

The Effect of Mindfulness on Stress in Mothers of Children with and without Autism Spectrum

Disorders: An Emotion Regulation Framework

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ABSTRACT

Parents, especially mothers, of a child with an Autism Spectrum Disorder (ASD) are more likely to experience higher levels of stress, and adaptive emotion regulation strategies, such as mindfulness and acceptance, may decrease stress among parents of children with ASD. Research has shown that mindfulness-based interventions reduce perceived stress among parents of typically developing children and improve the parent-child relationship, and similar interventions may be helpful for mothers of children with ASD. However, research has not yet established that mindfulness is related to decreased stress among parents. It is important to first establish this relationship, given the possibility that other factors, such as child behavioral difficulties or parental psychopathology are stronger predictors of maternal stress than the mother's regulation strategies. This study examined the unique contribution of maternal mindfulness to maternal stress in a sample of mothers ( $n = 154$ ) who completed an online battery of measures. As predicted, maternal mindfulness significantly predicted level of maternal stress, above and beyond child behavior problems and maternal psychopathology, and this relationship was not moderated by child's ASD diagnosis. Maternal emotion regulation and effortful control were also significantly related to maternal stress, and may account for the explained variance of mindfulness. These findings and their implications are discussed.

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**Introduction**

Self regulatory abilities such as effortful control (EC), the ability to adjust one's own cognitions and actions, are a prerequisite for the ability to regulate one's emotions (Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013). Parents', especially mothers', usage of particular emotion regulation (ER) strategies has been shown to be related to their child's emotion regulation strategies (Bariola, Gullone, & Hughes, 2011), and this relationship may be particularly pertinent when considering parents who report increased levels of stress.

**The Relationship of Stress and Self Regulatory Abilities in Parents**

Stress associated with raising a child has been an area of research for several decades (see Abidin, 1992, for a review). Parental stress is defined as an aversive or negative reaction to parenting, influenced by parenting-specific demands, parental well-being, the parent-child relationship, and child characteristics (Deater-Deckard, 1998). In addition, parenting stress has been theorized to have a bidirectional relationship with the child's behavior, such that increased parental stress contributes to poorer parenting and child behavior problems contributes to increased parenting stress. In this model, parenting stress consists of three parts: a parent component, child component, and a parent-child relationship component (Abidin, 1992).

Lazarus and Folkman (1984) proposed a transactional model of stress and coping which consists of both contextual stressors and a within-person reaction to the stressor. People, when experiencing stressors, appraise the stressor in order to assess whether it is a threat to their well-being or not (primary appraisal) and whether they have the sufficient resources to handle the stressor (secondary appraisal) (Lazarus & Folkman, 1984). With parent stress, parents'

perceptions of the demands placed upon them and their resources to handle these demands are also implicated as a factor that contributes to parenting stress (Deater-Deckard, 2004).

Parents' ability to regulate their own emotions also likely plays a role in perception of parenting stress. More broadly, emotion regulation (ER) is considered a form of self regulation, which is defined as the ability to regulate one's cognitions, emotions, and behavior (Karoly, 1993). Effortful control (EC), conceptualized as one's ability to initiate, shift, and inhibit behavior and emotions, has been examined in psychological literature and is seen as a self-regulatory model under which to study attention, behavioral inhibition, and emotion (Bridgett et al., 2013). Rothbart and Bates (1998) conceptualized EC as consisting of three parts: attentional control, or being able to focus and shift attention; activation, or the ability to perform an action when there is reason to not perform it; and inhibitory control, the ability to inhibit a typical or dominant response. Without EC abilities, successful ER would not be possible (Bridgett et al., 2013).

Research on ER, the ability to intentionally modulate one's affective state in the pursuit of adaptive and goal-directed behavior (Gross, 1998), has greatly expanded in the last several years (Thompson, Lewis, & Calkins, 2008). A limited ability to regulate one's emotions, or maintain an optimal level of arousal to cope with stress or other situations, has been theorized to play a role in many forms of psychopathology (e.g., Keenan, 2000). Most scientists agree that parents play a vital role in the development of ER abilities in children (Bariola, Gullone, & Hughes, 2011; Cole & Deater-Deckard, 2009; Keenan, 2000) through the processes of modeling and social learning, where children imitate their parent's emotion regulation strategies (Bariola, Gullone, et al., 2011). For example, previous research has found that mothers' usage of ER strategies is related to their older children and adolescents' ER strategy use (Bariola, Hughes, &

Gullone, 2011). Thus, it is feasible that parent's ER abilities are not only important for their own well-being, but also important to their children's behavior and emergent self-regulatory capacity.

The Process Model (Gross & John, 2003) of ER differentiates between antecedent-focused strategies, which occur prior to the emotion response itself, and response-focused strategies, which occur once an emotion response is already underway. One example of a response-focused strategy is expressive suppression, which involves inhibiting already-occurring emotional behavior (Gross & John, 2003). Much of ER research concerns an individual's ability to down-regulate experienced emotions in order to avoid unwanted, often negative, social consequences (Martini & Busseri, 2011), and this can be accomplished via antecedent- and response-focused strategies.

While down-regulation of one's emotions is adaptive in some contexts, response-focused strategies such as suppression only reduce the outward expression of the negative emotion. However, the individual's experience of the emotion remains and, moreover, deployment of these strategies (e.g., avoidance, suppression) consumes additional cognitive resources (Gross & John, 2003). Antecedent-focused strategies have been shown to be associated with greater EC (see Bridgett et al., 2013, for review). However, more recent research has also raised the question of whether emotion regulation strategies can be conceptualized as purely "adaptive" or "maladaptive," as so-called maladaptive strategies may be useful when utilized in specific contexts, and moreover, lack of flexible usage of ER strategies may be more indicative of dysregulation (Aldao, 2013; Aldao & Nolen-Hoeksema, 2012). In regard to parents' perceptions of their abilities to manage parenting demands, perceived ability to effectively manage one's own emotions can provide a sense of more available resources, as well as a sense of control and increased feelings of self-efficacy (Duncan, Coatsworth, & Greenberg, 2009; Parent et al., 2011).

## **Parenting Stress in Autism**

As the prevalence of Autism Spectrum Disorder (ASD) has increased to 1 in 88 children (CDC, 2012), with recent estimates as high as 1 in 50 (Blumberg et al., 2013), the mental and physical health of the individuals diagnosed, and the health of their caretakers, has become a more widely recognized area of study. A recent meta-analysis of parenting stress among parents of children with ASD found that they have higher levels of parenting stress when compared to parents of typically developing children as well as children with other developmental disabilities, with large effect sizes (mean= 1.58 and =0.64, respectively) (Hayes & Watson, 2013). This meta-analysis, like most research in this area, did not directly assess the potential differences between mothers and fathers of children with ASD. Mothers of children with ASD, relative to fathers, typically take on much of the additional strain associated with raising a child with special treatment needs and have been observed to have higher levels of parental stress than fathers (Johnson et al., 2011). Mothers who raise a child with ASD have been shown to experience increased levels of parenting stress, compared to parents of typically developing children and parents of a child with an intellectual disability (see Dunn, Burbine, Bowers, & Tantleff-Dunn, 2001, for review). Parental, child, and environmental factors such as increased child symptom severity, high levels of maladaptive child behaviors, lack of social support, and maladaptive coping skills have all been shown to effect the level of parental stress parents of children with ASD face (Benson, 2010; Dunn et al., 2001; Lyons, Leon, Roecker Phelps, & Dunleavy, 2009). All of these factors suggest that mothers of children with ASD would benefit from intervention that specifically targets parental stress.

