

**Sleep and Educational Environment:  
How do Children in Public/Private School, and Homeschool Settings  
Differ in Sleep, Subjective Well-Being, and Emotional Intelligence?**

by

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## Abstract

The study explored sleep, subjective well-being, and emotional intelligence among children ages 8 - 12 enrolled in either public/private school or homeschool. Previous research indicated educational environment relates to sleep duration and students function better from obtaining more sleep (Wolfson, Spaulding, Dandrow, & Baroni, 2007). Additionally, homeschooled students tend to receive more sleep than public or private school students (Meltzer, Shaheed, & Ambler, 2016). The Meltzer et al. (2016) study was the inspiration for the present study, which replicated some of their findings, accounted for some limitations, followed suggestions for future research, and looked at additional differences between public/private school and homeschool students.

With parental consent, 213 participants (children ages 8 - 12 years) completed an anonymous online questionnaire. Results indicated the homeschooled children received about one more hour of sleep per night on average than the children who went to public/private school. The homeschooled children also reported better sleep hygiene practices and less daytime sleepiness than the public/private school children. There was no relationship between educational environment and children's well-being, psychosocial health, or emotional intelligence. However, having longer sleep duration was related to children's well-being and having less daytime sleepiness was related to higher psychosocial health and higher emotional intelligence. Qualitative data indicated public/private school students had similarly structured schedules each day, and homeschooled students had more variability in their schedules. Homeschooled students also more often reported having a stay-at-home parent in the home. Research implications, limitations, and future research suggestions are discussed from these results.

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## I. Introduction

Many factors may impact an individual's emotional health, outlook on life, and daily functioning. For example, a person's mental health and well-being has the potential to influence academic performance by affecting concentration, motivation, and energy, all of which are necessary to perform at one's peak in educational settings. One factor that is often highly associated with well-being is sleep (Ming et al., 2011; Perkinson-Gloor, Lemola, & Grob, 2013). Sleep disturbances may cause problems in daily or academic performance, and could also be related to the presence of some mental health problems (Short, Gradisar, Lack, & Wright, 2013). Due to the demanding schedules of many educational institutions that require students to rise early and go to school, there has been concern about the amount of sleep that students are receiving and how this may be impacting their academic performance and mental health (Carskadon, 2011). The type of environment in which a student is educated seems to relate to how much sleep they get each night. For example, students who attend schools that have later start times may have better functioning in a variety of areas because they have the opportunity to obtain more sleep (Wolfson, Spaulding, Dandrow, & Baroni, 2007). Students who are homeschooled may have more flexibility in their schedules and may therefore receive more sleep on average than students who attend public or private schools (Meltzer, Shaheed, & Ambler, 2016).

Research using homeschool students as a sample population is limited. However, from the research that has been conducted on homeschooled students, homeschooled students tend to obtain scores on standardized college admission tests that are higher than the national average (Barwegen, Falciani, Putnam, Reamer, & Stair, 2004; Rudner,

1999). Others have demonstrated that homeschooled students typically have high academic achievement in general, and good social and emotional development (Galloway & Sutton, 2000; Martin-Chang, Gould, & Meuse, 2011; Ray & Rudner, 2001; Romanowski, 2006). Many parents who choose to homeschool their children do so because they believe in a strong sense of parental involvement in children's education, believe in the efficacy of their ability to educate their children, and feel concerned about the adequacy of the education that their children may receive in other school settings (Green & Hoover-Dempsey, 2007). Therefore, it makes sense that children in homeschool environments tend to have greater academic achievement, given the emphasis on education that is placed in households that homeschool. Further research, however, is needed on how homeschool environments may impact other areas of functioning, such as sleep, subjective well-being, and emotional intelligence. Better measurement of these factors may help in understanding the sleep habits of homeschooled children, and other positive attributes that come with having better sleep.

