Emotion Regulation and Sleep in School-Aged Children

By

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ABSTRACT

Emotion regulation is an important area of skill development in children, particularly those that are school-aged. The current study examined how sleep, a process known to also be vital for the functioning and development of children, is related to emotion regulation. Specifically, caregiver reports were used to investigate overall child sleep quality as well as specific sleep constructs. Participants were recruited from an online crowdsourcing marketplace. Two validated instruments were used to measure emotion regulation and sleep constructs. Correlational and regression analyses were done between total and subscale scores from each instrument. Findings suggest that overall sleep quality, psychological sleep factors, and physical sleep factors are all related to adaptive emotion regulation behaviors as well as caregiver-reported negative affect and mood lability in children. The current study has implications for education and intervention for caregivers and children alike to further assist in fostering healthy development and functioning in school-aged children.

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CHAPTER I

Introduction

Emotion regulation is an ability or skill that all individuals use to monitor and influence their emotions as a means of responding to stimuli in their environment (McRae & Gross, 2020). When individuals cannot effectively and adaptively regulate their emotions, several aspects of functioning are significantly affected (Amstadter, 2008). In children, emotion regulation is a particularly critical skill to acquire, as it sets up the foundations for cognitive and behavioral patterns that last throughout their lifetime (Eisenberg et al., 2010). One well-documented factor that affects an individual's ability to regulate their emotions is sleep, specifically the quantity and quality of it (Yoo et al., 2007).

The impact of sleep disruption on emotion regulation is especially pertinent in children, as sleep plays a critical role in their cognitive development, including affect regulation and modulation (Sadeh et al., 2002; Miller et al., 2016). So, the interaction between sleep and emotion regulation is one that is worth close examination. While some research exists to support the relationship of sleep and emotion regulation in children, more current research is warranted to examine these factors more closely, and especially post-COVID-19 global pandemic. The pandemic had significant permeating effects on many domains of functioning in both children and adults (Simpson et al., 2021; Levitt et al., 2022), so it is worthwhile to re-examine research questions and in new ways that include the context of the pandemic so that there can be a deeper understanding of the new and unique challenges that today's children may face.

Emotion Regulation

Emotion regulation is a critical process for healthy functioning across the lifespan. The regulation of emotions is defined by the American Psychological Association (APA) as the ability for one to influence the intensity or duration of an emotional response, either consciously or not (American Psychological Association, n.d.). In other words, emotion regulation is the means by which one manages their own emotions. It is important to note that there are different strategies or methods of emotion regulation, some of which are thought to be more maladaptive and harmful, and some of which are thought to be more adaptive and healthy (McRae & Gross, 2020). For example, reappraisal, or thinking of a situation or problem in a way that is neutral or positive compared to the oftentimes automatic negative perspective, has been found to elicit more positive and adaptive outcomes. On the other hand, suppression, an emotion regulation technique in which the individual refuses to acknowledge, feel, and/or express the presence of emotions, has been found to worsen the intensity of the emotion and of physiological arousal, thus being maladaptive and potentially leading to poor outcomes (Aldao et al., 2010).

Emotion regulation techniques can be implemented by an individual either automatically or intentionally, depending on the situation, their learning history, and their processing patterns. Emotion regulation can be learned through observation (by observing others and seeing which behaviors have preferred outcomes), but it can also be learned through self-monitoring of one's own behaviors and evaluating outcomes (Morris et al., 2007). Certain techniques that are perhaps learned the earliest in development or those that have the highest value of reinforcement are thought to become habitual,

meaning that an individual uses them without being conscious of the intent (Gyurak et al., 2011). Emotion regulation skills and techniques can also be directly taught to older children, adolescents, and adults in didactic settings such as in counseling or therapy. More commonly, however, most people fluctuate in their consciousness of cognitive processing when regulating their emotions (Gyurak et al., 2011).

The development of emotion regulation typically starts in infancy. Infants around the age of three to six months who experience strong negative emotions have been observed to show some examples of automatic self-soothing, such as moving different body parts or diverting their attention (Eisenberg et al., 2010). However, infants and toddlers mostly rely on external forces, like their caregivers, to provide safety, comfort, and soothing in unpleasant situations that elicit strong negative emotions (Thümmler et al., 2022). This is often referred to as co-regulation (Lobo & Lunkenheimer, 2020).

Further development of emotion regulation and executive control occurs around ages three to four. At this age, children have been observed to still engage in self-soothing behaviors, but now also engage in new regulation behaviors such as reframing the situation or verbalizing their emotions (Thümmler et al., 2022). Other findings from Cole et al. (2009) also suggest that children begin to recognize and implement different strategies for different emotions at this age, suggesting further and richer development of emotion regulation in the preschool years. It is also thought that, based on brain structure, the capability to regulate emotions is fully developed around age four (Rothbart et al., 2011). However, due to emotion regulation largely being a learned skill, whether purposefully or not, specific skills and abilities continue to develop throughout childhood and the across the lifespan (McRae & Gross, 2020).

There is some research to suggest that child gender may have an impact on the development and use of emotion regulation, however, findings are inconsistent. When looking at gender differences in emotional expression, Chaplin and Aldao (2013) found that in children, males tended to display more externalizing emotions (e.g., anger) and females tended to display more internalizing emotions (e.g., sadness, anxiety). In a more comprehensive study examining different emotion regulation strategies for different emotions, Sanchis-Sanchis et al. (2020) found that girls self-reported higher use of emotion regulation strategies than boys, but age had an effect on those findings such that the effect was more prominent as the children got older. Findings by Chaplin and Aldao (2013) also suggest that age and context modulated observed gender differences in emotion expression in children in their study. These findings indicate that there may indeed be differences in the use of emotion regulation in children by gender, but the effect is weak.

For children, ensuring learning positive, adaptive emotion regulation skills is crucial for their healthy development, as these healthy emotion regulation skills have been found to influence their adjustment and general attitude about life, which then affects further development and future functioning (Eisenberg et al., 2010). Specifically, emotion regulation has been found to have a significant positive effect on mental health and functioning. Daniel et al. (2020) found in their meta-analysis that there is ample evidence suggesting that emotion regulation leads to reduced symptoms of depression and anxiety as well as reduced internalizing and externalizing problems in children. They also found that emotion regulation serves as a protective factor in children and adolescents who were at greater risk of developing depression (Daniel et al., 2020).

Additionally, a great deal of research has been done to evaluate the impact of the lack of successful or adaptive emotion regulation processes. For example, Braet and colleagues (2014) found that the use of maladaptive emotion regulation strategies, such as self-blame, catastrophizing, and rumination, was associated with the presence of symptoms commonly found in various conduct disorders and affective disorders, such as depression and anxiety, in children. They also found that those same maladaptive strategies were associated with higher scores on a depression index for children, indicating a strong connection between the use of maladaptive emotion regulation strategies and the presence of clinically relevant depressive symptoms (Braet et al., 2014).

Similarly, Zeman et al. (2002) found that when children reported finding it difficult to identify their negative emotional states, which is thought to be an initial step in several adaptive emotion regulation techniques, it significantly predicted the presence of clinically significant self-reported internalizing symptoms. These findings illustrate that emotion regulation is a particularly crucial skill for children in the middle childhood age range to develop, as this is the period in which emotional and behavioral problems can start to become more stable and possibly develop into clinically significant levels of psychopathology (Loth et al., 2014).

Similar findings and implications have also been observed in adolescents. Shapero et al. (2016) found that depressive symptoms in 12 to 13-year-olds were negatively associated with self-reported cognitive reappraisal strategies, suggesting once again that emotion regulation has a protective effect on the development of depressive disorders in adolescence. Stikkelbroek et al. (2016) found similar results when examining

the relationship between stressful negative life events and the development of depression in adolescents, reporting that more frequent self-reported use of adaptive emotion regulation strategies was associated with lower levels of depressive symptoms, further illustrating a potential protective effect. These same researchers also found that the use of maladaptive strategies mediated the relationship between stressful life events and the development of depressive symptoms in adolescents (Stikkelbroek et al., 2016). This means that the consistent use of these maladaptive strategies was found to be a significant factor in the eventual development of symptoms that are consistent with depressive disorders in these adolescents.

Emotion regulation is also thought to play a large role in the development and maintenance of emotional adjustment, which can be described as the level of an individual's overall emotional functioning and health, especially in the face of stressors. When studying emotion regulation in international college students, Yoo et al. (2006) found that when paired with emotion recognition, which includes the ability to recognize emotional content from other people, emotion regulation predicted adjustment by the end of the school year. This means that the college students who had good emotion regulation skills were better off mentally and emotionally than their peers who did not. Furthermore, Li and colleagues (2014) found that high emotional adjustment scores were predicted by positive emotion enhancing and negative emotion weakening emotion regulation skills. These findings all seem to indicate that the knowledge of, successful processing of, and regulation of emotions lead to better social and health outcomes.

Furthermore, Berking and colleagues (2008b) found that self-report of emotion regulation skills in adults predicted the level of emotional adjustment, but emotional

adjustment did not predict the level of emotion regulation skills. That is, simply demonstrating healthy emotional adjustment levels was not predictive of successful use of emotion regulation skills, but using adaptive emotion regulation skills impacted the emotional adjustment of an individual (Berking et al., 2008b). This finding further indicates that positive emotion regulation skills have additional positive outcomes even for someone who could be described as already emotionally healthy.

It is also important to note that on a broader scale, emotion regulation has been formally included in many theoretical frameworks for the development and maintenance of different psychological disorders. Most researchers agree that experiencing a significant stressor or traumatic event is not guaranteed to lead to the development of a disorder, and that other factors such as genetics, history, mental processes, and others also influence outcomes (Sayed et al., 2015). Emotion regulation has recently been increasingly included in theories of etiology of psychopathology. For example, Hofmann and colleagues' (2012) model of mood and anxiety disorders places the use of emotion regulation strategies as a main factor that determines which outcome an individual will experience and how severe their symptoms might be (Hofmann et al., 2012).