There is limited research on parent-focused interventions for mothers of children with ASD. Previous research has shown that parent-training interventions, in which parents are



trained to become coaches for their children's behavior, tend to lead to improved behavioral outcomes among children with ASD (Aman et al., 2009; Arnold et al., 2012; Ingersoll & Dvortcsak, 2006; Ingersoll & Gergans, 2007). Maternal depression and stress have also been shown to be related to the severity of children's behavioral problems (Barker et al., 2011), and maternal depression can be reduced through parent training interventions (Bristol, Gallagher, & Holt, 1993). Thus, it can be hypothesized that parent-focused interventions may provide both direct benefit to the parent, via improved maternal well-being, and indirect benefit to the child, through improved mother-child interactions. Less research has examined the effects on parents *and* children of parent-directed interventions that target parent functioning rather than child behavior.

### **Mindfulness and Parenting Stress**

The concept of experiential avoidance, commonly considered a maladaptive ER strategy, has also been implicated in the development of psychopathology and poor mental health (Chawla & Ostafin, 2007). Experiential avoidance has been defined as consisting of two core components: unwillingness to remain in contact with negative or aversive emotions, thoughts, or sensations, and avoidance actions (Chawla & Ostafin, 2007). This concept has been related to many avoidance behaviors such as denial, repression, cognitive distortion, as well as self-destructive behaviors (Hayes & Feldman, 2004). One therapeutic method which targets experiential avoidance is mindfulness-based techniques (Chawla & Ostafin, 2007).

The use of techniques to increase mindfulness has become somewhat mainstream clinically, with a growing research base to support applicability and utility. Mindfulness has been defined as the ability to stay cognizant of the present moment and assess actions and emotions in an accepting, nonjudgmental manner (Herbert & Forman, 2011). Mindfulness

originates from Buddhist meditation practices, and has been utilized in psychotherapies as a way to increase awareness of emotions and reframe emotions in a more adaptive fashion (Bishop et al., 2004). Higher levels of trait mindfulness are associated with increased life satisfaction, decreased depression and anxiety, improved emotion regulation, and decreased experiential avoidance (Keng, Smoski, & Robins, 2011). Additionally, mindfulness has been theorized to be a type of ER strategy, which may either facilitate reappraisal or act as an independent adaptive ER strategy (Chiesa, Serretti, & Christian, 2013). Mindfulness has been utilized in many of the newer (“third generation”) forms of cognitive-behavioral therapy (CBT), such as Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), Mindfulness-Based Cognitive Therapy (MBCT), and Mindfulness-Based Stress Reduction (MBSR) (Herbert & Forman, 2011). While several therapies have utilized mindful meditation techniques, such as MBSR and MBCT, other therapies (ACT, DBT) rely on developing clients’ mindfulness as the primary mechanism of change, including intentionally directing one’s attention to the current moment and acceptance, or the implementation of a nonjudgmental attitude towards emotions and experiences (Herbert & Forman, 2011).

Mindfulness building techniques have also been utilized in several parenting interventions (Bluth & Wahler, 2011; Bögels, Lehtonen, & Restifo, 2010; Duncan, Coatsworth, & Greenberg, 2009; Van der Oord, Bögels, & Peijnenburg, 2012), including with parents of children with ASD (Gika et al., 2012; Singh et al., 2007). Mindfulness has been described as a particularly pertinent tool for parenting interventions, as it effects intrapersonal skills, such as attributions and parental attitudes, as well as interpersonal skills (e.g., how parents respond to their children’s behavior) (Coatsworth, Duncan, Greenberg, & Nix, 2009). Mindfulness could have particular utility in parenting interventions in the ASD population, as it is a strategy that

targets experiential avoidance (Blackledge & Hayes, 2008). Parenting children with ASD has been found to be associated with higher levels of stress, anxiety, and worry. Mindfulness has been shown to reduce these variables, as well as improve overall psychological health (Keng et al., 2011). Singh and colleagues (2007; 2006) utilized mindfulness meditation and mindfulness exercises (e.g., teaching to reconsider before reacting, monitoring one's self-talk during the day, etc.) in a 12-week program with seven mothers of children with ASD aged 3-6 years in two separate studies. They found that mothers reported increased satisfaction with their parenting skills and their parent-child interactions, in addition to fewer behavior problems (e.g., aggression, noncompliance, and self-injury) in their children with ASD. Another study completed by Gika and colleagues (2012) found that training in progressive muscle relaxation and relaxation breathing were significantly lowered scores on measures of parenting stress and overall stress in 11 mothers of children with ASD, as well as lowered parental report of child behavioral problems. These results provide preliminary evidence that mindfulness-based parent interventions can be useful for the ASD population.

However, many unanswered questions remain about the relationship between ER, mindfulness, and parent stress in ASD. It has not been established that mindfulness is in fact related to parental stress. Only one previous study has assessed this relationship in parents with ASD, and found that parental mindfulness was significantly negatively correlated with their child's behavioral problems, as well as lower levels of parental stress and depressive symptoms; however, the study's sample size ( $n = 28$ ) was underpowered for further evaluation of potential gender differences between mothers and fathers (Beer, Ward, & Moar, 2013). The purpose of the present study was to examine the relationship between mindfulness and stress specifically in mothers, taking into account the severity of child behavior problems. An exploratory aim was to

explore potential moderational relationships among the presence of child ASD diagnosis, child behavior problems, maternal mindfulness, and maternal stress.

### **Specific Aims and Hypotheses**

In order to determine the role that mindfulness plays in mothers' parenting stress, we sought to assess the effect of mindfulness on mothers' stress above and beyond factors such as child behavior problem severity, maternal psychopathology, and other life stressors.

Establishing that a mindful and accepting outlook predicts less parental stress, controlling for child behavioral difficulties, is an important prerequisite for future development of mindfulness-based treatments targeting stress reduction in mothers. For mothers of children with ASD in particular, it is imperative that we explore the relationship between maternal mindfulness and stress, regardless of child behavioral difficulties. This study examined these relationships among mothers of typically-developing children and in mothers of children with ASD in order to determine whether mindfulness functions similarly in both groups of mothers.

It was predicted that maternal mindfulness would predict stress in mothers above and beyond child behavior problems and maternal pathology. A measure of child social withdrawal was used in order to assess the characteristic difficulties in ASD, as opposed to behavioral concerns that may present among many different psychological diagnoses in children.

An additional, exploratory aim was to explore relationships among child ASD diagnosis, child behavior problems, maternal mindfulness, and maternal stress in order to better characterize the potential relationships between these variables. Moderation models were used to determine whether child diagnosis (ASD versus non-diagnosed) or child behavior problems moderated the relationship between maternal stress and mindfulness, and whether maternal mindfulness functioned as a moderator in the relationship between maternal stress and child

behavior problems. No statistical hypotheses were proposed given the exploratory nature of this secondary aim.

This study's findings may contribute to the literature on mindfulness and its relationship to parenting skills and stress. Of potential clinical import, results may inform our understanding of the relationship between mindfulness and stress in mothers of children with ASD and the potential promise of interventions to foster mindfulness, specifically for mothers raising children with ASD.

## **Methods**

### **Procedure**

Study procedures were approved by the university's Institutional Review Board (IRB; See Appendix A). A secure, online survey, created using Survey Monkey© (<http://www.surveymonkey.com>), was used to collect data from August-October of 2012. Participants visited the online study site, where an introduction to the study was provided that explained the purpose of the study (i.e., to obtain knowledge about parental well-being), and provided the opportunity to complete the consent form (See Appendix B). Once the participant agreed to continue with the survey, she was given access to the demographic form and questionnaires. Time to complete the survey in its entirety was approximately 30 minutes. The survey was structured so that participants would receive a reminder to complete all questions on each page if an item was skipped; thus, there were no missing items on a completed measure. After the data collection period ended, the email addresses (used to contact individuals concerning the raffle) were separated from the participants' data, and all participants were assigned a de-identified number.