The primary goal of the present study was to look at the differences in sleep that can be observed among children who attend different educational settings and how these variations in sleep may be related to subjective well-being and emotional intelligence. Particularly the aim was to study children aged 8 - 12 years old who attend either public/private school or are homeschooled with a focus on measuring their sleep habits, subjective well-being, and emotional intelligence. The premise is that homeschooling affords greater flexibility than public or private schools and the homeschool schedule may be accommodated to allow children the opportunity for optimal functioning in a variety of areas. Because wake times are not dictated by school start times, homeschooled

children who are allowed to wake later may be getting more sleep. Getting more sleep may result in children having better subjective well-being and more emotional intelligence. These factors could be linked to some of the reasons why homeschooled children tend to have higher academic achievement, such as readiness to study and ability to learn as a result of better sleep. One study was found that touches on the topic of homeschooled students and sleep, and while it provides a very useful beginning, there are several directions that can be taken for further understanding of the questions (Meltzer et al., 2016).

Meltzer et al. (2016) highlighted the importance of looking at the sleep variations among students attending different types of educational institutions. They compared the sleep patterns and sleep hygiene of adolescents who attended public and private schools to those who were homeschooled. To study these variables, Meltzer et al. (2016) recruited 407 adolescents ranging in ages from 11 - 17 years, 245 who attended either public or private school and 162 who were homeschooled, with no significant demographic differences. Participants were recruited via email invitation to complete an online questionnaire. In situations where there was more than one child in the home who met criteria for participation, participants were asked to complete only one survey per household. The two-part survey asked both caregivers and the adolescent participants to answer questions about sleep patterns and sleep hygiene that were developed by the National Sleep Foundation. The questions asked about technology in the bedroom, caffeine use, activities before bedtime, sleep duration, sleep onset, waking after falling asleep, and depressive symptoms.

The results indicated that homeschooled students, on average, received more sleep

each night than students who attended public/private school and had more flexible morning schedules. Meltzer et al. (2016) suggested that, when given the opportunity, adolescents might choose to get more sleep during the week than they usually receive with a typical school schedule. According to Meltzer et al. (2016), the participants who were homeschooled started working on their school tasks later in the day than the students who attended public/private school. The homeschooled students were often waking up around the same time that the public/private school students were starting school. Additionally, they found that the children who went to school had more homework to complete after school and used more technology after school and before bedtime. However, in the Meltzer et al. (2016) study, having technology in the bedroom was associated with less sleep, regardless of the school setting that the children attended. Meltzer et al. (2016) reported some limitations in their study. For example, they did not use an objective measure of sleep or a measure of socioeconomic status. They also did not include questions about how the participants were functioning during the day and how their sleep patterns might be impacting their daytime functioning (e.g., academic performance, daytime sleepiness, or well-being factors). Although they included a measure of depression, their results were inconclusive and they recommended that more extensive information about the relationship between sleep, mood, and daytime outcomes be investigated. These recommendations offer a rich opportunity for further exploration.

In the present study, additional measurement of emotional functioning of the children was conducted by examining subjective well-being and emotional intelligence, in addition to measuring sleep via administration of the Children's Report of Sleep Patterns (CRSP; Meltzer et al., 2013). This measure assesses sleep in three domains:

Sleep Patterns, Sleep Hygiene, and Sleep Disturbances. Additionally, the measure includes a Daytime Sleepiness Scale. In their description of the instrument, Meltzer et al. (2013) state:

“Sleep Patterns includes questions about bedtimes, wake times, sleep onset latency, night waking frequency and duration, naps, sleep schedule variability, and subjective sleep quality, with separate questions for last night, typical weekdays when the child is in school, typical weekends/holidays when the child is not in school, and overall sleep “most days.” The Sleep Hygiene Index includes questions about caffeine use, activities in the hour before bed, sleep location (where child falls asleep and wakes up), and electronics used at the time of sleep onset. The Sleep Disturbance Scale has questions about bedtime fears/worries, restless legs syndrome symptoms, parasomnias, and insomnia. Additional indicator items were included for snoring, enuresis, and nightmares. Higher scores indicate poorer sleep hygiene or greater sleep disturbances” (p. 236).

The CRSP also looks at daytime sleepiness, which allows for the exploration of how well participants are functioning during the day based on how much sleep they are getting. In the present study, daytime sleepiness was examined in terms of its relationship to subjective well-being and emotional intelligence. This information helped test the hypothesis that obtaining more sleep improves daytime functioning, which in turn, may be related to better subjective well-being and emotional intelligence.