Due to the links between emotion regulation and mental disorders and other emotional or behavioral issues, it is no surprise that teaching adaptive skills are used as a core part of or in congruence with many treatment modalities. Berking and colleagues (2008a) found that when treating someone with cognitive behavioral therapy, providing additional training on emotion regulation and modification lead to markedly better outcomes in adult inpatient participants. Furthermore, some of the most empirically supported treatments for a variety of mental disorders include training in emotion

regulation skills, such as dialectical behavior therapy (Linehan, 1993) and acceptance and commitment therapy (Hayes, 2013). New therapy modalities are also being developed with emotion regulation as the main focus, such as emotion regulation therapy, which has been shown to be effective for patients with generalized anxiety disorder in early outcome studies (O'Toole, 2019).

Teaching emotion regulation skills in treatment specifically for children and adolescents also has empirical support. Many professionals have been discussing the theoretical and logical bases for it for some time (Young et al., 2019), and now empirical research is being published in support of it as well. For example, Weiss and colleagues (2018) provided emotion regulation focused cognitive behavioral therapy to children ages 8 to 12 with autism spectrum disorder and found that those in the treatment group made significant improvements in negative emotionality and externalizing behaviors that were maintained 10 weeks later. Wyman and colleagues (2010) found that when children in kindergarten to third grade were taught emotion regulation skills and were reinforced for using them, disciplinary referrals and actions decreased for those children by 46%.

It is important to note that most of the literature emphasizes that younger children may not benefit from the explicit teaching of emotion regulation techniques, as they do not yet have the cognitive capacity for the level of self-monitoring that is required. For these children, emotion regulation is more often taught through behavior management strategies and modelling of behaviors from their caregivers, such as in the evidence-based, dyadic model parent-child interaction therapy (PCIT; Rothenberg et al., 2019). Other methods used to teach emotion regulation skills in children are sometimes taught along or within coping skills training targeted directly to children, like in the Coping Cat

model (Kendall & Hedtke, 2006). Coping skills programs for young children often include direct teaching about emotions and how to identify them, which is a key part of the process of emotion regulation (Beidas et al., 2010).

In sum, emotion regulation is a significant factor that impacts the general functioning, quality of life, and overall mental health for individuals. What is less clear, is the extent to which certain factors influence the development and use of emotion regulation in children. One variable that is thought to be significant is the effect of sleep on emotion regulation. While sleep's influence on emotion regulation has been thoroughly researched in adult populations, less is known about the relationship between sleep and emotion regulation in children, particularly given the swift and significant changes occurring throughout the development period.

Importance of Sleep

To better understand the relationship between sleep and emotion regulation, it is necessary to understand the basic processes and purposes of sleep. Sleep is generally understood to be a state of unconsciousness in which the brain is less responsive to sensory stimuli, but is still active (Carley & Farabi, 2016). It is a biologically restorative process in which humans go through different stages that vary in deepness and function. Specifically, Yoo et al. (2007) found that sufficient sleep increases the amount of activation and connections between the amygdala, an area of the brain associated with automatic emotional responses, and the prefrontal cortex, an area that is partly responsible for executive control, indicating that proper sleep is responsible for developing and maintaining the brain environment and structures needed for emotion regulation. The same researchers also found that sleep deprivation, on the other hand,

increased the number of connections between the amygdala and the brainstem, another area that is associated with automatic responses (Yoo et al., 2007). These findings suggest that poor sleep can actually make it more difficult for the brain to engage in self-regulating behaviors.

It is also thought that sleep aids in the strengthening and successful completion of numerous other cognitive processes that are essential for proper functioning (Brinkman et al., 2022; Tononi & Cirelli, 2014). Holding et al. (2021) found that those who were sleep deprived performed significantly worse on four different cognitive tasks throughout the day. Van Dongen et al. (2003) found that restricting sleep for several nights in a row caused significant cognitive performance deficits that lasted days following the end of the sleep restriction. Ma et al. (2020) found that those who reported sleep durations of less than 4 hours or greater than 10 hours a day had greater levels of cognitive decline in their older age than those who reported typical sleep duration. Sleep is also theorized to aid in selective emotional memory processing, which is responsible for sorting the emotional components of a memory in order to alter the salience of the memories and their associated emotions (Goldstein & Walker, 2014). These findings all demonstrate that abnormal and inadequate sleep can greatly affect memory and cognition, which are largely required for many emotion regulation processes.

For children, the importance of sleep cannot be overstated, as it has been demonstrated that sleep is crucial for the continuing adaptive development of various brain structures in infants and young children. Kocevska et al. (2017) found that children who had issues falling asleep between the ages of 2 and 6 had significantly smaller gray matter in an area of the prefrontal cortex that is associated with self-regulation than

children who slept normally. Taki et al. (2012) found that sleep was positively correlated with volume of the hippocampal body and the same part of the prefrontal cortex in 5- to 18-year-olds. This part of the prefrontal cortex that was affected in both studies plays a large role in memory consolidation and emotion processing, further suggesting that sleep aids in the development of the structures needed for healthy emotion regulation.

Similar effects have been found in adolescents as well. Brooks et al. (2022) found that shorter sleep duration in early adolescents was associated with less connectivity and functionality in areas of the brain associated with memory processes, executive control, and emotional processing and regulation. Similarly, Yang et al. (2022) found that shortened sleep duration in early adolescents lead to a qualitatively different structure of the basal ganglia, a set of structures that influence executive function and emotions.

Sleep has also been demonstrated to significantly impact children's behavior and social functioning. For example, Berger et al. (2011) found that when nap restricted, toddlers' emotional responses to negative stimuli, such as pictures of scary animals, were more negative, and their emotional responses to positive stimuli, such as pictures of puppies or candy, were less positive. They also found that the nap restricted toddlers responded less confused to a challenge, meaning they were less likely to engage in problem solving behaviors, which is an important part of numerous emotion regulation processes (Berger et al., 2011).

Similarly, when studying different emotion regulation techniques of toddlers when faced with an unsolvable puzzle, Miller et al. (2016) found that toddlers who were nap restricted, meaning they were not allowed to nap for the 5-day duration of the study, engaged in less cognitively based self-soothing techniques than toddlers who maintained

their typical nap patterns. These cognitive-based techniques include skepticism, (wondering if the task could actually be completed), and negative self-appraisal (realizing that their actions were not effective). They also found that the nap-restricted toddlers engaged in more physical self-soothing strategies, like thumb-sucking or hair-twirling, and displayed more perseveration on the task, which further illustrates less use of cognitive strategies with diminished sleep (Miller et al., 2016). These findings indicate that sleep greatly impacts behavior and performance of emotion regulation processes.

Additionally, Keefe-Cooperman and Brady-Amoon (2014) examined the relationship between sleep patterns and adaptive functioning and found that 3-year-olds who got more sleep had lower scores on the externalizing scale of the BASC-2, a parent-report measure, indicating they showed less aggression and other conduct problems. The children who got more sleep also had higher scores on the adaptive skills scale, indicating better adaptability and prosocial behavior. Furthermore, children who slept through the night also had higher adaptive scale scores, lower externalizing scale scores, and additionally, lower internalizing scale scores, indicating fewer symptoms of anxiety and depression (Keefe-Cooperman & Brady-Amoon, 2014).

When looking at the behavior and sleep of school-aged children, Sadeh et al. (2002) found that children who were biologically measured to be poorer sleepers had higher scores on the delinquent problems scale on the parent-report CBCL, which is suggestive of potentially defiant, violent, and/or spiteful behaviors against others. They also scored higher on the thought problems scale, which indicates the presence of a higher rate of either obsessive, erratic, and/or delusional thoughts. Moreover, Yang et al. (2022) found that adolescents in their study who had less sleep had a greater chance at

developing depressive symptoms and thought problems, such as obsessive thoughts, delusions, and hallucinations, later on in their lives. All of these findings taken together illustrate just how important sleep is for children's emotional states and behaviors.

Sleep Hygiene

For different ages, varying amounts of hours are recommended to ensure healthy development. For infants, around 12 to 16 hours of sleep are needed each day (American Academy of Sleep Medicine, 2016), however, this total time is made up of many short sleep periods, with each one being around 2 to 4 hours (Patel et al., 2022). For children ages two to five, required sleep time lessens to around 11 to 13 hours, and the number of sleep periods decreases as the time in each sleep period increases (Patel et al., 2022). Around ages five to six, children will generally start to have only one sleep period that lasts the full amount of their required sleep time, which is between 9 and 11 hours, and this pattern continues into adolescence. During adolescence, it is recommended to get 8 to 10 consolidated hours of sleep per night to meet their developmental needs (Hirshkowitz et al., 2015).

Although the literature supports clear sleep recommendations for children, it is not uncommon for children to struggle to meet them. It has been shown that certain mental and medical conditions, as well the medications used to treat them, have a significant impact on the quality of children's sleep. For example, Sivertsen et al. (2009) found that children who had a chronic illness had higher levels of sleep problems than their peers. They also found that those same children were more at risk for sleep problems later in life (Sivertsen et al., 2009). Similar results were found by Fletcher et al. (2018) when looking at children with anxiety, as they too had significantly higher sleep

problems. This finding further illustrates the complex and seemingly intertwined relationship between sleep and mental and emotional factors.

One major way to ensure children meet their sleep requirements is to facilitate proper sleep hygiene (Mishra et al., 2017). Sleep hygiene can be understood as the behavioral and environmental processes that aid in experiencing adequate and healthy sleep (Irish et al., 2015). For children, one of the most important aspects of proper sleep hygiene for children is having a consistent bedtime routine, meaning caretakers go through the same activities at around the same time every night (Mindell et al., 2015). Bedtime routines have been shown to significantly improve the quality of sleep in children. For example, when examining how bedtime routines affect children's sleep, Mindell and Williamson (2018) found that consistently implemented bedtime routines not only improved the children's quality of sleep and emotional functioning, but it also led to better outcomes for the whole family system as well. Furthermore, Ivanova and Israel (2006) found that when children reported greater family stability, as measured by day-to-day regularity and routine, including bedtime routines, the parents then reported less child behavioral problems.