### **Participants**

Participants were mothers of children aged 4-17, both with and without a confirmed ASD diagnosis. Criteria for having a child between the ages of 4 and 17 is due to prior research that suggests that age 3 is the average age of an ASD diagnosis and the age range accounts for the variable time of diagnosis with ASD, as factors such as race, socioeconomic status, and symptom severity have been shown to affect age of initial diagnosis (Howlin & Moorf, 1997; Mandell, Novak, & Zubritsky, 2005). Age 17 was selected as the upper age of the range due to the tendency of mothers of children with ASD to remain heavily involved in coordination of care for their adult offspring. Mothers were targeted for this study due to prior research suggesting that there are gender differences in parental stress, especially in parents of a child with a disability (Johnson et al., 2011).

Recruitment targeted mothers of children via flyers and online sources. Mothers of typically developing children were recruited through utilizing local advertising in the New River Valley area, a large area in southwestern Virginia comprised of four counties and multiple towns and cities, including advertising through the Virginia Tech community (VT-Work-Life office, faculty and staff email listservs) and through the participant databases of the Department of Psychology, which consist of families who have volunteered to participate in research. The ASD subsample was recruited largely via online resources, including the Virginia Tech Autism Clinic Registry and Autism Connection of PA research emails. The VTAC registry consists of parents who have consented to participate in research and the Autism Connection of PA email blast consist of parents, individuals with ASD, and professionals, primarily in Pittsburgh and the greater Southwestern Pennsylvania area. This sampling strategy resulted in a convenience sample comprised of volunteers from these resources. Participants were asked if their child has an ASD diagnosis, and this parent-reported information was used for group determination.

Parents were asked to report on either their child with ASD or on their child with the most behavioral difficulties in order to provide more behavioral problems in the sample and avoid a larger disparity with the ASD group. Participants were given the option of providing their email addresses in order to be entered in a raffle, where five \$20 gift certificates were awarded to participants who completed the study.

Two hundred and one people began the survey. A subsample size of 154 was used for all analyses, with the exception of an additional regression model including measures of emotion regulation and effortful control, for which a sample size of 153 was used due to attrition of one additional participant. The following reasons resulted in cases being excluded: only completed the first question of the survey ( $n=2$ ; 1.00%), respondent was male ( $n=4$ ; 1.99%), marked two different responses for whether they had a child with ASD ( $n=1$ ; 0.50%), all of their children were outside the 4-17 year range ( $n=19$ ; 9.45%), and did not complete the four questionnaires for hypothesis #1 ( $n=21$ ; 10.45%). Given the limited literature concerning the relationship between mindfulness and stress among parents, a medium effect size was assumed. A power analysis was conducted using G-Power 3.1.3 software (Faul, Erdfelder, Buchner, & Lang, 2009) for a linear multiple regression,  $R^2$  increase, using a medium effect size of  $f^2 = .15$  and an  $\alpha$  of .05. The power analysis indicated that two groups of 54 participants (mother of typically developing children and mothers of children with ASD), for a total sample size of 108, would achieve sufficient power (0.80) in order to detect a medium effect of the unique variance of mindfulness in the model and be able to compare the two groups statistically for the exploratory analysis.

## **Measures**

*Demographics questionnaire.* Participants completed a demographic questionnaire created for this study (See Appendix C) at the beginning of the online session. Information on

the mother's age, ethnicity, socioeconomic status (SES), prior and current psychiatric treatment history, children's ages, and children's diagnoses was collected. In order to determine SES, an SES 'risk composite' was created from several items, including being a single mother, high school-level education or lower in the mother or father, paternal unemployment, and non-single family housing (see Deater-Deckard, Chen, Wang, & Bell, 2012, for more information). Mothers were asked to answer questions specifically either about their child with ASD or their child about which they have the most concerns in order to best replicate a typical community-based sample among the mothers who do not have a child with ASD, and include typically developing children with challenging behaviors.

### **Primary Measures.**

*Depression Anxiety Stress Scale-21* (DASS-21; Lovibond & Lovibond, 1995).

Participants completed the DASS-21, a 21-item scale which measures depressive and anxiety symptoms on a 4-point Likert scale (0= "did not apply to me at all" to 3= "applied to me very much, or most of the time"). Depression, anxiety, and stress scales measure affective symptoms on a dimensional basis. Each item on the DASS-21 is multiplied by 2 in order to compute the total scale scores, and higher scores indicate higher levels of affective symptoms. Factor analysis has confirmed the 3-scale structure, with the 3 factors correlating with each other from .28-.53, similar to the overlap of other depression and anxiety scales. Internal consistency on the scales ranged from .87-.94, and concurrent validity has been established with other measures of depression and anxiety (Antony, Bieling, Cox, Enns, & Swinson, 1998). In this sample, internal consistency for the total score was  $\alpha=.933$ ,  $\alpha=.91$  for the depression scale,  $\alpha=.82$  for the anxiety scale, and  $\alpha=.88$  for the stress scale.



***Perceived Stress Scale*** (PSS; Cohen, Kamarck, & Mermelstein, 1983). The PSS has been used widely in research in health care and various psychiatric and community populations and high levels of perceived stress have been shown to be correlated with negative health and poor quality of life consequences (Mitchell, Crane, & Kim, 2008). The measure consists of 10 items, each rated on a 5-point Likert scale from 0 (never) to 4 (very often). Items inquire about degree to which the person has felt stress in various situations over the past month, and higher scores indicate higher levels of perceived stress. Internal consistency has been found to be acceptable, with  $\alpha = .89$  for the total score and ranging from .82 to .85 for the 2 empirically derived factors, Perceived Self-Efficacy and Perceived Helplessness (Roberti, Harrington, & Storch, 2006). Internal consistency for this sample was  $\alpha = .89$ .

***Mindful Attention Awareness Scale*** (MAAS; Brown & Ryan, 2003). The 15 items comprising the MAAS are rated on a 6-point Likert scale (0= almost always to 5=almost never) to yield a total score that reflects the person's tendency to be attentive and mindful of present experiences, where higher scores indicate higher levels of trait mindfulness. The measure has demonstrated internal reliability of .82 and convergent reliability with related constructs such as emotional intelligence and openness to experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The internal consistency for this sample was  $\alpha = .90$ .

***Aberrant Behavior Checklist*** (ABC: Aman, Singh, Stewart, & Field, 1985). The ABC is a behavior scale developed for children with developmental disabilities such as ASD, which can be completed by someone who knows the child well. It consists of 58 informant-rated items that are divided among five subscales (Irritability, Social Withdrawal, Stereotypic Behaviors, Hyperactivity, and Inappropriate Behavior) and higher scores indicate higher levels of problem behaviors. Internal consistency ranges from .86-.95 and test-retest reliability from .96-.99. The

Social Withdrawal subscale (16 items; e.g., “seeks isolation from others,” “lacks emotional responsiveness,” “shows few social reactions to others”) was selected for this study to provide a composite index of ASD-specific social disability. Previous research has shown that the Social Withdrawal subscale is an accurate measure of the unique social difficulties that children with ASD face (Scahill et al., 2013). The internal consistency for the social withdrawal scale was  $\alpha=.93$  for this sample.

### **Exploratory Measures.**

*Emotion Regulation Questionnaire* (ERQ; Gross & John, 2003). The ERQ is a ten-item scale which derives two subscales of habitual emotion regulation strategies, reappraisal and suppression, which are rated on a 1 (“strongly disagree”) to 7 (“strongly agree”) scale, and higher scores indicate increased usage of the strategy. Reliability for the reappraisal items has averaged .79, and .73 for suppression. Test-retest reliability across 3 months was .69 for both subscales (Gross & John, 2003). Participants completed the ERQ as a gauge of their own emotion regulatory capabilities. The internal consistency for the suppression scale for this sample was  $\alpha= .81$  and the reappraisal scale was  $\alpha= .88$ .