### **Rationale**

The Meltzer et al. (2016) study was the inspiration for the present study, which aimed to account for some of the limitations in their study, follow some of their

suggestions for future research directions, and look at additional differences that may exist among homeschooled and public/private schooled children. The particularly interesting aspect of the Meltzer et al. (2016) study was that they used a population of students studied less frequently in the research, homeschooled students. They noted that homeschooled students offer a naturalistic population of individuals who may have the opportunity to obtain more sleep.

Because homeschooled students are underrepresented in the research literature, the present study utilized this population to gain more information and add to the literature. Additionally, the present study gathered data on constructs that were not initially measured. For example, Meltzer et al. (2016) did not include a measure of socioeconomic status (SES). Because SES is an important variable related to the type of educational environment that a child may have access to, the present study gathered this information to examine how SES plays a role. For example, SES may be related to other variables such as having a stay at home parent who could be more involved in a child's education, or having more access to technology. Children from lower SES tend to experience more disruptive sleep patterns and daytime sleepiness (Bagley, Kelly, Buckhalt, & El-Sheikh, 2015). However, children from economically advantaged families may get less sleep due to more opportunities to be involved in extracurricular activities that may cause them to have more rigorous schedules (APA, 2014). Therefore SES is an important variable to consider when looking at children's sleep.

In the Meltzer et al. (2016) study, private and public school students were placed together in one category and compared to homeschooled students. There may be many differences between students who attend public or private schools, such as SES, parental

involvement or investment in academic achievement, access to educational resources, differences in grading scales, or differences in extracurricular activities. The present study aimed to separately analyzed the data from the three educational environments: Private school, public school, and homeschool. However, very few private school students participated in the study, despite efforts to recruit from this population. Therefore, the present study also grouped public/private school students into one category, and compared their results with the homeschool participants. Analyses were conducted to determine if sleep factors and educational environment were related to child subjective well-being and emotional intelligence.

### **Significance to Counseling Psychology**

The present study looked at the relationships among the variables of sleep, educational environment, emotional intelligence, and subjective well-being. Counseling psychology is a specialty within professional psychology that focuses on personal and interpersonal functioning with a particular emphasis on “emotional, social, vocational, educational, health-related, developmental, and organizational concerns” (Division 17, 2017). Typically, counseling psychologists work to improve overall well-being and understand the emotional experiences of persons of all ages using a broad range of culturally-sensitive practices (Division 17, 2017). Educational background is a cultural variable that is important for counseling psychologists to consider when working to understand the world view of others (Lee & Burkham, 2003; Wilms, 2003). Because education and the setting in which a student receives their education helps construct their cultural identity, educational background has the potential to shape one’s outlook on life as well as psychosocial development. Therefore, studying educational background and

how this background relates to subjective well-being and emotional intelligence is an area appropriate for study in the counseling psychology field.

Many counseling psychologists utilize therapeutic interventions that aim to further explore and understand their client's emotional experiences. For example, Emotion Focused Therapy is a therapeutic approach often utilized by counseling psychologists. Emotion Focused Therapy aims to help clients improve their overall emotional intelligence by learning to understand, regulate, experience, and communicate with their emotions (Goldman & Greenberg, 2015). Therefore, counseling psychology research could focus on studying additional factors that may contribute to the development of one's emotional intelligence such as educational environment and sleep.

Counseling psychologists are also known for taking a holistic approach to understanding the experiences of others. Therefore, studying the mind-body connection such as the relationship between sleep hygiene and subjective well-being is an appropriate venture for counseling psychology research. Additionally, the APA division of counseling psychology has a section focused on Positive Psychology, which promotes research on health and well-being conducted by counseling psychology students and professionals (Division 17, Positive Psychology Section, 2017). Subjective well-being is a concept that is highly studied in the field of positive psychology, and is therefore an appropriate concept to be explored within counseling psychology research.

### **Definitions and Operational Definitions**

*Public schooled students:* Students who attend a state or federally funded school full time. Educational environment was measured in the present study by asking participants if they attended one of three educational settings (public school, private school, or



homeschool). Participants that did not identify as attending one of these three educational environments were disqualified from participating in the study.

*Private schooled students:* Students who attend a privately funded school full time. See operational definition above.