Specific bedtime activities have been shown to maximize sleep and its numerous benefits. For example, Mindell et al. (2009) found that both preschoolers and school-age children slept more when they had a consistent bedtime routine and one that specifically included reading. Furthermore, Hale et al. (2011) found that implementing language-based bedtime routines, such as singing, reading, or story-telling, resulted in children having longer sleep duration and higher verbal ability test scores. This finding demonstrates the importance of sleep hygiene and rituals in regard to sleep quality, but it

also illustrates how sleep can impact the development of long-term cognitive functioning, something needed for emotion regulation and thus healthy mental functioning.

Current Study

The current study examined caregiver perceptions of child behavior in an effort to further determine the relationship between overall sleep quality and different sleep behaviors with emotion regulation skills in school-aged children (ages 5 to 10). This age range is the target of the current study due to this period of development being demonstrated to be critical for the creation and maintenance of behavioral and emotional patterns that may serve as risk or protective factors for psychopathology (Loth et al., 2014).

Hypotheses. H1: It was hypothesized that children's overall sleep quality problems, as reported by their caregivers and as measured by the total score of the Children's Sleep Habits Questionnaire (CSHQ; Owens et al., 2000), would be significantly negatively correlated with children's overall adaptive emotion regulation abilities, as reported by their caregivers and as measured by the total score of the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997). More specific sleep constructs, such as if children's sleep duration is within normal limits (sleep duration), how often children wake up in the night (night wakings), how resistant children are to going to bed on their own (bedtime resistance), how afraid or anxious children are to fall asleep (sleep anxiety), how often children experience disruptions during their sleep (e.g., sleepwalking, nightmares, teeth grinding, etc.; parasomnias), and how difficult it is for children to become awake and alert during the day (daytime sleepiness), as measured by individual subscales on the CSHQ, were also hypothesized to correlate with children's overall

adaptive emotion regulation abilities and behaviors, as well as with children's general positive emotion regulation behaviors and overall externalizing behaviors/mood lability, as measured by the two subscales of the ERC.

H2: Several linear regression models were analyzed in order to more closely examine the relationship between children's caregiver-reported sleep quality and emotion regulation. It was hypothesized that two specific sleep constructs related to processes preceding sleep, bedtime resistance (BR) and sleep anxiety (SAnx), would predict children's overall adaptive emotion regulation behaviors (ERCTotal), as well as general positive emotion regulation skills (ER). The equations for these linear regression models were:

$$\text{ERCTotal} = \beta_0 + \beta_1 \text{BR} + \beta_2 \text{SAnx}$$

$$\text{ER} = \beta_0 + \beta_1 \text{BR} + \beta_2 \text{SAnx}$$

It was also hypothesized that the sleep constructs of daytime sleepiness (DS), sleep duration (SD), night wakings (NW), and parasomnias (Ps) would predict children's overall adaptive emotion regulation behaviors (ERCTotal), as well as overall mood lability/externalizing behaviors (L/N). The equations for these linear regression models were:

$$\text{ERCTotal} = \beta_0 + \beta_1 \text{DS} + \beta_2 \text{SD} + \beta_3 \text{NW} + \beta_4 \text{Ps}$$

$$\text{L/N} = \beta_0 + \beta_1 \text{DS} + \beta_2 \text{SD} + \beta_3 \text{NW} + \beta_4 \text{Ps}$$

H3: It was hypothesized that the relationship between children's caregiver-reported sleep quality (CSHQTotal) and children's caregiver-reported adaptive emotion regulation behaviors (ERCTotal) would be moderated by the child's reported gender. The equation for this linear regression model was:

$$\text{ERCTotal} = \beta_0 + \beta_1 \text{CSHQTotal} + \beta_2 \text{gender} + \beta_3 \text{CSHQTotal*gender}$$

Additionally, exploratory analyses between demographic data, caregiver sleep data, and data gathered on children's reported sleep and emotion regulation functioning were conducted to determine if any relationships exist between groupings (e.g., parent income and parent education level).

CHAPTER II

Method

Participants

Participants were recruited through Amazon Mechanical Turk (MTurk). They were first screened to ensure that inclusion criteria were met. Inclusion criteria required that participants be a current resident of the United States, be at least 18 years of age, be the parent or primary caregiver of a child between the ages of 5 and 10, and that they felt confident to respond to questions about their child's sleep, sleep behaviors, emotions, and behaviors related to emotion regulation. If participants indicated having more than one child in the target age range, they were instructed to choose their youngest child within the age range to answer the survey questions about. Participants received compensation in the form of one dollar for their participation, consistent with recommendations and general standards for compensation on MTurk. A total of 270 participants were recruited for the study, however the final sample size was 51 (see Procedures section below for details on data cleaning and final sample size). Institutional Review Board (IRB) approval was obtained by Middle Tennessee State University's IRB.

Measures

Demographics. Participants were asked a series of demographics questions about themselves and the child of focus in the survey. Demographic information was obtained about the child, including the child's age, biological sex (Male; Female; Intersex or Other), race (Asian; Black/African-American; Hispanic and/or Latino; Indigenous American; Native Hawaiian or Pacific Islander; White; Bi- or Multi-racial; Other; I prefer not to say), grade in school or grade most recently completed (Kindergarten; 1st grade;

2nd grade; 3rd grade; 4th grade; 5th grade; Other; I prefer not to say), and what type of school they attend (Public; Private; Homeschool; Other; I prefer not to say).

Participants were then asked a series of demographic questions about themselves, including their age, their gender identity (Woman; Man; Non-binary; Genderfluid; Other; I prefer not to say), their relationship to the child of focus (Mother; Father; Step-mother; Step-father; Other family member with custody; Other legal caregiver; Other), their marital status (Single, never married; Married; Domestic partnership; Widowed; Divorced; Separated; Other; I prefer not to say), if the child of focus currently lives with them (Yes, all of the time; Yes, some of the time; No; I prefer not to say), how many people live in the participant's current residence, their highest education level attained (Some high school, no diploma; High school diploma or equivalent [for example: GED]; Some college, no degree; Associate degree; Bachelor's degree; Master's degree; Doctorate degree; Some trade/technical/vocational training, no completion; Completed trade/technical/vocational training; Other; I prefer not to say), and their annual household income ($0-$30k; $31k-$60k; $61k-$90k; $91k-$120k; $121k+; I prefer not to respond).

Participants were also asked to report on their own typical amount of sleep each night in hours and minutes, as well as how long it typically takes them to fall asleep at night (0-20 minutes; 21-40 minutes; 41-60 minutes; Over an hour). Lastly, participants were asked how often they wake up feeling well-rested, how often they wake up in the middle of the night, and how often they feel tired during the day all on a 5-point Likert scale ranging from *never* to *always*.

Children's Sleep Habits Questionnaire (CSHQ). The CSHQ (Owens et al., 2000) was used to measure the constructs of different sleep behaviors and overall sleep

quality in the sample. The CSHQ is a retrospective, parent-report measure designed to assess sleep behavior in children. It consists of 45 items that are rated on a three-point Likert-type scale where *usually* indicates the behavior took place 5 to 7 times per week, *sometimes* indicates the behavior took place 2 to 4 times per week, and *rarely* indicates the behavior took place 0 to 1 time per week.

The CSHQ yields results in 8 subscales, each measuring a different sleep construct. The Bedtime Resistance subscale measures how resistant a child is when completing bedtime routines and in going to bed on their own. The Sleep Duration subscale helps to determine if a child's length of sleep is within normal limits, meaning they are not sleeping too much or too little. The Parasomnia subscale assesses for many disruptions that may occur in children's sleep, such as talking during sleep, sleepwalking, restlessness or excessive movement, bedwetting, teeth grinding, and experiencing nightmares or night terrors. The Sleep Disordered Breathing subscale assesses for the presence of snoring or other disruptions to children's breathing during sleep. The Night Wakings subscale measures how often a child wakes up in the night or changes sleeping locations. The Daytime Sleepiness subscale measures how difficult it is for a child to get out of bed in the morning and become awake and alert, as well as how sleepy they appear during the day. The Sleep Anxiety subscale assesses for fear and anxiety in children when sleeping in general, and when sleeping alone, in the dark, or away from home. Lastly, the Sleep Onset Delay subscale is one item that determines whether a child falls asleep within 20 minutes.

The CSHQ also includes a Total Sleep Disturbances Index, also known as the CSHQ total score, which is a combination of scores from all items and measures the

overall amount of sleep problems. For all scores derived from this measure, a higher score is indicative of more reported sleep disturbance behaviors and thus poorer sleep quality. Some items in each subscale are reverse scored to follow this pattern.

The CSHQ demonstrates good psychometric properties. The authors deemed the scales to have acceptable reliability, and reported that the measure had an internal consistency of .68 and Pearson's and Spearman's correlations for test-retest scores ranging from .62 to .79, which also demonstrate adequate reliability (Owens et al., 2000). Validity of the CSHQ is supported through significant differences in scores between a control community sample and a clinical sample of children referred to a pediatric sleep disorders clinic (Owens et al., 2000).

Emotion Regulation Checklist (ERC). The ERC (Shields & Cicchetti, 1997) was used to measure the construct of overall adaptive emotion regulation abilities and behaviors as well as more general positive emotion regulation skills and overall mood lability and externalizing behaviors in the sample. The ERC is a retrospective, parent-report measure designed to assess emotionality and emotion regulation in children. It consists of 24 items in which parents indicate how frequently behaviors occur in their children on a 4-point Likert-type scale ranging from *never* to *always*. The ERC produces scores for two subscales: the Emotion Regulation subscale, which consists of 8 items, measures situationally appropriate affective displays, empathy, and emotional self-awareness, and the Lability/Negativity subscale, which is made of 15 items, measures a lack of flexibility, mood lability, dysregulated negative affect, and general externalizing behaviors (Shields & Cicchetti, 1997). Several items on each subscale are reverse scored so that a higher score on the Emotion Regulation subscale indicates greater positive

emotion regulation and thus better functioning, and a higher score on the Lability/Negativity subscale indicates greater emotion dysregulation and thus poorer functioning. One item is not included in either scale as it did not load on either factor in early validation analyses (Shields & Cicchetti, 1997).