*Acceptance and Action Questionnaire-II* (AAQ-II; Bond et al., 2011). The AAQ-II is a ten-item measure designed to capture a person’s level of experiential avoidance, where each item is ranked on a 1-7 scale (“never true” to “always true”). Higher scores on the measure reflect higher levels of experiential avoidance. Reliability of the measure is .84, with test-retest reliability ranging between .79 and .81 up to 12 months later (Bond et al., 2011). The AAQ-II has a single-factor structure and has also been shown to have good convergent validity with standard measures of depression, anxiety, stress, and overall psychological health (Bond et al., 2011). The internal consistency of the AAQ for this sample was  $\alpha= .90$ .

*Adult Temperament Questionnaire- Effortful Control subscale* (Rothbart, Ahadi, & Evans, 2000). The ATQ is a 177-item questionnaire which assesses different aspects of adult temperament. Only the Effortful Control (EC) scale (19 items) was used for this study. The EC items are ranked from 1 (extremely untrue of you) to 7 (extremely true of you). The EC scale is comprised of 3 subscales; attentional control, the ability to focus and shift attention, inhibitory control, the ability to inhibit inappropriate behaviors, and activation control, the ability to do an action when it is not desirous to do so. Higher scores on the EC scales reflect higher levels of effortful control strategies. The internal reliability for the attentional control, inhibitory control, and activation control are .88, .66, and .84, respectively (Rothbart et al., 2000). The total internal consistency for the EC scale is  $\alpha=.82$ , the attentional control subscale was  $\alpha=.72$ , inhibitory control subscale was  $\alpha=.57$ , and the activation control subscale was  $\alpha=.74$ .

### **Data Analyses**

After ensuring accuracy of the data via independent dual scoring of questionnaires by two coders using syntax, data were analyzed using IBM SPSS Statistics Version 20.0. After excluding cases which were out of range or incomplete (see above), data were screened for careless responding, using three validation items that were among the other items to detect careless responding (e.g., "Please select 'frequently' for this item."). No participants failed more than a single careless responding item, and thus, no participants were excluded for this reason. Next, the leverage, distance, and influence of total and subscale scores from each of the measures were calculated. No cases were found to be significantly influential, indicating alterations were not needed (Cohen, Cohen, West, & Aiken, 2003). The normality of each measure was analyzed, using the steps outlined in Tabachnick and Fidell (2001), and no transformations were needed.

To test the central hypothesis, that maternal mindfulness would predict maternal stress significantly and uniquely in addition to child social withdrawal and maternal mental health, hierarchical linear regression was used. Tests of multicollinearity indicated that none of the variables were correlated above .90. The dependent variable (maternal stress) was normally distributed, and it was decided to not transform the independent variables, as multiple linear regression is highly robust to non-normality among independent variables (Cohen et al., 2003). The increased variance of maternal stress caused by maternal mindfulness was explored by analyzing the  $R^2$  change statistic when mindfulness was entered in the multiple regression model.

For the secondary aim, three exploratory analyses were conducted to examine the relationship between child ASD diagnosis, child social withdrawal, maternal mindfulness, and maternal stress. Three potential moderation models were tested:

- Model 1: The ASD diagnostic status of the child will moderate the relationship between mindfulness and parental stress.
- Model 2: Mindfulness moderates the relationship between child behavior problems and mothers' stress.

For each of these models, the independent variable was mean-centered in order to decrease nonessential multicollinearity (Cohen et al., 2003), and linear multiple regressions were run. The presence of the interaction was indicated by significant findings for the interaction term. For model 2, hierarchical multiple regression was used with child behavior problems and mindfulness, respectively, added in separate blocks order to assess for their unique variance controlling for influence of the other. Two additional moderation models, conducted in the same manner as the secondary aim, were conducted with child hyperactivity and inappropriate behavior respectively. These were undertaken in order to assess whether different child

behavioral difficulties may moderate the relationship between maternal mindfulness and stress. Finally, a regression model, similar to that tested in the central aim but with the addition of maternal ER strategies (suppression and reappraisal) and EC added into the stepwise model, was run in order to assess whether maternal self-regulatory abilities significantly contributed to maternal stress.

## Results

An independent-samples *t*-test was conducted in order to compare the group with missing data from the participants who completed the entire survey. The participants with missing data did not differ from those with complete data on mother's age ( $t(173) = -0.976, p = 0.331$ ), racial or ethnic minority status ( $t(173) = -1.712, p = 0.089$ ), marital status ( $t(173) = -1.490, p = 0.138$ ), employment status ( $t(173) = 1.221, p = 0.224$ ), the SES risk composite ( $t(173) = 0.660, p = 0.510$ ), or child ASD diagnostic status ( $t(173) = -0.354, p = 0.724$ ).

Descriptive statistics were computed for all demographic variables (i.e., age, ethnicity, race, level of education, employment status, marital status, maternal psychiatric history, number of children, and child diagnostic status), as well as the subscale and total scores and correlations for the measures utilized (see Tables 1, 2, and 3). Maternal age ranged from 27-57 years ( $M=40.98; SD=7.17$ ), and age of child identified with ASD or behavioral concerns ranged from age 4-17.

### Central Aim: Mindfulness Predicting Stress

The hypothesis that maternal mindfulness would predict stress among mothers above and beyond maternal mental health and child social withdrawal was supported (See Table 4). Results indicated that each of the predictors was significant. Increased child social withdrawal, as

measured by the social withdrawal subscale of the ABC [block 1], was significantly associated with increased stress among mothers ( $\beta = .075$ ;  $F(1, 152) = 42.64$ ,  $p < .000$ ). Similarly, increased maternal psychopathology, as measured by the total score on the DASS [block 2], was associated with increased stress among mothers ( $\beta = .340$ ;  $F(1, 151) = 130.830$ ,  $p < .000$ ). As predicted, lower levels of maternal mindfulness, as measured by the MAAS [block 3], was significantly related to higher levels of stress among mothers after controlling for child social withdrawal and maternal psychopathology ( $\beta = -.088$ ;  $F(1, 150) = 5.432$ ,  $p < .021$ ).

### **Secondary Aims: Moderating Influences**

The first moderation model assessed whether child ASD diagnostic status moderated the relationship between maternal mindfulness and maternal stress. Child ASD diagnostic status was dummy coded and entered into the model first, maternal mindfulness was entered second, and the interaction of maternal mindfulness and ASD diagnostic status was entered into the model last. Significant main effects for both child ASD diagnostic status ( $\beta = 2.713$ ;  $F(1, 152) = 16.385$ ,  $p = .000$ ) and maternal mindfulness ( $\beta = -.259$ ;  $F(1, 151) = 52.406$ ,  $p = .000$ ) were found (See Table 5); however, the interaction of ASD status and maternal mindfulness was not found to be significant ( $\beta = -.011$ ;  $F(1, 150) = .024$ ,  $p = .878$ ).

In the second model, testing the interaction between child social withdrawal and maternal mindfulness on maternal stress, main effects for child social withdrawal ( $\beta = .232$ ;  $F(1, 152) = 17.336$ ,  $p = .000$ ) and maternal mindfulness ( $\beta = -.262$ ;  $F(1, 151) = 10.510$ ,  $p = .000$ ) were found (See Table 6), but the interaction of child social withdrawal and maternal mindfulness was not significant ( $\beta = .010$ ;  $F(1, 150) = 2.571$ ,  $p = .111$ ).