*Homeschooled students:* School-aged children who are educated at home rather than in public or private school settings (Basham, Merrifield, & Hepburn, 2001). See operational definition above.

*Sleep Patterns:* The typical pattern of sleep behavior that a person engages in including bedtime, wake time, length of time it takes to fall asleep, waking during the night, duration of sleep, napping schedule, and quality of sleep obtained (Meltzer et al., 2013).

*Sleep Hygiene:* The various practices and habits that can be done to ensure good nighttime sleep quality and full daytime alertness (National Sleep Foundation, 2017). In the present study, this variable was measured with the CRSP, which includes questions about sleep hygiene practices the hour before bed (participation in extracurricular activities, caffeine use, technology use, bathing, and reading; Meltzer et al., 2013).

*Sleep Disturbance:* The occurrence of events that disturb one's sleep such as fear or worry at bedtime, restless legs syndrome symptoms, movement or emotional problems during the time between sleep and wakefulness, insomnia, snoring, bedwetting, or nightmares (Meltzer et al., 2013).

*Sleep Duration:* The total number of hours of sleep obtained in a 24-hour period (Kline, 2013). The Centers for Disease Control and Prevention (CDC) recommends children ages 6 - 12 obtain 9 - 12 hours of sleep in a 24-hour period (CDC, 2017). The sleep duration

variable in this study was measured with questions about typical sleep and wake times included on the Children's Report of Sleep Patterns (CRSP; Meltzer et al., 2013).

*Daytime Sleepiness:* The experience of feeling tired during the day in times when one should not feel sleepy (e.g., eating, talking, at school, playing, and a short car ride; Meltzer et al., 2012). This variable was measured using the Sleepiness Scale that is included as part of the Children's Report of Sleep Patterns (Meltzer et al., 2012).

*Subjective Well-Being:* A term defined as "a person's positive cognitive and affective evaluations of his or her life" (Diener, Oishi, & Lucas, 2002, p. 63). This variable was measured using two scales, the Stirling Children's Well-Being Scale (SCWBS; Liddle & Carter, 2010) and the Pediatric Quality of Life Inventory - Child Self-Report, Psychosocial Scale (PedsQL - Child Self-Report, Psychosocial; Varni, 2017).

*Emotional Intelligence:* A term that has been developed in the field of psychology to define an individual's understanding of his or her own emotional experiences. The term "emotional intelligence" was originally coined in 1990 by Peter Salovey and John Mayer and is officially defined as, "a form of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action" (Golis, 2013, p. 1). This variable was measured using the Trait Emotional Intelligence Scale - Child Short Form (TEIQue – CSF; Mavroveli, Petrides, Shove, & Whitehead, 2008).

### **Research Questions**

Q1: Do children who are homeschooled have better outcomes in the following areas of sleep health than children who attend public/private school?

- a. Sleep duration

- b. Sleep hygiene
- c. Daytime sleepiness

Q2: If children who are homeschooled have better outcomes in sleep health, do they also have better outcomes in the following areas of emotional health than children who attend public/private school?

- a. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- b. Emotional Intelligence

Q3: For all participants, do children who obtain more hours of sleep each night and engage in healthier sleep hygiene practices have better outcomes in the following areas?

- a. Daytime sleepiness
- b. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- c. Emotional Intelligence

## **Hypotheses**

### **Null Hypothesis.**

1) The null hypothesis is that children who attend public/private school and homeschool do not have significant differences in the following areas of sleep health and emotional health:

- a. Sleep duration
- b. Sleep hygiene
- c. Daytime sleepiness
- d. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- e. Emotional Intelligence

### **Research Hypotheses.**

- 1) It was hypothesized that children who are homeschooled have better outcomes in the following areas of sleep health than children who attend public/private school:
  - a. Sleep duration
  - b. Sleep hygiene
  - c. Daytime sleepiness
  
- 2) It was hypothesized that, if children who are homeschooled have better outcomes in sleep health, homeschooled children will also have better outcomes in the following areas of emotional health than children who attend public/private school:
  - a. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
  - b. Emotional Intelligence
  
- 3) It was hypothesized that, for all participants, children who obtain more hours of sleep each night and engage in healthier sleep hygiene practices will have better outcomes in the following areas:
  - a. Daytime sleepiness.
  - b. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
  - c. Emotional intelligence

### **Replication Hypotheses from the Literature (Meltzer et al., 2016).**

- 1) Homeschooled students get more hours of sleep each night than children who attend public/private school.
  