The ERC also offers an Emotion Regulation Total score that can be calculated as a measure of general adaptive emotion regulation abilities and behaviors, with high scores reflecting good use emotion regulation in a multitude of different settings, and low scores reflecting poor emotion regulation. This score can be calculated by adding 23 of the 24 items, some of which are reverse scored. As with the previous subscale scores, one item (Item 12) is excluded from scoring (Shields & Cicchetti, 1997).

The ERC demonstrates good psychometric properties, as evidenced by internal consistency Cronbach's alphas of .83 for the Emotion Regulation subscale and .96 for the Lability/Negativity subscale (Shields & Cicchetti, 1997). Another study using the ERC found the Cronbach's alphas to be .60 for the Emotion Regulation subscale and .84 for the Lability/Negativity subscale, further demonstrating adequate reliability (Suveg et al., 2018). The ERC has also been found to have excellent interrater reliability, discriminant validity, and construct validity (Shields & Cicchetti, 1997).

Procedure

Prior to data collection, approval from Middle Tennessee State University's Institutional Review Board (IRB) was obtained (see Appendix A). This study was an online Qualtrics survey, and participants were recruited through MTurk. The participants gained access to the study via a link to the Qualtrics survey. First, informed consent (see Appendix B) and Captcha verification were obtained, and participants were then

prompted to answer questions to ensure inclusion criteria were met. If users did not consent to participate, if they failed the Captcha verification, or if they did not meet the inclusion criteria, they were directed to the end of the survey and thanked for their time.

Once it was determined that inclusion criteria were met, participants were directed to the demographic questions (see Appendix C). The CSHQ (Owens et al., 2000) and the ERC (Shields & Cicchetti, 1997) were then presented in separate blocks in random order. Participants were also asked to complete attention check multiple-choice questions in between the measures to ensure effort validity. Once participants completed the study, they were presented with a debriefing page (see Appendix D) where they were again given information about the purpose of the study along with contact information for the investigators and university, and resources for implementing healthy sleep rituals in children and impact of sleep disruption on emotion dysregulation in young children.

CHAPTER III

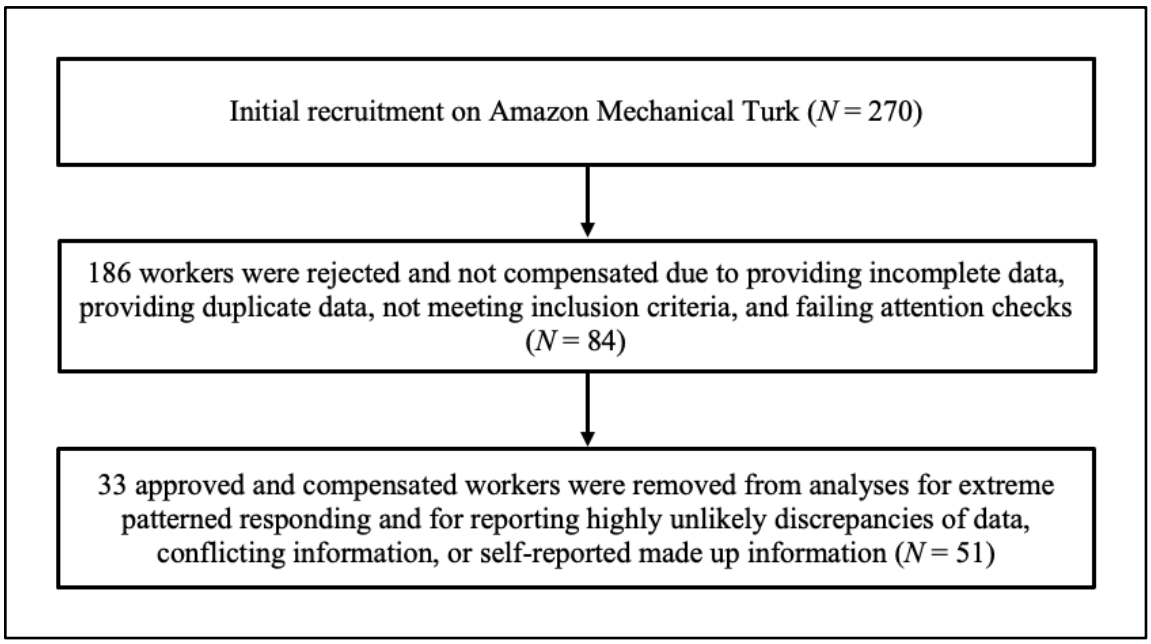
Results

Data Preparation

In total, 270 responses were recorded on Qualtrics from the anonymous link posted on MTurk. Of those responses, 84 MTurk workers were approved to receive compensation after investigator review of their data. All other workers failed one or more attention check questions, did not indicate that they have a child in the required age range, submitted more than one response (i.e., duplicate completion of the survey), or provided incomplete data. Of the 84 workers who were approved, 51 participants' data were used in the analyses (see Figure 1 for data collection and elimination process). The approved workers whose data were removed from analyses were removed for reasons such as extreme patterned responding, reporting highly unlikely discrepancies between child age and grade (e.g., indicating their child's age was 6 and their child's grade was 5th), reporting conflicting information about the number of people within their household, or indicating they made up answers on the survey. Participants were not excluded based on time spent completing the survey. It took participants in the final sample size an average of 21 minutes to fully complete it. The final sample size used in the statistical analyses was $N = 51$. The statistical software SPSS (Version 29.0.2.0) was used to perform all analyses.

Figure 1

Data Cleaning Process



Descriptive Statistics

Demographic information for participants and their children is reported by number and percentages in each category in Table 1. All categorical demographic variables were coded into numbers to be used in statistical analyses. Only self-reported mothers and fathers participated, and all parent participants reported being married and educated with a bachelor's degree or higher education. Children for whom the caregivers reported data included both females and males who were primarily White between the ages of 5 and 9 years and attended mostly public (47%) and private (49%) schools.

Table 1

Sociodemographic Characteristics of Children and Participants

	n	*%*	*M*	*SD*		*n*	*%*	*M*	*SD*
Child Age			6.49	1.16	Participant Age			33.98	6.66
5	8	15.7			20-29	6	11.8		
6	25	49.0			30-39	40	78.4		
7	7	13.7			40-49	2	3.9		
8	7	13.7			50+	3	5.9		
9	4	7.8			Participant Gender				
Child Gender					Woman	21	41.2		
Female	26	51.0			Man	30	58.8		
Male	25	49.0			Relationship to Child				
Child Race					Mother	22	43.1		
Asian	5	9.8			Father	29	56.9		
Indigenous American	1	2.0			Marital Status				
White	45	88.2			Married	50	98.0		
Child Grade					Domestic partnership	1	2.0		
Kindergarten	7	13.7			Education Level				
1st grade	21	41.2			Bachelor's degree	37	72.5		
2nd grade	11	21.6			Master's degree	13	25.5		
3rd grade	6	11.8			Doctorate degree	1	2.0		
4th grade	5	9.8			Annual Income				
5th grade	1	2.0			$0 - $30k	2	3.9		
Child Schooling Type					$31k - $60k	19	37.3		
Public	24	47.1			$61k - $90k	17	33.3		
Private	25	49.0			$91k - $120k	11	21.6		
Homeschool	2	3.9			$121k +	2	3.9		

Note. $N = 51$.

Hypothesis Testing

Hypothesis One. It was predicted that children's overall sleep quality problems would be significantly negatively correlated with children's overall adaptive emotion regulation abilities. This was tested by calculating means and Pearson's correlation coefficients between the total scores of the Children's Sleep Habits Questionnaire

(CSHQ; Owens et al., 2000) and the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997). Preliminary analyses showed relationships among variables to be linear with all variables normally distributed, as evidenced by visual inspection of scatterplots between the variables. There were no outliers. There was a statistically significant strong negative correlation between caregiver-reported child sleep quality problems, as measured by the total score of the CSHQ, and adaptive emotion regulation abilities, as measured by the total score of the ERC, $r = -.656$, $p < .001$.

It was also hypothesized that significant correlations would be found between children's overall adaptive emotion regulation, specific sleep constructs, and children's general mood lability and emotion regulation behaviors. This was assessed by calculating means and Pearson's correlation coefficients between all of the subscale scores of the CSHQ and the total ERC score, as well as the two subscales of the ERC. Significant negative correlations were found between the total scores of the ERC and several of the subscales of the CSHQ, including the Sleep Duration (SD) subscale ($r = -.534$, $p < .001$), the Sleep Anxiety (SAnx) subscale ($r = -.343$, $p < .05$), the Night Wakings (NW) subscale ($r = -.431$, $p < .01$), the Parasomnias (Ps) subscale ($r = -.524$, $p < .001$), the Sleep Disordered Breathing (SDB) subscale ($r = -.614$, $p < .001$), and the Daytime Sleepiness (DS) subscale ($r = -.579$, $p < .001$).

