalizing symptoms.

It is clinically significant to understand the different ways that routines may be important or even demand extra manipulation beyond typically developing children. The best example of this is when discipline routines as assessed by the CRI, a measure developed for typically developing children, are predictive of greater amounts of problem behaviors in children with PDD.

This study offers a systematic and empirical investigation of the effects of routines using a reliable and valid measure of routines, the CRI, to investigate the
usefulness of routines in decreasing problem behaviors. For the most part it was found that just like there typically developing peers, and possibly even more so in some cases routines are a helpful parenting practice and with some fine adjustments or specific considerations are likely to result in positive consequences to the family and child if utilized.
REFERENCES


Noble, G. S. (2010). *Attention-deficit/hyperactivity disorder and sleep disturbances: Consideration of familial influences.* (71), ProQuest Information & Learning, US. Available from EBSCOhost psych database.


APPENDIX

ETHICAL APPROVAL
Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB’s Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA0005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator: PENNICK, MARK
Co-Investigator(s):  
Protocol Number: X120115009
Protocol Title: How Do Daily Routines Influence Behaviours in Children?

The IRB reviewed and approved the above named project on 2-8-13. The review was conducted in accordance with UAB’s Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 2-8-13

Date IRB Approval Issued: 2-8-13

HIPAA Waiver Approved?: Yes

Marilyn Doss, M.A.
Vice Chair of the Institutional Review Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.