Additional exploratory analyses were run in order to assess whether child hyperactivity or inappropriate behavior, as measured by the ABC, functioned as moderators in the relationship between maternal stress and mindfulness. Significant main effects for both child hyperactivity ( $\beta=.184$ ;  $F(1, 152) = 46.940$ ,  $p = .000$ ) and maternal mindfulness ( $\beta= -.214$ ;  $F(1, 151) = 31.453$ ,  $p = .000$ ) were found (See Table 7); however, the interaction of child hyperactivity and maternal mindfulness was not found to be significant ( $\beta=.008$ ;  $F(1, 150) = .532$ ,  $p = .467$ ). Similarly, significant main effects for both child inappropriate behavior ( $\beta=.630$ ;  $F(1, 152) = 32.394$ ,  $p = .000$ ) and maternal mindfulness ( $\beta=-.242$ ;  $F(1, 151) = 39.228$ ,  $p = .000$ ) were found; however, the interaction of child inappropriate behavior and maternal mindfulness was not found to be significant ( $\beta=.010$ ;  $F(1, 150) = .819$ ,  $p = .367$ ; See Table 7).

Maternal ER and EC both predicted significantly lower levels of maternal stress in the regression model. With these variables in the model, maternal mindfulness was no longer significant (See Table 8). Decreased EC [block 1] was found to be predictive of increased stress for mothers ( $\beta= -.058$ ;  $F(1, 151) = 52.261$ ,  $p < .000$ ), as was decreased usage of reappraisal as measured by the ERQ [block 2] ( $\beta= -.043$ ;  $F(1, 150) = 4.577$ ,  $p = .034$ ). However, decreased suppression [block 3] did not uniquely explain a significant proportion of the variance in maternal stress ( $\beta= -.065$ ;  $F(1, 149) = .419$ ,  $p = .519$ ). Increased child social withdrawal [block 4] ( $\beta= .080$ ;  $F(1, 148) = 10.997$ ,  $p = .001$ ) and maternal psychopathology symptoms [block 5] ( $\beta= .316$ ;  $F(1, 147) = 70.732$ ,  $p < .000$ ) remained significant. However, decreased maternal mindfulness [block 6] was no longer significantly predictive of increased stress ( $\beta= -.058$ ;  $F(1, 146) = 2.039$ ,  $p = .155$ ).

## Discussion

This study investigated the effect of maternal mindfulness on stress in a sample of mothers with children with and without ASD. Results supported the primary hypothesis that maternal mindfulness is predictive of maternal stress, above and beyond child factors as well as maternal depressive and anxiety symptoms. These findings are consistent with, and extend, prior research which has found that greater mindfulness among parents of children with ASD is associated with lower levels of parenting stress (Beer et al., 2013). Results from the present study demonstrate that this relationship exists in a sample of mothers both with and without ASD, regardless of maternal psychopathology or child social withdrawal.

There was no evidence that the relationship between maternal mindfulness and stress was moderated either by child ASD status or by child social withdrawal. While these child variables and maternal mindfulness are both significant main effects, no interactions suggestive of moderation were found. The additional analyses including maternal EC and ER found that both lower EC and reappraisal, but not suppression, were significantly associated with increased stress among mothers. Interestingly, the addition of these variables resulted in maternal mindfulness no longer being a significant predictor. The relationship among EC, ER, and mindfulness has been discussed in previous research (Bridgett et al., 2013; Chiesa et al., 2013) and the present study's results may provide additional support for considering mindfulness an adaptive emotion regulation strategy (Chiesa et al., 2013; Garland, Gaylord, & Fredrickson, 2011). However, it should also be noted that maternal mindfulness, although a significant predictor of maternal stress in the central aim, did not explain a large proportion of variance ( $R^2$  change=.005). Thus, ER and EC variables may have resulted in non-significant findings due to the deleterious effect



of additional variables on power to detect effects, and not an extensive amount of shared variance between mindfulness and ER and EC.

The present study is among the first to explore the relationship between trait mindfulness and stress in mothers of children with and without ASD. Trait levels of maternal mindfulness contributed to maternal stress, above and beyond child social withdrawal and maternal psychopathology in a sample comprised of mothers of children with ASD and mothers of typically developing children with behavioral concerns. Such findings lend support to the potential clinical utility of mindfulness-based interventions, including among parents of a child with ASD, who are known to experience higher levels of parenting stress ( Hayes & Watson, 2013). This study also is consistent with preliminary research showing that mindfulness-based interventions may be effective among parents of children with ASD (Gika et al., 2012; Singh et al., 2006, 2007).

### **Limitations**

There are several limitations to note in this study. First and foremost, all data come from a single source and modality, and were collected at a single point in time. The study consisted solely of online participation in a survey, which did not allow for confirmation of an ASD diagnosis in the child. Future studies that consist of face-to-face contact with the participants would be able to account for this limitation. Furthermore, all the questions were completed by the mother. As such, respondent bias and shared reporter variance must be considered. Additionally, previous research has suggested that first-degree relatives of individuals with ASD can present with milder ASD symptoms, termed the Broader Autism Phenotype (see Sucksmith, Allison, Baron-Cohen, Chakrabarti, & Hoekstra, 2013, for review). ASD symptomatology in

some of the mothers in this study may have resulted in differential validity; in other words, perhaps response patterns of the mothers of children with ASD were affected by non-clinical ASD characteristics. Results are influenced by maternal perceptions and viewpoints, and including other sources, such as child report, teacher report, and clinician interviews, will strengthen future research.

The convenience sample nature of the study would also be a limitation of the study, as mothers who volunteer to complete such a survey may not be indicative of a typical community sample, nor can we generalize these findings to a treatment-seeking sample. Participants of typically developing children were asked to complete the survey considering the child about whom they had the most behavioral concerns, however, in order to have a more equally distributed set of scores between the ASD and non-ASD groups. Without establishing temporal precedence of mindfulness or experimentally manipulating mindfulness to examine the effect on stress, the directionality of the relationship between mindfulness and stress in these mothers must only be inferred and meditational models could not be conducted.

Another potential weakness of the study is the inclusion of a global stress measure, the PSS, rather than a measure of parenting stress. While it can be argued that global stress affects parenting, stress specific to parenting may be especially pertinent to the ASD group, as they may experience more negative perceptions of their ability to parent their child effectively (Lyons et al., 2009). Similarly, the usage of the social withdrawal scale of the ABC may not entirely encompass the unique deficits seen among individuals with ASD, although this measure has been widely used in this population to assess the unique difficulties experienced by individuals with ASD and its psychometric properties are well-established (Aman, Farmer, Kaat, Leser, & Nevil,

2012). Future research should consider comparing potential measures of global deficits in order to determine whether a certain measure would prove more effective for measuring this construct.

Lastly, statistical power to detect a moderation effect was minimal. Future research examining these variables (e.g., emotion regulation, mindfulness, effortful control) must employ sufficiently large samples to avoid risk of a false null finding.

### **Future Directions**

Future research should further elaborate a model of self regulatory abilities and strategies, such as EC, ER, and mindfulness, among parents. Comparing behavioral, and self-report, and other-report measures using large samples is suggested. A study specifically designed to assess potential meditational models among these variables, using a temporal experimental design, would be helpful in assessing whether variables such as high levels of mindfulness or particular emotion regulation strategies affect the relationship of parenting stress with other variables.

In addition, future research could investigate the relationship between trait mindfulness and parental stress in the context of a mindfulness-based intervention among parents of children with ASD. Further investigation of the relationships among transdiagnostic concepts such as self-regulatory and emotion regulation processes would also be informative in order to better understand the underlying mechanisms of mindfulness and parenting stress, both among typically developing and ASD populations. For example, previous research has suggested that putatively maladaptive emotion regulation strategies are more proximally related to psychopathology, such as depression and anxiety, than more adaptive ER strategies ( Aldao & Nolen-Hoeksema, 2010), and future research could examine how these variables would be associated with parenting stress.