Other significant correlations between measure variables were found with the Lability/Negativity (L/N) subscale from the ERC, which measures child emotion dysregulation, mood lability, and general externalizing behaviors. Specifically, there was a statistically strong positive correlation between caregiver-reported child sleep quality problems, as measured by the total score of the CSHQ, and the L/N subscale, $r = .698$,

$p < .001$. The same L/N subscale was also found to be correlated with several subscales of the CSHQ, including the Bedtime Resistance (BR) subscale ($r = .303$, $p < .05$), the SD subscale ($r = .507$, $p < .001$), the SAnx subscale ($r = .408$, $p < .001$), the NW subscale ($r = .446$, $p < .001$), the Ps subscale ($r = .577$, $p < .001$), the SDB subscale ($r = .600$, $p < .001$), and the DS subscale ($r = .623$, $p < .001$). No significant correlations were found between the Emotion Regulation (ER) subscale of the ERC and any of the scales from the CSHQ. All correlations between measures, as well as measure means and standard deviations are reported in Table 2.

Table 2

Descriptive Statistics and Correlations for Measure Variables

	N	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. ERC Total[a]	51	2.74	.30	–										
2. L/N[b]	51	2.34	.43	-.94**	–									
3. ER[a]	51	2.89	.30	.40**	-.07	–								
4. CSHQ Total[b]	51	1.83	.34	-.66**	.70**	-.04	–							
5. BR[b]	51	1.95	.32	-.24	.30*	.11	.42**	–						
6. SOD[b]	51	1.71	.73	-.17	.21	.08	.34*	.14	–					
7. SD[b]	51	1.58	.48	-.53**	.51**	-.20	.65**	.02	.36*	–				
8. SAnx[b]	51	2.08	.47	-.34*	.41**	.09	.60**	.58**	.04	.20	–			
9. NW[b]	51	1.86	.47	-.43**	.45**	-.06	.74**	.27	.19	.46**	.31*	–		
10. Ps[b]	51	1.75	.51	-.52**	.58**	.02	.92**	.25	.32*	.57**	.48**	.66**	–	
11. SDB[b]	51	1.67	.65	-.61**	.60**	-.19	.78**	.20	.20	.53**	.22	.53**	.72**	–
12. DS[b]	51	1.91	.36	-.58**	.62**	-.02	.84**	.21	.11	.50**	.58**	.54**	.72**	.57**

** = Correlation is significant at the .01 level.
* = Correlation is significant at the .05 level.
[a] = Higher scores are indicative of better functioning.
[b] = Higher scores are indicative of poorer functioning.
Note: ERC = Emotion Regulation Checklist; L/N = Lability/Negativity; ER = Emotion Regulation; CSHQ = Children's Sleep Habits Questionnaire; BR = Bedtime Resistance; SOD = Sleep Onset Delay; SD = Sleep Duration; SAnx = Sleep Anxiety; NW = Night Wakings; Ps = Parasomnias; SDB = Sleep Disordered Breathing; DS = Daytime Sleepiness.

Hypothesis Two. It was predicted that the specific sleep constructs of bedtime resistance and sleep anxiety would predict children's overall adaptive emotion regulation behaviors, as well as their general positive emotion regulation skills. This was assessed through multiple linear regression analyses in which models were made to see if the subscales of Bedtime Resistance (BR) and Sleep Anxiety (SAnx) from the CSHQ, when

calculated together, could predict the total scores of the ERC, as well as scores from its ER subscale.

To assess linearity, scatterplots of variables were plotted for every model. Visual inspection of these plots indicated a linear relationship between the variables in all models. There was homoscedasticity, as assessed by visual inspection of plots of standardized residuals versus standardized predicted values, and normality of the residuals, as assessed by visual inspection of a normal probability plots, in all models. There was independence of residuals and no outliers were detected in all models.

Multiple linear regression indicated that bedtime resistance and sleep anxiety statistically significantly predicted adaptive emotion regulation abilities, $F(2, 48) = 3.27$, $p < .05$, $R^2 = 0.12$, adjusted $R^2 = 0.08$. However, neither bedtime resistance nor sleep anxiety were significant predictors of adaptive emotion regulation on their own when controlling for the other variable. Sleep anxiety was a marginally significant predictor ($p = .07$). Multiple linear regression also indicated that bedtime resistance and sleep anxiety did not statistically significantly predict general positive emotion regulation skills. See Table 3 for these regression models.

Table 3

Multiple Linear Regression Models using Two Sleep Constructs as Predictors

			95% CI for Estimate			
	Estimate	SE	LL	UL	Beta	*p*
Model 1 – ERC Total						
Intercept	3.27	0.26	2.75	3.79		
BR	-0.06	0.16	-0.38	0.26	-0.06	.71
SAnx	-0.20	0.11	-0.41	0.02	-0.31	.07
Model 2 – ER subscale						
Intercept	2.68	0.27	2.14	3.21		
BR	0.08	0.16	-0.25	0.41	0.09	.62
SAnx	0.03	0.11	-0.20	0.25	0.04	.81

Note: SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit; ERC = Emotion Regulation Checklist; ER = Emotion Regulation; BR = Bedtime Resistance; SAnx = Sleep Anxiety; for Model 1, $F(2, 48) = 3.27$, $p < .05$, $R^2 = 0.12$, adjusted $R^2 = 0.08$; for Model 2, $F(2, 48) = 0.34$, $p = .71$, $R^2 = 0.01$, adjusted $R^2 = -0.03$.

For hypothesis two, it was also predicted that the sleep constructs of daytime sleepiness, sleep duration, night wakings, and parasomnias would predict children's overall adaptive emotion regulation behaviors and their overall mood lability and externalizing behaviors. This was assessed through multiple linear regression analyses in which models were made to see if the subscales of Daytime Sleepiness (DS), Sleep Duration (SD), Night Wakings (NW), and Parasomnias (Ps) from the CSHQ, when calculated together, could predict the total scores of the ERC, as well as scores from its L/N subscale.

Multiple linear regression indicated that daytime sleepiness, sleep duration, night wakings, and parasomnias when analyzed together significantly predicted child adaptive emotion regulation behaviors, $F(4, 46) = 8.37$, $p < .001$, $R^2 = 0.42$, adjusted $R^2 = 0.37$.

Daytime sleepiness was a significant predictor of overall adaptive emotion regulation when controlling for all other variables (B = -0.30, 95% CI [-0.58, -0.02]), as was sleep duration (B = -0.19, 95% CI [-0.37, -0.01]). Night wakings and parasomnias were not found to be significant predictors on their own. Multiple linear regression also indicated that daytime sleepiness, sleep duration, night wakings, and parasomnias significantly predicted child mood lability, $F(4, 46) = 9.49$, $p < .001$, $R^2 = 0.45$, adjusted $R^2 = 0.41$. Daytime sleepiness was the only significant predictor of child mood lability in this model when controlling for all other variables, B = 0.46, 95% CI [0.08, 0.84]. See Table 4 for these regression models.

Table 4

Multiple Linear Regression Models using Four Sleep Constructs as Predictors

			95% CI for Estimate			
	Estimate	SE	LL	UL	Beta	*p*
Model 3 – ERC Total						
Intercept	3.75	0.20	3.36	4.15		
DS	-0.30	0.14	-0.58	-0.02	-0.36	.04*
SD	-0.19	0.09	-0.37	-0.01	-0.29	.04*
NW	-0.04	0.10	-0.24	0.15	-0.07	.66
Ps	-0.03	0.11	-0.26	0.20	-0.05	.78
Model 4 – L/N subscale						
Intercept	0.87	0.27	0.33	1.41		
DS	0.46	0.19	0.08	0.84	0.39	.02*
SD	0.19	0.12	-0.06	0.43	0.21	.13
NW	0.04	0.14	-0.23	0.31	0.04	.78
Ps	0.13	0.16	-0.19	0.44	0.15	.42

* = Correlation is significant at the .05 level.

Note: ERC = Emotion Regulation Checklist; L/N = Lability/Negativity; DS = Daytime Sleepiness; SD = Sleep Duration; NW = Night Wakings; Ps = Parasomnias; for Model 3, $F(4, 46) = 8.37$, $p < .001$, $R^2 = 0.42$, adjusted $R^2 = 0.37$; for Model 4, $F(4, 46) = 9.50$, $p < .001$, $R^2 = 0.45$, adjusted $R^2 = 0.41$.

Hypothesis Three. It was predicted that the relationship between children's sleep quality problems and adaptive emotion regulation behaviors would be altered by gender effects. To test this, A hierarchical multiple regression was run to assess any change in variation explained by the addition of an interaction term between overall child sleep quality and child gender when predicting child overall adaptive emotion regulation abilities. For this model, the total scores for the CSHQ, the reported gender of the children, and the interaction between those two variables were calculated to see if they could significantly predict the total scores on the ERC.

Linearity was established by visual inspection of a scatterplot and there was no evidence of multicollinearity. No outliers were found. There was homoscedasticity, as assessed by visual inspection of the studentized residuals plotted against the predicted values. The residuals were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). The model found that child gender did not moderate the effect of child overall sleep quality on adaptive emotion regulation abilities, as evidenced by an increase in total variation explained of 2.8%, which was not statistically significant, $F(1, 47) = 2.53$, $p = .12$. See Table 5 for this regression model.

Table 5

Multiple Linear Regression Model using Child Gender as a Moderator

			95% CI for Estimate			
Model 5 – ERC Total	Estimate	SE	LL	UL	Beta	*p*
Intercept	3.64	0.22	3.20	4.09		
CSHQ	-0.51	0.12	-0.76	-0.26	-0.56	< .001
Child Gender	0.69	0.39	-0.09	1.48	0.39	.08
CSHQ*Child Gender	-0.33	0.21	-0.75	0.09	-1.07	.12

Note: ERC = Emotion Regulation Checklist; CSHQ = Children's Sleep Habits Questionnaire

Exploratory Analyses

Exploratory correlational analyses using bivariate Pearson's correlation coefficients were conducted between demographic variables of both caregivers and children (e.g., sex, age, race, income, caregiver education level, grade level, type of schooling), caregiver sleep data, and data from measures on child functioning as reported by caregivers. These analyses found that child age was positively correlated with caregiver tiredness during the day ($r = .337$, $p < .05$), meaning the older the child, the more the caregiver felt tired during the day. The amount of time caregivers reported it taking them to fall asleep (i.e., a higher score indicates longer time spent falling asleep thus poorer sleep) positively correlated with their own reported number of night wakings ($r = .513$, $p < .001$) and their own reported feelings of tiredness during the day ($r = .358$, $p < .05$). The amount of time it takes caregivers to fall asleep at night was also negatively correlated with their child's reported overall adaptive emotion regulation abilities ($r = -.311$, $p < .05$) and it was positively correlated with their child's reported mood lability ($r = .346$, $p < .05$), their child's overall sleep quality problems ($r = .335$, $p < .05$), their

child's experiences of parasomnias ($r = .302$, $p < .05$), and their child's experiences of sleep disordered breathing ($r = .370$, $p < .01$).