- 2) Homeschooled students have better sleep hygiene practices before bed than children who attend public/private school.

- 3) For all students, poor sleep hygiene is related to obtaining fewer hours of sleep each night.

Figure 1 offers a visual representation of the relationships among the variables of educational environment, sleep, subjective well-being and emotional intelligence that were explored with these hypotheses.

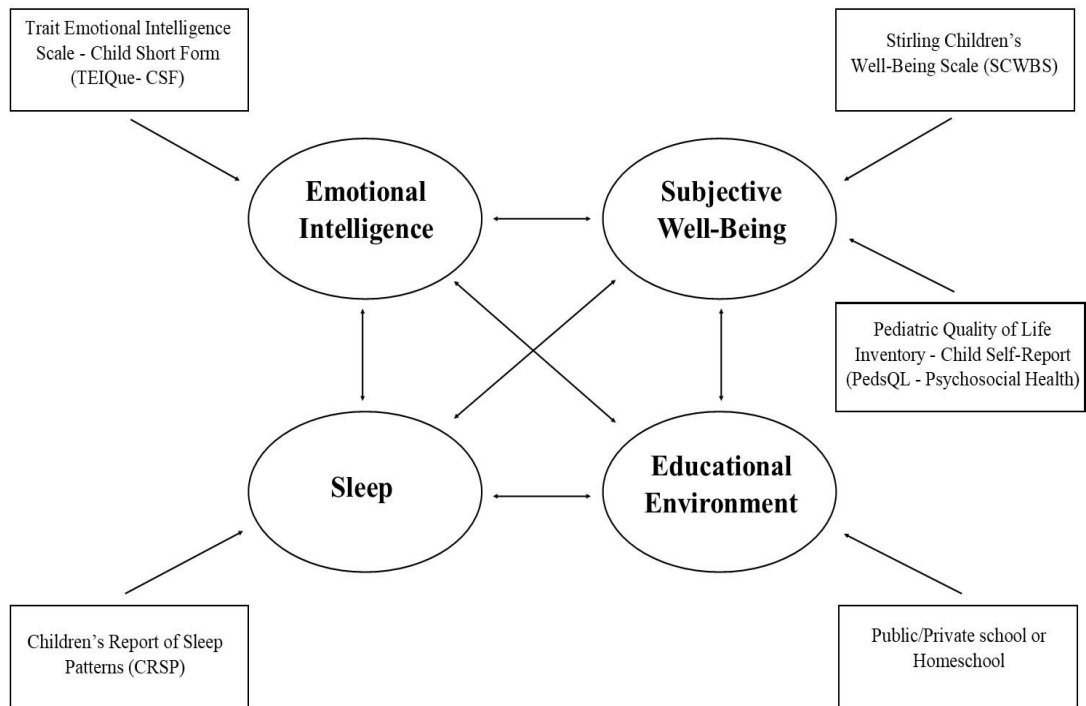


Figure 1. An illustration of the relationships among the main variables explored in this study; Educational Environment, Sleep, Subjective Well-Being, and Emotional Intelligence. Additionally, the instruments used to measure each variable are noted.

## II. Review of the Literature

### Homeschooling

The practice of homeschooling, defined as “parent-led home-based education,” has a history that is rooted deeply in tradition and also includes a more modern movement (Ray, 2016, p.1). In the early history of the United States, prior to the 1900s, the majority of children were educated at home, as only the wealthiest families could afford to send their children to schools that required the payment of tuition. Later, American leaders such as Thomas Jefferson and John Adams called for state sponsored schools, and by the turn of the 20<sup>th</sup> century all states had enacted school attendance laws (Seelhoff, 2001). This requirement caused a major shift from a preference for homeschooling to a preference for public education (Kreager, 2010). Then in the 1970s, an educational theorist names John Holt called for an educational reform due to his concern that public institutions focused too much on rote learning (Knowles, Marlow, & Muchmore, 1992). This later led to a new wave of homeschooling in the 1980s and 1990s (Knowles et al., 1992). Homeschooling is now considered one of the fastest growing educational trends in the United States with approximately 2.3 million home-educated students (Ray, 2016).