Furthermore, in parenting-related stress, among other domains, research is needed to truly determine when and if such “adaptive” and “maladaptive” strategies function as such. In parenting a child with difficulties, such as ASD, some ability to temporarily distract one’s self from difficult situations may prove to be, at least at times, adaptive. Additionally, more flexible and context-dependent usage of ER strategies may play an even more important role in parenting, as parenting is a complex social relationship that is vital for both parental and child well-being. More in-depth research regarding these contextual factors across the repertoire of ER strategies, as suggested by Aldao (2013) and others, would be helpful in order to determine the potential focus of instruction of ER strategies in parenting-focused interventions. These results may offer clinical implications, as components of mindfulness or broader emotion or self regulatory strategies which are the most closely linked to parenting stress could be targeted in an intervention. Additionally, a better understanding of these factors could lead to individualization of treatment for parents who face increased stress, such as mothers of children with ASD.

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Table 1

*Demographics by ASD and non-ASD Groups*

<i>Maternal Characteristics</i>	<i>n</i> <i>ASD/nonASD</i>	<i>% of sample</i> <i>ASD/nonASD</i>	<i>Child Characteristics</i> <i>ASD/nonASD</i>	<i>n</i> <i>ASD/nonASD</i>	<i>% of sample</i> <i>ASD/nonASD</i>
Race/Ethnicity <sup>a</sup>			Number of children		
African-American	1/1	1.5/1.5	One	9/15	13.2/17.2
Asian-American	1/1	1.5/1.5	Two	31/42	45.6/48.3
White	65/82	95.6/94.3	Three	22/19	32.4/21.8
Hispanic	1/3	1.5/3.4	Four	3/7	4.4/8.0
Native American	2/1	2.9/1.1	Five	1/4	1.5/4.6
Preferred not to answer	0/1	0/1.2	Six or more	1/0	1.5/0
Marital status			Child with ASD/ Behavioral Concerns		
Divorced	6/10	8.8/11.5	Male	56/50	82.4/57.5
In relationship	1/0	1.5/0	Female	11/37	16.2/42.5
Married	59/66	86.8/75.9	Not Specified	1/0	1.5/0
Remarried	1/2	1.5/2.3	ASD diagnosis	67/87	n/a
Separated	1/5	1.5/5.7	ADHD <sup>a</sup>	35/16	51.5/18.3
Single	0/2	0/2.3	Anxiety disorder	27/7	39.7/8.0
Widowed	0/2	0/2.3	ODD	8/4	11.8/4.5
Another caregiver in home	56/61	82.4/70.1	Learning Disorder	18/8	26.5/9.2
Schooling			Depression	9/2	13.3/2.2
High School	4/3	5.9/3.4	Intellectual Disability	13/0	19.1/0
Some college/technical	21/15	30.9/17.2			
Bachelor's degree	24/27	35.3/31.0			
Graduate school	19/42	27.9/48.3			

*Note.* <sup>a</sup> Participants were able to mark more than one option

Table 1 continued

*Demographics*

Currently in therapy	7/5	10.3/5.7
Ever been in therapy	32/51	47.1/58.6
Currently on medication	15/14	22.1/16.1
Ever taken psychiatric medication	32/29	47.1/33.3
No psychiatric diagnosis	37/66	54.4/75.9
Depression <sup>a</sup>	20/14	29.4/16.1
Anxiety	19/12	27.9/13.8
Learning disorder	2/0	2.9/0
ADHD	5/2	7.4/2.3
ASD	1/0	1.5/0
Eating disorder	1/0	1.5/0
Schizophrenia	0/0	0/0

*Note.* <sup>a</sup> Participants were able to mark more than one option

Table 2

*Descriptive Data*

	<i>n</i>	Minimum	Maximum	Mean ( <i>SD</i> )	Skewness	Kurtosis
total PSS	154	2	38	18.32 (6.81)	.147	-.143
depression DASS	154	0	21	4.10 (4.76)	1.638	2.375
anxiety DASS	154	0	21	2.71 (3.51)	2.112	5.492
stress DASS	154	0	21	6.99 (4.60)	.848	.475
Total DASS	154	.0	61	14.33 (11.79)	1.351	1.774
total MAAS	154	25	90	58.20 (12.74)	-.192	.250
Irritability ABC	154	0	42	8.61 (9.21)	1.529	1.961
Social withdrawal ABC	154	0	36	5.27 (7.10)	1.903	3.793
Stereotype ABC	154	0	17	2.27 (3.84)	1.981	3.554
Hyperactive ABC	154	0	45	12.21 (11.59)	1.072	.496
Inappropriate ABC	154	0	12	2.19 (2.93)	1.546	1.604
Activation ATQ	153	21	46	32.92 (4.24)	-.284	.264
Attention ATQ	153	3	35	22.21 (6.18)	-.318	-.009
Inhibition ATQ	153	17	48	32.56 (6.70)	.080	-.617
Total ATQ-EC scale	153	55	117	87.69 (13.32)	-.270	-.375
Reappraisal ERQ	153	6	42	28.69 (7.42)	-.518	.412
Suppression ERQ	153	4	28	13.04 (5.52)	.272	-.557
Total AAQ	153	10	70	29.84 (11.97)	.854	.556



Table 3

*Correlations between measures*

	1	2	3	4	5	6	7	8	9	10	11	12	1 3
1. ASD diagnosis	--												
2. Total PSS	.31* *	—											
3. Total DASS	.33* *	.72* *	—										
4. Total MAAS	-.23* *	-.54* *	-.61* *	—									
5. Irritability ABC	.45* *	.46* *	.48* *	-.44* *	—								
6. Social Withdrawal ABC	.54* *	.32* *	.35* *	-.20* *	.60* *	—							
7. Stereotype ABC	.57* *	.30* *	.41* *	-.31* *	.60* *	.63* *	—						
8. Hyperactivity ABC	.51* *	.49* *	.55* *	-.44* *	.83* *	.54* *	.70* *	—					
9. Inappropriate ABC	.53* *	.42* *	.47* *	-.38* *	-.71* *	.54* *	.77* *	.76* *	—				
10. Total EC	-.16	-.44* *	-.49* *	.54* *	-.27* *	-.17* *	-.26* *	-.31* *	-.30* *	—			

		*	*		*	*	*	*				
11. Reappraisal ERQ	-.14	-.27*	.30*	.24*	-.16*	-.02	-.09	-.17*	-.13	.26	—	
12. Suppression ERQ	.13	.12	.21*	-.22*	.13	.13	.02	.37*	.06	-.12	-.06	---
13. Total AAQ	.25*	.66*	.75*	-.56**	.33*	.28*	.26*	.37*	.33*	-.48*	-.40*	.42*
	*	*	*		*	*	*	*	*	*	*	*

Note: \*  $p < .05$  (1-tailed), \*\*  $p < .01$  (2-tailed)

Table 4

*Regression of Maternal Stress on Child Social Withdrawal, Maternal Psychopathology symptoms, and Maternal Mindfulness (Central Aim).*

Dependent Variable	Predictors	<i>b</i>	<i>F</i>	<i>R</i> <sup>2</sup> Change
Maternal Stress (total PSS)	Block 1 Child Social Withdrawal (ABC)	.075	42.64***	.102
	Block 2 Maternal Psychopathology (DASS total)	.340	130.83***	.417
	Block 3 Maternal Mindfulness (MAAS total)	-.088	5.432*	.005

Note. Coefficients and *t*-tests are reported at the step in which the variable was entered.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 5

*Regression of Maternal Stress on ASD Diagnostic Status and Maternal Mindfulness (Secondary Aim, Moderation Model 1).*

Dependent Variable	Predictors	<i>b</i>	<i>F</i>	<i>R</i> <sup>2</sup> Change
Maternal Stress (PSS total)	Block 1			
	Child ASD status	2.713	16.385***	.102
	Block 2			
	Maternal Mindfulness (MAAS total)	-.259	52.406***	.236
	Block 3			
	ASD diagnosis x  Maternal Mindfulness	-.011	.024	.000

*Note.* Coefficients and *t*-tests are reported at the step in which the variable was entered.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Table 6

*Regression of Maternal Stress on Child Social Withdrawal and Maternal Mindfulness*

*(Secondary Aim, Moderation Model 2/3)*

Dependent Variable	Predictors	<i>b</i>	<i>F</i>	<i>R</i> <sup>2</sup> Change
Model 2				
Maternal Stress (PSS total)	Block 1 Child Social Withdrawal (ABC)	.232	17.336***	.102
	Block 2 Maternal Mindfulness (MAAS total)	-.262	10.510***	.046
	Block 3 Child Social Withdrawal x Maternal Mindfulness	.010	2.571	.010

*Note.* Coefficients and *t*-tests are reported at the step in which the variable was entered.