Caregivers' reported sleep quality, as measured by how frequently they wake up feeling well-rested (i.e., a higher score indicates better quality sleep), was negatively correlated with their child's reported mood lability ($r = -.288$, $p < .05$) and their child's sleep onset delay ($r = -.288$, $p < .05$). Caregivers' reported number of their own night wakings (i.e., a higher score indicates more frequent waking in the night and thus poorer sleep) was positively correlated with their child's reported bedtime resistance ($r = .286$, $p < .05$), their child's reported daytime sleepiness ($r = .287$, $p < .05$), and their own reported daytime tiredness ($r = .505$, $p < .001$).

Additionally, two more multiple linear regression models were analyzed following the results of models from hypothesis two. Specifically, one multiple linear regression model was analyzed to see if bedtime resistance and sleep anxiety predicted child mood lability/externalizing behaviors. This model indicated that bedtime resistance and sleep anxiety did statistically significantly predict child mood lability, $F(2, 48) = 5.02$, $p < .05$, $R^2 = 0.17$, adjusted $R^2 = 0.14$. For this model, sleep anxiety was found to be a statistically significant predictor of child mood lability when controlling for other variables, $B = 0.35$, 95% CI [0.02, 0.61], but bedtime resistance was not. The other multiple linear regression model was analyzed to determine if daytime sleepiness, sleep duration, night wakings, and parasomnias significantly predicted child general emotion regulation. This model indicated that these four sleep constructs did not significantly predict child general emotion regulation, $F(4, 46) = 0.891$, $p = .48$, $R^2 = 0.07$, adjusted $R^2 = -0.01$. These additional exploratory regression models can be seen in Table 6.

Table 6

Exploratory Multiple Linear Regression Models using Sleep Constructs as Predictors

			95% CI for Estimate			
	Estimate	SE	LL	UL	Beta	*p*
Model 6 – L/N subscale						
Intercept	1.42	0.35	0.71	2.13		
BR	0.13	0.22	-0.30	0.57	0.10	.54
SAnx	0.32	0.15	0.02	0.61	0.35	.04*
Model 7 – ER subscale						
Intercept	3.04	0.24	2.55	3.53		
DS	-0.01	0.17	-0.35	0.34	-0.01	.97
SD	-0.19	0.11	-0.41	0.03	-0.31	.09
NW	-0.06	0.12	-0.30	0.19	-0.09	.65
Ps	0.15	0.14	-0.14	0.43	0.26	.30

***** = Correlation is significant at the .05 level.

Note: L/N = Lability/Negativity; BR = Bedtime Resistance; SAnx = Sleep Anxiety; ER = Emotion Regulation; DS = Daytime Sleepiness; SD = Sleep Duration; NW = Night Wakings; Ps = Parasomnias; for Model 6, $F(2, 48) = 5.02$, $p < .05$, $R^2 = 0.17$, adjusted $R^2 = 0.14$; for Model 7, $F(4, 46) = 0.89$, $p = .48$, $R^2 = 0.07$, adjusted $R^2 = -0.01$.

CHAPTER IV

Discussion

Findings from the present study demonstrate a clear connection between sleep and emotion regulation functioning in children. It was predicted in the first hypothesis that children's overall sleep quality and children's overall adaptive emotion regulation abilities would be significantly correlated. Analyses support this hypothesis and illustrate a clear relationship between poorer sleep and poorer emotion regulation abilities. Results indicate that as children were reported by their caregivers to have poorer sleep, by ratings of more frequent sleep disturbances and issues around sleep, they were also reported to have poorer overall adaptive emotion regulation abilities and behaviors. This means that as children got less sleep or experienced more sleep disturbances, they were less likely to engage in behaviors that suggested the use of adaptive emotion regulation skills, such as delaying gratification, modulating their excitement and negative emotions, or being able to recover from upsetting situations. These findings demonstrate just how important healthy sleep can be in how adaptively a child can interact with their environment and with their peers. These results also correspond with previous literature, namely findings by Lollies et al. (2022), in which they found that sleep deprivation and sleep disturbances were associated with impaired functional emotion regulation behaviors.

It was also predicted in hypothesis one that children's overall sleep quality would be associated with their positive emotion regulation behaviors as well as their caregiver-reported negative affect and mood lability. While no evidence was found to suggest a relationship between child sleep quality and positive emotion regulation behaviors, findings do indicate a significant relationship between child sleep quality and mood

lability. It was found that sleep quality was associated with caregiver reports of lack of flexibility, mood lability, externalizing behaviors, and a general dysregulated, negative affect in their children. This means that as children's overall sleep quality declines, they are reported to exhibit more instability in their moods, more heightened negative emotional states, and more behaviors that are generally socially maladaptive. These findings are very similar to what Keefe-Cooperman and Brady-Amoon (2014) and Sadeh et al. (2002) found in their respective studies examining sleep and externalizing behaviors in children.

Additionally, it was predicted in hypothesis one that several separate and specific sleep constructs, as opposed to overall sleep quality, would be correlated with emotion regulation functioning. Analyses for these predictions were examined in order to get a better understanding of exactly which disruptions in the whole process of sleep are associated with the current observed findings of poorer emotion regulation. Results support this prediction and suggest that the less children sleep, the more anxious children are about going to sleep, the more frequently children wake up in the night, the more frequently children experience disturbances in the middle of their sleep, the more frequently children experience breathing issues in their sleep, and the more difficult it is for children to become awake and alert in the morning are all associated with less adaptive emotion regulation abilities and behaviors.

Furthermore, while no evidence was found to support the prediction from hypothesis one of any relationship between these same sleep constructs and positive emotion regulation behaviors, results did support predictions from hypothesis one of associations between sleep constructs and children's caregiver-reported negative affect

and mood lability. Specifically, it was found that the more resistant children are in going to bed, the less children sleep, the more anxious children are about going to sleep, the more frequently children wake up in the night, the more frequently children experience disturbances in the middle of their sleep, the more frequently children experience breathing issues in their sleep, and the more difficult it is for children to become awake and alert in the morning are all associated with increased caregiver reports of mood lability, externalizing behaviors, and general negative affect in their children.

When taken together, these findings seem to support most predictions made in hypothesis one to suggest that many different disruptions of sleep and sleep processes can have a significant impact on child emotional functioning. Whether from insufficient duration of children's sleep, disruptions in the processes before children go to bed or fall asleep, or disruptions in the middle of children's sleep, all aspects of sleep seem to be hugely important for the adaptive emotional functioning of school-aged children.

In order to help further parse apart and understand the effects of disruptions of or poor quality in different sleep processes, the current study looked at different combinations of sleep constructs in their relationship to emotion regulation functioning. Firstly, the constructs of bedtime resistance and sleep anxiety were paired together to predict emotion regulation functioning due to both constructs describing behaviors that occur during the time preceding sleep. It was predicted in hypothesis two that these two constructs would together be able to explain some of the variability and patterns of ratings of children's adaptive emotion regulation abilities and behaviors, such that higher ratings of resistance of children to go to bed and higher ratings of anxiety about sleeping would predict lower ratings of adaptive emotion regulation behaviors. It was found that

when combined, how resistant a child is to go to bed and how anxious children are in going to sleep were significantly able to predict how poorly caregivers rated their children's overall adaptive emotional functioning. Although neither construct was a significant predictor on its own, this result suggests that significant disruptions in children's emotional states or routines when going to bed can significantly impact their emotional functioning during the day.

It was also predicted in hypothesis two that these same two sleep constructs of bedtime resistance and sleep anxiety would also be able to predict positive emotion regulation behaviors and skills. While primary analyses did not support this hypothesis, additional exploratory analyses regarding these sleep constructs indicate that they were associated with caregiver-reported child mood lability and general negative affect instead. This means that the more children were rated as being resistant in going to bed and more anxious about sleeping, the more they were rated as having a general negative affect, having greater mood lability, and engaging in more externalizing behaviors. Also, more specifically, children's anxiety about going to sleep was by itself a significant predictor of general negative affect and mood lability, indicating that more anxiety surrounding sleep strongly implies more issues with negative emotionality and externalizing. This result might suggest that caregiver perceptions of their children's emotional or mood issues at bedtime may carry into their perceptions of their child's daytime functioning. This finding may also simply show consistency between caregiver reports of their children's daytime behaviors with their nighttime behaviors.

Another combination of sleep constructs were grouped together to examine their relationship to emotion regulation. These constructs included sleep duration, night

wakings, parasomnias, and daytime sleepiness. It was predicted in hypothesis two that these constructs would together be able to explain some of the variability and patterns among ratings of child adaptive emotion regulation abilities. The current study found that when combined, how typical children's sleep duration is, how frequently children wake up in the night, how frequently children experience disturbances in the middle of their sleep, and how difficult it is for children to become awake and alert in the morning were significantly associated with poorer adaptive emotion regulation abilities. Additionally, results found that sleep duration and daytime sleepiness were significant predictors of poorer adaptive emotion regulation on their own, which indicates that both inadequate or atypical amount of sleep and increased tiredness during the day were strong indicators of poorer adaptive emotion regulation abilities.