Through the years, various legal battles regarding the regulation of homeschooling have occurred and in 1972 the Supreme Court established that parents have the constitutional right to educate their children at home, as long as they remain subject to state attendance laws (Kreager, 2010). As of today, all 50 states allow homeschooling and have different ways that they regulate homeschooling attendance. Some states consider homeschooling to be a form of private school and it falls under the

same guidelines that are in place for private schools, while other states require parents to obtain permission from their local school board to homeschool (Kreager, 2010). A common argument of those who oppose homeschooling is that a homeschooling environment does not allow for the development of appropriate social skills due to the potential lack of interaction with peers (Medlin, 2013). However, research on the topic of homeschooled students and socialization have not supported this claim, and have in fact found that homeschooled children have equivalent or better social skills than their publicly educated peers (Medlin, 2013; Montes, 2015; Shyers, 1992; Smedley, 1992).

Research indicates homeschooled students often do well academically as indicated by their typical achievement of higher than average scores on standardized tests and tendency to function well in college (Drenovsky, & Cohen, 2012). However, more research is needed on the aspects of the homeschool environment that may be attributing to these positive outcomes. Perhaps homeschool students tend to have high academic achievement and good adjustment in college due to having a stronger sense of autonomy over their education. Maybe the one-on-one guidance that they receive in a homeschool environment is a contributor. One major factor that seems to be different between homeschooled students and students who attend public or private schools is flexibility of schedule. Most homeschooled students may not have to get up early for school and they may be able to schedule their schoolwork during times of peak learning efficiency. They may also have more opportunity to take breaks during the day depending on each child's individual attention and interest levels. In other words, the flexible environment may be able to accommodate each child's style of learning as well as allow them to get more sleep. The flexible homeschool environment and the positive outcomes of such a



schedule has barely been considered in the research literature, and only one study to date has looked at the flexible sleep schedule of homeschooled students (Meltzer et al., 2016). Therefore, this area offers much opportunity for further exploration.

### **Sleep and Positive Outcomes**

Obtaining adequate sleep is associated with a number of positive outcomes. For example, many researchers have found a relationship between sleep and academic performance. Through a survey of 1,941 adolescents, Ming et al. (2011) found that students typically received less than adequate sleep during the week and many participants compensated for inadequate sleep with daytime napping. The researchers found that those students who received less than seven hours of sleep per night on average (including weekends) were more likely to have academic difficulties. To feel fully rested, adolescents typically require 9.2 hours of sleep per night, but school demands often prevent students from obtaining this much sleep, resulting in significant daytime sleepiness (Wolfson et al., 2007). Others have found that adolescents who receive anything less than eight hours of sleep per night are more likely to have a number of negative outcomes, including behavioral problems, tiredness, pessimistic outlooks on life, and lower grades (Perkinson-Gloor et al., 2013). Students with poorer academic performance may also be more likely to have difficulties initially falling asleep, awaken during the night, and have a higher number of specific sleep complaints (Ming et al., 2011). Ming et al. (2011) also determined that adolescent students who go to school earlier received less sleep and had poorer quality of sleep, were also more likely to have additional sleep hygiene problems. This suggests that students who have the opportunity to sleep later in the mornings might have improved sleep overall.

The relationship between insufficient sleep and poor academic performance has been found across cultures. A study conducted in Germany that collected data from 27 primary schools, found that children with more disrupted sleep (having more nightmares and waking up frequently during the night) were more likely to have poor academic performance (Wiechers et al., 2011). In Australia, it was found that sleep quality had an effect on academic performance and mental health (Short et al., 2013). Researchers recruited 385 adolescent participants and looked at circadian rhythm, alertness, depression, sleep duration and quality, and academic performance. The results indicated sleep quality rather than duration had more of an effect when participants with poorer sleep quality reported worse grades, less alertness, and more depression. Poorer sleep quality was also associated with an evening rather than morning circadian rhythm (Short et al., 2013).