\**p*<0.05, \*\**p*<0.01, \*\*\**p*<0.001

Table 7

*Regression of Maternal Stress on Child Hyperactivity/Inappropriate Behavior and Maternal Mindfulness (Exploratory Aim).*

Dependent Variable	Predictors	<i>b</i>	<i>F</i>	<i>R</i> <sup>2</sup> Change
Maternal Stress (PSS total)	Block 1			
	Child Hyperactivity (ABC)	.184	46.940***	.236
	Block 2			
	Maternal Mindfulness (MAAS total)	-.214	31.453***	.132
	Block 3			
	Child Hyperactivity x Maternal Mindfulness	.008	.532	.002
Maternal Stress (PSS total)	Block 1			
	Child Inappropriate Behavior (ABC)	.630	32.394***	.176
	Block 2			
	Maternal Mindfulness (MAAS total)	-.242	39.228***	.170
	Block 3			
	Child Impulsivity x Maternal Mindfulness	.010	.819	.004

*Note.* Coefficients and *t*-tests are reported at the step in which the variable was entered.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Table 8

*Regression of Maternal Stress on Maternal Effortful Control, Reappraisal, Suppression, Child Social Withdrawal, Maternal Psychopathology, and Maternal Mindfulness (Exploratory Aim).*

Dependent Variable	Predictors	<i>b</i>	<i>F</i>	<i>R</i> <sup>2</sup> Change
Maternal Stress (PSS total)	Block 1			
	Maternal EC (EC-ATQ)	-.058	52.261***	.257
	Block 2			
	Maternal Reappraisal (Reappraisal ERQ)	-.043	4.577*	.022
	Block 3			
	Maternal Suppression (Suppression ERQ)	-.065	.419	.002
	Block 4			
	Child Social Withdrawal (ABC)	.080	10.997**	.050
	Block 5			
	Maternal Psychopathology (DASS total)	.316	70.732***	.217
	Block 6			
	Maternal Mindfulness (MAAS total)	-.058	2.039	.006

*Note.* Coefficients and *t*-tests are reported at the step in which the variable was entered.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

## Appendix A

### IRB Approval Letter



Office of Research Compliance  
Institutional Review Board  
2000 Kraft Drive, Suite 2000 (0497)  
Blacksburg, VA 24060  
540/231-4606 Fax 540/231-0959  
email irb@vt.edu  
website <http://www.irb.vt.edu>

#### MEMORANDUM

**DATE:** September 14, 2012  
**TO:** Susan Williams White, Caitlin Mary Conner  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)  
**PROTOCOL TITLE:** Mindfulness and Maternal Stress  
**IRB NUMBER:** 12-544

Effective September 14, 2012, the Virginia Tech Institution Review Board (IRB) Administrator, Carmen T Green, approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

#### PROTOCOL INFORMATION:

Approved As: **Exempt, under 45 CFR 46.110 category(ies) 2**  
Protocol Approval Date: **June 15, 2012**  
Protocol Expiration Date: **N/A**  
Continuing Review Due Date\*: **N/A**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

#### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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## *Appendix B*

### Information Form

### **Parenting Difficulties Survey**

#### Investigators

Principal Investigator: Susan W. White, PhD, Assistant Professor

Co-Investigator: Caitlin Conner, Graduate Student

Psychology Department, Virginia Tech

#### Purpose

The purpose of this study is to assess the difficulties mothers face. Based on the results of this study, we hope to develop and/or improve services offered to mothers.

#### Procedure

For this survey, you will be asked to complete a series of questions about your behaviors, feelings, and experiences. Please read each question carefully and try to answer each question to the best of your ability. It is estimated that it will take approximately 30-40 minutes to complete these questions. If you choose to participate in this study, you will be directed to a secure website to complete the survey.

#### Risks and Benefits

This survey should not take a great deal of time to complete, but it is time that you could spend doing other activities. A second risk is related to the types of questions we are asking in the survey. Some of the questions related to problems you may experience could make you feel uncomfortable. At the end of the survey, we provide a list of several services available to help you if you would like someone to talk to. Also, if the questions are too distressing for you, please remember that you can stop at any time. There is no immediate and direct benefit to you for completing this survey. However, we hope that results of this project can help inform services that help mothers like you. No promises or guarantees of benefits have been made to encourage you to participate.

#### Costs and Payment for Participation



In order to participate in the raffle (see below), you will be required to enter your email address so we can contact the winners. There is no cost for participating in this survey, nor is any payment offered. You are also invited to enter a raffle, in which you will have the opportunity to win a gift certificate for a Target gift card. Approximately 5 gift certificates, valued at \$20.00 each, will be awarded to survey participants. We can't predict exactly how many individuals will enroll and take the survey, but we estimate a 1 on 20 chance of winning a gift certificate.

### Confidentiality

We ask for only a limited amount of personally identifying information in this survey (your email address). Beyond this we ask for no other information, such as your name or birthdate, so as to ensure as much confidentiality as possible. We need your email address so that we can conduct the raffle. Your e-mail address will be stored separately from your survey answers in a secure location, and subject numbers will be assigned for data storage. All of your answers will be kept *strictly confidential*; the study team will keep your responses private and your email address will not be released to anyone outside of this study. If you would like to contact a member of the research team or the lab that is sponsoring this study, you are welcome to do so. Contact information is at the bottom of this document.

It is possible that the Institutional Review Board (IRB) may view this study's collected data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research. If you would like to contact the graduate student conducting this study or her advisor, you are welcome to do so. Contact information is at the bottom of this page.

You do not have to participate in this survey and if you choose to participate, you can stop at any time. We do ask, however, that you try to answer every question completely to the best of your ability.

Any identifiable information that is obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by U.S. or State law.

### Questions/Contact Information

If you have any questions about the protection of human research participants regarding this study, you may contact Dr. David Moore, Chair Virginia Tech Institutional Review Board for the Protection of Human Subjects, telephone: (540) 231-4991; email: [moored@vt.edu](mailto:moored@vt.edu); address: Office of Research Compliance, 2000 Kraft Drive, Suite 2000 (0497), Blacksburg, VA 24060 or David W. Harrison, PhD, Chair Departmental Institutional Review Board, telephone: (540) 231-4422 ; e-mail: [dwh@vt.edu](mailto:dwh@vt.edu).

If you would like to speak with a member of this research team, please call the Psychosocial Interventions Lab at (540) 231-6744 or email Caitlin Conner and Susan White at [psyc.soc.interventions@gmail.com](mailto:psyc.soc.interventions@gmail.com) and [cconner4@vt.edu](mailto:cconner4@vt.edu).

**Your completion of this online survey will indicate that you consent to participate in this study.**

**We appreciate your input and Thank You for your time and help in this study!**

Thank you for participating in this survey.

The following are some local resources available to you, should you need someone to talk with about mental health services or personal problems.