It was also predicted in hypothesis two that these same four sleep constructs combined would be associated with and able to explain some of the variability and patterns among ratings of caregiver-reported child general negative affect and mood lability. Findings support this hypothesis, indicating a strong association with negative emotionality, mood lability, and externalizing behaviors. This suggests that disruptions of physical sleep processes were related to an increase of frequency of children experiencing and expressing heightened negative emotions throughout the day. Furthermore, in this model, daytime sleepiness was found to be the sole significant predictor of caregiver ratings of child mood lability when isolated from other variables. This implies that children's feelings of tiredness and difficulty in waking up in the morning significantly contribute to children's mood lability and negative affect as reported by caregivers. Taken together, these findings imply that the start of a child's day and how they feel in

the morning may largely impact their emotional states and functioning throughout the day.

The current study also examined demographic variables in their relationship to child sleep and emotion regulation. Specifically, it was predicted in hypothesis three that child gender would significantly alter the effects that sleep quality had on caregiver-reported emotion regulation functioning. This analysis was done in an effort to help clarify the mixed findings of gender differences in the study of emotion regulation in children. In this study, this prediction was not supported, as it was found that gender did not have any significant impact on the previously demonstrated effect that sleep quality has on child adaptive emotion regulation abilities and behaviors.

Caregiver sleep was also examined in the current study, as an effort to explore other variables that may be contributing to caregiver reports of child behavior or emotion regulation problems. Findings suggest that some sleep characteristics are largely similar between children and their caregivers. Specifically, the longer it took caregivers to fall asleep at night, the poorer they rated their children's overall sleep quality and the more they reported their children as well as experiencing disturbances during their sleep. Furthermore, the more caregivers reported feeling tired during the day, the more they reported their children taking to fall asleep at night. It was also found that the more caregivers reported themselves waking up in the middle of the night, they more they reported their children as being resistant to go to bed and the more they reported their children as being sleepy and slow to wake in the morning. Taken together, these associations suggest an interesting connection between child and caregiver sleep.

Caregivers' own sleep may have also impacted their perceptions of their children's behavior and emotional functioning. There were significant associations between caregivers' reported sleep quality and time it takes them to fall asleep with their children's reported general negative affect and mood lability, implying that the less sleep a caregiver gets or the longer it takes them to fall asleep at night, the more they rate their child's behavior as being more emotional or negative. Furthermore, the more time it takes caregivers to fall asleep at night, the less they rate their children as having better and more adaptive emotion regulation behaviors. Of course, no definitive statements can be made about causality of the ratings of child behavior due to the nature of the current study, but considering caregiver perceptions of child behavior is certainly worthwhile when conceptualizing the relationship between sleep and emotion regulation in children.

When examining the results of the present study as a whole, the most apparent finding is the strong connection between children's sleep quality and their ability to effectively and adaptively regulate their emotions. Interestingly though, correlational results indicate that child sleep quality had a stronger association with child mood lability and general negative affect than with child use of positive emotion regulation, as reported by their caregivers. This may indicate that poor sleep is more strongly associated with children experiencing and expressing heightened negative emotions than quality sleep is with children adaptively regulating their emotions. In other words, poorer sleep may be maladaptive more so than quality sleep may be protective or beneficial to emotional functioning.

While the associations of poor sleep with child mood lability found in the current study certainly parallel previous literature, the lack of any associations between sleep and

positive emotional expression and regulation seems to contradict with some of the literature. Specifically, Lollies and colleagues (2022) found in their meta-analysis on the functioning of children and adolescents that better sleep actually enhances better mood and affect states. However, other research using caregiver- or parent-report methods (Sadeh et al., 2002) seem to have similar findings of the current study, in which poor sleep was most strongly associated with an increase of negative emotionality and externalizing behaviors.

Another potential explanation for this surprising lack of associations between child sleep quality and use of positive emotion regulation may be a function of the visibility of different behaviors of children to their caregivers. When examining behaviors related to emotional states and regulation in children, outwardly expressed problem behaviors that are indicators of emotion (e.g., externalizing behaviors such as crying, tantrums, etc.) tend to be more readily noticed than the more positive, internal behaviors that may suggest successful and adaptive emotion regulation. It may then be more difficult for caregivers to accurately understand and report on the behaviors that suggest the use of emotion regulation techniques.

The results of the current study strengthen knowledge about the relationship between sleep and emotional functioning and emotion regulation in children, but more importantly, findings from the current study provide more details regarding what aspects of sleep are specifically the most associated with emotional functioning. Findings suggest that, while many different aspects of sleep are closely associated with poorer emotional functioning in children, how slow to wake up and how sleepy a child is during the day, as well as if children are sleeping the typical, recommended amount seem to be the most

strongly related to the daily functioning in children. How anxious or fearful a child is about going to sleep also seems to be strongly related to their experiences of other heightened negative emotions during the day.

These findings of the current study provide useful information for potential areas of intervention for children and families who are experiencing hardships due to sleep dysfunction or emotional or mood issues. Specifically, in accordance with the findings of this study, it is crucial that children are getting enough sleep, that their sleep is of good quality, and that they do not experience disruptions before they go to sleep or while they are sleeping. Furthermore, caregivers could be educated on the influence of their own sleep functioning as well as their own perceptions of their children's behaviors and the potential for their impact on the sleep and behaviors of their children. These results are particularly important given the major disruption to the daily life and development of school-aged children that occurred during the Covid-19 global pandemic that children are still recovering from. It is paramount to have recent and updated data on factors related to functioning to ensure competency and best practices when working with children.

Strengths and Limitations

Although the current study had many strengths, there are some considerable limitations of the utility and generalizability of the present study. Most apparent is the quality of the data obtained. As reported, a large number of responses were recorded, but very few were able to be included in the final analyses. It appears as though many individuals who took the survey sped through it, did not pay attention to items or their responses, and fabricated information to obtain compensation. This is supported by the number of responses showing failed attention check questions, visually noticeable

patterns in responding, conflicting demographic data, and/or responses that were submitted in five minutes or less. While the entries used in the final analyses were deemed to be acceptable, the true accuracy of the responses is unknown. The limitations of data collection resulted in a small sample size, which could have skewed results or resulted in data that is not generalizable to a broader population.

Furthermore, the current sample did not gather data from any participants that indicated being single caregivers, which could further hinder the generalizability of the results to the greater population. Another limitation of the present data that occurred due to the small sample size is that child age was not examined or controlled for in any of the analyses. The age of the children would likely have had a significant impact on both their sleep habits and emotion regulation abilities, but due to the small sample size and lack of variability in the reported ages of the children, such analyses were not conducted in the current study.

Another limitation of the current study is that the data obtained about child emotional functioning may not be entirely accurate or objective, as the measures used in this study were retrospective and caregiver-report in nature. This might explain the somewhat surprising lack of associations with the ER subscale of the ERC, which measures the more adaptive or positively perceived behaviors in children. It is possible that caregivers may only notice or remember the more socially unacceptable or personally straining behaviors of their children that occur when they experience and express their more negative emotions, which may have caused possible underreporting or perhaps a lack of variability in the reporting of the emotion regulation skills and behaviors that comprise the ER subscale. Expanding on that point, the measure that the

current study used to assess emotion regulation in children may not be able to obtain the most accurate or true data regarding their emotion regulation abilities. Given the largely cognitive nature of emotion regulation processes, especially as children grow older, it may be more difficult for caregivers to accurately determine if their children are regulating their emotions and if so, in what ways they are doing so.

Despite its limitations, the current study also exhibited many strengths. First, while the use of caregiver-report methods has its shortcomings, it also has its benefits, as it is an easy and ethical way to get incredibly informed data about the behaviors and functioning of children without having to directly interfere with their routines or development. Primary caregivers of young children spend significant time with their children and are direct observers of their behaviors. Thus, they tend to have the most knowledge about their child's behaviors and emotion functioning. Moreover, the online survey format of the current study provided an easily accessible and relatively quick way for caregivers to report on their children's behaviors and participate in scientific research. Furthermore, the current study was able to recruit similar numbers of male and female caregivers, which may make results more generalizable to the broader population, as female caregivers are most often the majority of participants in child research.

Also notable, the current study provides recent data on the functioning and behaviors of children. While it is always important to consistently update scientific knowledge, it is even more important to reexamine the relationships of factors that affect child functioning post-Covid 19 global pandemic. The current study includes reports on the behaviors of children who largely had their development significantly disrupted in

this time, and so in gathering data on their functioning, findings from this study help provide a better understanding of them.

Finally, the current study is unique in that it assessed for caregiver influences of their own sleep-related behaviors on their child's reported emotion regulation and functioning. To date, little-to-no research has been done looking at how caregiver's own sleep-related behaviors may model or influence their child's sleep dysfunction, and consequently, their emotion regulation abilities. Gathering data on this possible relationship between caregiver and child provides additional valuable insight into the factors that affect emotion regulation functioning in children.

Directions for Future Research

While the current study provided ample findings of strong and significant associations between child sleep and emotion regulation, more research is needed to determine if these results can be replicated in a larger sample size, with a sample size that is more representative of the general population, or with a sample recruited from a different method. Also, it would be worthwhile to repeat the current study using different techniques to assess emotion regulation in children (e.g., behavioral observation, self-report, etc.) and to examine how results may change when controlling for children's ages. Directly observing children and their behaviors, interviewing them, or using self-report measures with children themselves may provide a more objective and accurate picture of their true emotion regulation abilities. Additionally, more accurate reporting methods on sleep (e.g., actigraphy data) could more precisely inform relationships between sleep functioning and emotion regulation.

Furthermore, more research needs to be done to determine if there are any causal relationships between sleep quality and sleep processes with emotion regulation and functioning in children. Specifically, it would be worthwhile to examine if there is any change in child emotional functioning and emotion regulation from a baseline following nap-restriction or implementing later bedtimes, and if there is any change in emotion regulation abilities with education about how to adaptively regulate emotions combined with typical sleep and with poorer sleep.