Dewald, Meijer, Oort, Kerkhof, and Bögels (2010) conducted three meta-analyses that looked at the effect that sleep quality, sleep duration, and daytime sleepiness had on school performance. The studies concluded that sleepiness was the most strongly related to academic performance; sleep quality was the second most related and sleep duration the third. The research also indicated that the academic performance of younger participants was more significantly impacted by these sleep factors (Dewald et al., 2010). Ahrberg, Dresler, Niedermaier, Steiger, and Genzel (2012) studied an adult population of medical students preparing for an exam and found that sleep quality prior to taking an exam was correlated with exam grades. Those students who performed lower on the exam had achieved poorer sleep quality before the exam, but the researchers were unable to find this correlation at other points in the semester. It was hypothesized that those

students who were more poorly prepared for the exam experienced more stress and poorer sleep quality prior to the exam, therefore it is unknown whether the sleep quality or the level of preparedness resulted in the exam performance. This also demonstrates that sleep problems may relate to academic issues among various age groups.

### **Sleep and School Start Time**

School start time is an important factor to consider when exploring the literature on sleep and well-being. Because improved sleep has been associated with higher well-being, it could be deduced that later school start times may also contribute to better outcomes since later start times provide students with the opportunity to obtain more hours of sleep.

Wolfson et al. (2007) explored the wake times of two groups of adolescents (205 participants total) in urban public schools who were required to arrive at school at 7:15 am and 8:37 am. The researchers learned that those students who awakened later had more positive outcomes including feeling less sleepy and were more likely to arrive at school on time, resulting in fewer demerits for being tardy. This study used participants who were homogenous on other variables, such as bed time, sleep hygiene, and weekend sleep schedules, to lessen the probability of these variables contributing to the results (Wolfson et al., 2007).

Additionally, as mentioned previously, homeschool students offer a naturalistic population of individuals who may have the opportunity to sleep later (Meltzer et al., 2016). Therefore, further exploring the opportunity to sleep later using this population may be helpful in adding to the literature supporting later school start times.

## **Sleep and Emotional Intelligence**

Because sleep is an important factor that impacts human physiological and cognitive functioning, it is reasonable to deduce that sleep also impacts human emotions. Killgore et al. (2008) looked at the effect of sleep deprivation on perceived emotional intelligence and constructive thinking skills. Their research indicated that decreased emotional intelligence, reduced positive thinking, reduced quality of interpersonal relationships, and reduced self-regard (in addition to other constructs) were associated with sleep deprivation. Participants with sleep deprivation experienced a significant decline in their total emotional intelligence scores on emotional intelligence measures (significant decline in their Total EQ scores, with an average decline of 4.12 points in their perceived emotional intelligence; Killgore et al., 2008).

Brown and Schutte (2006) assessed subjective fatigue, emotional intelligence, and other psychosocial factors in a sample of 167 college students. Their results indicated a relationship between less fatigue and more emotional intelligence. The relationship between emotional intelligence and fatigue was partially mediated by sleep quality and several psychosocial variables, including: depression, anxiety, optimism, internal health, locus of control, amount of social support, and satisfaction with social support. Additionally, emotions can impact sleep just as sleep can impact emotions, as researchers have also demonstrated that children who have high levels of emotional intensity and difficulty regulating their emotions have more sleep disturbances (El-Sheikh & Buckhalt, 2005).

Differences in emotional intelligence have also been measured among children who have sleep disorders, specifically obstructive sleep apnea syndrome (OSAS), and

children with healthy sleep abilities (Parisi et al., 2017). Parisi et al. (2017) conducted a study with children (mean age 9.5 years), 29 of whom had OSAS and 60 with typical sleep abilities. They assessed emotional intelligence using the Bar-On Emotional Quotient inventory and found that the children with OSAS obtained significantly lower emotional intelligence scores when compared to the children with typical sleep abilities. These findings suggest that emotional intelligence is a complex function that can be impaired by sleep difficulties.

### **Emotional Intelligence in Educational Settings**

When searching for information about emotional intelligence studied in school settings, much information was found on the emotional intelligence of schools' administrative staff. For example, Juma (2014) conducted a case study of a public elementary school principal and used a variety of surveys and interviews to measure the self-perceived emotional intelligence of the principal. The principal's self-perceived emotional intelligence was related to the views of teachers and administrative staff about the organizational atmosphere of the school environment (Juma, 2014). Birknerová (2011) looked at the presence of emotional intelligence in an academic environment. The study measured headmasters, teachers, and students and their levels of emotional skill and determined that the position in the school was related to the amount of emotional intelligence, self-respect, adaptability, and low impulsivity experienced by participants.