**Café Moms**

**(mother site with online groups)**

<http://www.cafemom.com/>

**Online Parenting Message Boards**

[http://childparenting.about.com/od/onlineparentsupport/Online\\_Parent\\_Support.htm](http://childparenting.about.com/od/onlineparentsupport/Online_Parent_Support.htm)

**New River Valley Resources**

**ACCESS/Raft Crisis Hotline**

(Emergency services clinicians)

(540) 961-8400

<http://www.nrvcs.org/services.htm>

**Center for Family Services**

(703) 538-8470

<http://www.nvc.vt.edu/cfs>

**Mental Health Association of the New River Valley**

(540) 951-4990; (800) 559-2800

<http://www.mhanrv.org/>

**New River Valley Community Services**

(540) 961-8400

<http://www.nrvcs.org/>

**VT Psychological Services Center**

(540) 231-6914

<http://www.psyc.vt.edu/centers/psc/>

*Appendix C*

Demographic Form

- I. Do you have a child with autism or an autism spectrum disorder (e.g., Asperger's disorder, PDD-NOS)
- a. Yes
  - b. No
- (the questionnaire will use skip logic to only administer ASD-related questions to participants who indicate they have a child with ASD)

Please answer the following questions about yourself

1. Your Gender

- Male
- Female

2. Your Age: \_\_\_\_\_

3. Your Race/ethnicity (check all that apply)

- African or African American
- Asian or Asian American
- Caucasian/European American
- Latina/ Hispanic
- Native American
- Other            please specify: \_\_\_\_\_

4. Your Marital Status

- Divorced
- Married
- Remarried
- Separated
- Unmarried and in a relationship
- Widowed
- Single

5. Your Highest Level of Schooling Completed (select one)

- Middle school
- High school (diploma or GED)
- Some college/technical school

- Bachelor's/4-year college degree
  - Graduate school (Master's degree or above)
6. Your Spouse's or Partner's Highest Level of Schooling Completed
- N/A (no partner)
  - Middle school
  - High school (diploma or GED)
  - Some college/technical school
  - Bachelor's/4-year college degree
  - Graduate school (Master's degree or above)
7. Is there currently another caregiver living in the home?
- If yes, please indicate type:
    - i. Spouse/partner
    - ii. Grandparent
    - iii. Other family member
    - iv. Other
8. Are you currently employed?
- Yes
  - No
9. Is your spouse/partner currently employed?
- Not Applicable
  - Yes
  - No
10. What type of housing do you reside in?
- Apartment
  - Townhouse
  - Duplex
  - Mobile home
  - Detached single family home (house)
  - Other
11. Do you currently pay rent on your housing?
- Yes
  - No

12. Do you currently pay a mortgage on your housing?

- Yes
- No

13. Are you currently in counseling or therapy?

- Yes
- No
- If yes, please indicate for how long: \_\_\_\_\_

14. Do you currently take any psychiatric medications?

- Yes
- No
- If yes, please indicate which medication(s) you take: \_\_\_\_\_

15. Do you currently have any psychiatric diagnoses or symptoms?

- No psychiatric diagnoses or symptoms
- Depression
- Anxiety (Social Anxiety, OCD, Generalized Anxiety Disorder, Panic Disorder, Specific Phobia, PTSD)
- Learning disorder
- Attention Deficit Hyperactivity Disorder (ADHD)
- Autism spectrum disorder
- Eating disorder (Anorexia, Bulimia)
- Schizophrenia
- Other: \_\_\_\_\_

16. Have you ever sought counseling or therapy?

- Yes
- No
- If so, for what: \_\_\_\_\_
- If so, how old were you: \_\_\_\_\_

17. Have you ever taken psychiatric medications?

- Yes
- No
- If so, which medication(s) and how long have you taken it: \_\_\_\_\_

18. Have you experienced any of these experiences over the previous year? (Check all that apply)

- Separation or Divorce
- Marriage
- Change in individuals in household
- Financial changes (significant increase or decrease in income)
- Moved
- Started a new job or changed position at job
- Death of family member
- Death of close friend
- None of the above

19. How many children do you have?

- 1
- 2
- 3
- 4
- 5
- 6 or above

20. Please list the ages, gender, and biological status of your children:

- Child 1
- Child 2
- Child 3
- Child 4
- Child 5
- Child 6
- Child 7
- Child 8

(note: this question will have drop-down menus for each category)

Please answer the following questions about the child about which you have the most behavioral concerns or find most challenging (OR [oldest child with an ASD](#))

21. Your Child's Age: \_\_\_\_\_

22. Is this your biological child?

- Yes
- No



- i. Foster child
- ii. Adopted
- iii. Stepchild

23. The gender (sex) of this child:

- Female
- Male

24. Has this child been diagnosed with:

- Any medical diagnoses?
  - i. Please specify: \_\_\_\_\_
- Any psychiatric diagnoses? For each diagnosis, please list who first made the diagnosis. If the child has not been diagnosed, please mark N/A.
  - i. Depression
    - 1. If yes, please indicate the individual who made the diagnosis
      - a. Psychiatrist
      - b. Psychologist
      - c. Primary care physician (e.g., Pediatrician)
      - d. School Psychologist
      - e. Other: Please specify: \_\_\_\_\_
  - ii. Anxiety
    - 1. Social anxiety disorder
    - 2. Specific phobia
    - 3. Obsessive Compulsive Disorder
    - 4. Generalized Anxiety Disorder
    - 5. Separation Anxiety Disorder
    - 6. Don't know
      - a. If yes, please indicate the individual who made the diagnosis
        - i. Psychiatrist
        - ii. Psychologist
        - iii. Primary care physician (e.g., Pediatrician)
        - iv. School Psychologist
        - Other: Please specify: \_\_\_\_\_
  - iii. Attention Deficit Hyperactivity Disorder (ADHD)
    - 1. If yes, please indicate the individual who made the diagnosis
      - a. Psychiatrist

- b. Psychologist
  - c. Primary care physician (e.g., Pediatrician)
  - d. School Psychologist
  - e. Other: Please specify: \_\_\_\_\_
  
- iv. Oppositional Defiant Disorder (ODD)/Conduct Disorder
  - 1. If yes, please indicate the individual who made the diagnosis
    - a. Psychiatrist
    - b. Psychologist
    - c. Primary care physician (e.g., Pediatrician)
    - d. School Psychologist
    - e. Other: Please specify: \_\_\_\_\_
  
- v. Learning Disorder (for example, dyslexia, math learning disorder, nonverbal learning disorder)
  - 1. If yes, please indicate the individual who made the diagnosis
    - a. Psychiatrist
    - b. Psychologist
    - c. Primary care physician (e.g., Pediatrician)
    - d. School Psychologist
    - e. Other: Please specify: \_\_\_\_\_
  
- vi. Intellectual Disability/Mental Retardation
  - 1. If yes, please indicate the individual who made the diagnosis
    - a. Psychiatrist
    - b. Psychologist
    - c. Primary care physician (e.g., Pediatrician)
    - d. School Psychologist
    - e. Other: Please specify: \_\_\_\_\_
  
- vii. Please indicate the individual who made the ASD diagnosis
  - a. Psychiatrist
  - b. Psychologist
  - c. Primary care physician (e.g., Pediatrician)
  - d. School Psychologist
  - e. ASD is suspected but never diagnosed
  - f. Other: Please specify: \_\_\_\_\_
  
- viii. Any other developmental disability (for example, a language delay, motor delay)?

Please specify: \_\_\_\_\_

1. If yes, please indicate the individual who made the diagnosis
  - a. Psychiatrist
  - b. Psychologist
  - c. Primary care physician (e.g., Pediatrician)
  - d. School Psychologist
  - e. Other: Please specify: \_\_\_\_\_