Finally, additional research is needed to investigate how caregiver's own sleep-related behaviors might model or influence child behaviors. Social learning theory would suggest that caregiver modeling is critical in child learning, but the extent to which sleep patterns and emotion regulation abilities are affected is still unclear.

Conclusion

The purpose of the current study was to gain a better understanding of how sleep and emotion regulation are related in school-aged children using caregiver-report methods. It is known that sleep quality and quantity affect functioning in both adults and children, and this study aimed to explore that vital relationship more in-depth for children in middle childhood, as a means to grow understanding and to help identify more specific areas of potential intervention for children.

Closely examining the emotional functioning of school-aged children is important to ensuring their functioning, and emotion regulation is an important facet of development. Emotion regulation greatly impacts children's functioning and development, in either an adaptive way or a maladaptive way, which is why it is necessary to continue to investigate its impacts on children throughout their development.

While there is previous literature demonstrating that sleep impacts emotional functioning and the use of emotion regulation, there is still much to learn about this relationship.

Findings from the current study truly strengthen the knowledge and understanding that sleep quality and processes have a considerable effect on the emotional functioning and emotion regulation use of school-aged children. These findings seem to suggest that children's psychological and emotional functioning surrounding sleep are just as important as their sleep duration and quality when looking at how sleep can affect emotion regulation and emotional functioning. These results can have considerable implications on intervention for children and education of caregivers and children alike.

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Appendices

Appendix A

IRB Letter of Approval

Date: May 31, 2024
PI: Ciera Schoonover
Department: Middle Tennessee State University, Psychology
Re: Initial - IRB-FY2023-168
Caregiver Perceptions of Psychosocial Factors that Influence Child Functioning
The Middle Tennessee State University Institutional Review Board has rendered the decision below for the above referenced study.
Decision: Exempt
Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;
Findings: Research Notes:
Please note that even though your proposed study is deemed exempt from further IRB review, the following apply to your approved study:

1. In accordance with 45 CFR 46.110, expiration dates do not apply to research eligible for Exempt Review under the Common Rule, and continuing review is not required by the IRB.
2. Any unanticipated harm to participants or adverse events must be reported to the Office of Compliance.
3. All modifications to the approved study must be submitted for review through Cayuse IRB for approval before their

implementation. Adding new researchers constitutes a modification to the protocol. Per MTSU Policy, a researcher is defined as anyone who handles the data or interacts with participants. Everyone meeting this definition for this project must have completed the required CITI training and received IRB approval prior to becoming actively involved in the project.

4. Closure of the study must be submitted within Cayuse when the study ends or when personal identifiers are removed from the data and all codes and keys are destroyed.
5. All research materials must be retained by the PI for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.

Sincerely,
The Middle Tennessee State University Institutional Review Board

Appendix B

Informed Consent

Study Title: Caregiver Perceptions of Environmental Factors that Influence Child Functioning
Protocol Number: IRB-FY2023-168
Approval Date: 5/31/2024
Principal Investigator: Rebecca White, B.S.
Institution: Middle Tennessee State University

You are being asked to participate in a research project. The following information is provided to inform you about the research project and your participation in it.

1. Purpose of the study: The current study will seek to better understand relationships among psychosocial variables in school-aged children, such as sleep, caregiver stress, and emotion regulation, as reported by their primary caregivers.

2. Description of procedures to be followed and approximate duration of the study: You will be asked a series of demographic questions, followed by questions regarding your child's social and emotional functioning, including behavior, emotion regulation, and sleep patterns, as well as your general stress level and your stress related to parenting. It will take approximately 20 minutes to complete this study.

3. Compensation for participation: You will be compensated one dollar for your completion of the survey. You will not be compensated if you are under the age of 18, are not a primary caregiver of a child between the ages 5 and 10, are not based in the U.S., if you do not consent to participate, provide incomplete data, or do not pass one or more of four attention checks. Your work will be approved or rejected within 3 days. Once it is approved, you will receive the payment in your account.

Here are your rights as a participant:

a) Your participation in this research is voluntary.
b) You may skip any item that you don't want to answer, and you may stop the research at any time. Note that if you leave an item blank, you will be warned that you missed one, just in case it was an accident. You can still click that you don't want to answer. Some items may be required in order to accurately present the study.
c) There are no risks associated with your participation besides possible discomfort with some of the questions.
d) There are no real benefits to you from participating besides possibly learning something about the research.
e) You will NOT be asked to provide any identifiable personal information.

f) All efforts, within reason, will be made to keep the personal information in your research record private, but total privacy cannot be promised. Your information may be shared with people at MTSU (such as the MTSU Institutional Review Board) or other agencies (such as the Federal Government Office for Human Research Protection) if you or someone else is in danger or if we are required to do so by law.

Contact Information: If you should have any questions about this research study please contact:
Principal Investigator: Rebecca White, B.S.
Contact Information: rw5g@mtmail.mtsu.edu
Faculty Advisor: Ciera Schoonover, PhD, MSW, MPH
Contact Information: ciera.schoonover@mtsu.edu

For additional information about giving consent or your rights as a participant in this study, please contact the Middle Tennessee State University (MTSU) Office of Compliance at 615-494-8918 or via email at irb_information@mtsu.edu. (http://www.mtsu.edu/irb)

If you're ready to get started, please make your choice below before clicking the arrow button.

Thanks again for volunteering your time to this project!

I have read the information above. I am at least 18 years old. I believe I understand the purpose, risks, and benefits of the research, and I know what I will be expected to do as a study participant.

Appendix C

Demographic Questions

Child Demographic Questions:

1. What is your child's age? _____

2. What is the biological sex of your child?
   - Female
   - Male
   - Intersex or Other

3. What is your child's racial identity?
   - Asian
   - Black/African-American
   - Hispanic and/or Latino
   - Indigenous American
   - Native Hawaiian or Pacific Islander
   - White
   - Bi- or Multi-racial
   - Other _____
   - Prefer not to say

4. What grade is your child currently in? (If not currently enrolled, please select the most recent grade your child completed).
   - Kindergarten
   - 1st grade
   - 2nd grade
   - 3rd grade
   - 4th grade
   - 5th grade
   - Other _____
   - Prefer not to say

5. What type of schooling does your child currently receive? (If not currently enrolled or if in between two options, please select the most recent type your child attended).
   - Public
   - Private
   - Homeschool
   - Other _____
   - Prefer not to say

Participant Demographic Questions:

1. What is your age? _____

2. What is your gender?
   - Woman
   - Man
   - Non-binary
   - Genderfluid
   - Other _____
   - Prefer not to say

3. What is your relationship to the child?
   - Mother
   - Father
   - Step-mother
   - Step-father
   - Other family member with custody
   - Other legal caregiver
   - Other _____

4. What is your marital status?
   - Single, never married
   - Married
   - Domestic partnership
   - Widowed
   - Divorced
   - Separated
   - Other _____
   - Prefer not to say

5. Does your child currently live with you?
   - Yes, all of the time
   - Yes, some of the time
   - No
   - Prefer not to say

6. How many people, including you, live in your current residence? _____

7. What is the highest degree or level of school you have completed? (If currently enrolled, highest degree received).
   - Some high school, no diploma
   - High school diploma or equivalent (for example: GED)
   - Some college, no degree
   - Associate degree
   - Bachelor's degree
   - Master's degree
   - Doctorate degree
   - Some trade/technical/vocational training, no completion
   - Completed trade/technical/vocational training

Other _____
Prefer not to say

8. What is your annual household income?
   $0 - $30k
   $31k - $60k
   $61k - $90k
   $91k - $120k
   $121k +
   Prefer not to say

9. What is your typical amount of sleep each night?
   Hours _____
   Minutes _____

10. How much time does it typically take you to fall asleep at night?
   0-20 minutes
   21-40 minutes
   41-60 minutes
   Over an hour

11. How often do you wake up feeling well-rested?
   Never
   Rarely
   Sometimes
   Usually
   Always

12. How often do you wake up in the middle of the night?
   Never
   Rarely
   Sometimes
   Usually
   Always

13. How often do you feel tired during the day?
   Never
   Rarely
   Sometimes
   Usually
   Always

Appendix D

Debriefing Page

Thank you for your participation in our study.

From this study, we hope to better understand relationships among psychosocial variables in school-aged children, such as sleep, caregiver stress, and emotion regulation, as reported by their primary caregivers. Your participation will help further the understanding of relationships among these variables.

If, after participating in this study today, you have concerns about your experience as it relates to stress or aspects of your mental health, your child's mental health, or you or your child's sleep, the following resources have information and further resources that might be able to help you.

For general information about the function and importance of sleep, visit this site from the National Institute of Health:
https://www.nichd.nih.gov/health/topics/factsheets/sleep

For information on child sleep problems and recommendations for facilitating healthy sleep patterns in children, visit this site from the American Academy of Child and Adolescent Psychiatry:
https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Childrens-Sleep-Problems-034.aspx

For information on children's mental health as well as resources to find care for your child, visit this site from the Centers for Disease Control and Prevention:
https://www.cdc.gov/mentalhealth/children/index.htm

For information on stress related to parenting as well as a few management tools for parenting stress, visit this site from UNICEF:
https://www.unicef.org/parenting/mental-health/how-reduce-stress-parents

If you have a mental health emergency, contact the National Alliance of Mental Illness (NAMI):

Phone: 1-800-950-NAMI (6264)
Text "HelpLine" to 62640
Email: helpline@nami.org

For after-hour mental health emergencies call or text 988 or go to the nearest emergency room.

If you have questions about this research, you may contact:
Principal Investigator: Rebecca White, B.S.
Contact Information: rw5g@mtmail.mtsu.edu
Faculty Advisor: Ciera Schoonover, PhD, MSW, MPH
Contact Information: ciera.schoonover@mtsu.edu

For additional information about giving consent or your rights as a participant in this study, please contact the Middle Tennessee State University (MTSU) Office of Compliance at 615-494-8918 or via email at irb_information@mtsu.edu. (http://www.mtsu.edu/irb)