Others have investigated the impact of teachers' emotional intelligence on student perceptions of self, ability, and beliefs in their achievement (Curci, Lanciano, & Soleti, 2014). Curci et al. (2014) hypothesized that students' perceptions of self and their ability to perform well in math and science would be moderated by their teachers' levels of

emotional intelligence. The researchers obtained 338 junior high students and 12 teachers to participate in the study and learned that the teachers with higher levels of emotional intelligence positively influenced student's self-esteem and their beliefs in their scholastic abilities. This study suggests that informing teachers about the importance of their own emotional intelligence may positively impact student academic performance.

Additionally, teachers with higher emotional intelligence may be more aware of the impact of emotions on their students' performance and may therefore encourage their students to be aware of their own emotional experiences. Teachers with higher emotional intelligence might be more likely to develop meaningful relationships with their students that make their student's feel confident in the classroom setting. This information may additionally support the hypothesis that children who are homeschooled may have greater emotional intelligence, due to the one-on-one attention from and meaningful relationships with their parental instructors.

In the fields of counseling and psychology, the concept of modeling is often discussed as being an important aspect of social learning theory that involves "learning from observing and imitating role models" (Encyclopedia of Mental Disorders, 2014, para. 2). Therefore, it could also be hypothesized that teachers with more emotional intelligence may be modeling functional forms of emotional expression and therefore providing educational environments that foster the student's own emotional intelligence. It would be logical to conclude that these positive experiences in the classroom may then improve students' academic performance.

## **Emotional Intelligence and Academic Achievement**

Authors have looked at factors that contribute to improved emotional intelligence in children, which may translate into high academic achievement as well. Bergen and Fromberg (2009) argue that children who are allowed to engage in more play opportunities at school and home may have more emotional competence. The authors suggest that opportunities for play may also facilitate cognitive development, imagination skills, social development, and a sense of affiliation among children.

Malik and Shujja (2013) investigated the relationship between academic performance and emotional intelligence in a study involving 204 children between the ages of 9 and 13 (Mean age = 11.48). One hundred and seven of the children were considered high academic achievers and 97 were low academic achievers (based on percentile grades on a previously administered grade promotion examination) sampled from both private and public educational institutions in Pakistan. Data were collected, with the help of classroom teachers, by administering emotional intelligence measures to groups of 10-15 students at a time. A positive correlation was found between the constructs of emotional intelligence and academic achievement (Malik & Shujja, 2013). Those students who were previously identified as either high or low academic achievers demonstrated significantly different scores on the measures of emotional intelligence. Gender differences were found within the experimental groups for other scales, such as interpersonal skill and stress management scales, but no differences were found between genders for emotional intelligence. Additionally, differences were found based on the educational environment in which the children were enrolled. Students attending public schools obtained higher emotional intelligence scores and lower academic achievement

scores when compared to the children who attended private schools (Malik & Shujja, 2013). The researchers concluded that student emotional intelligence is an important factor to consider in an educational environment, because a better understanding of this construct by teachers, school counselors, and parents can lead to improved academic functioning. As a result, parents, teachers, and school counselors can work to facilitate activities and interactions that will help to foster the development of their students' emotional intelligence, thus improving their academic experiences (Malik & Shujja, 2013).

### **Subjective Well-Being and Children**

One of the major goals of subjective well-being research is studying how individuals can live a happier life and have greater life satisfaction (Lun & Bond, 2016). Learning more about what encourages the development of subjective well-being in children could potentially improve the lives and coping mechanisms of the general population. Autonomy, competence, relatedness, and self-esteem have been found to be the four biggest contributors to life satisfaction in college students, and this finding has been supported cross-culturally (Lun & Bond, 2016). Therefore, encouraging these features in children should allow for them to have better experiences as adults functioning in college or work settings. Research has also found that when subjective well-being is encouraged in children, they have improved coping skills and adaptability (Park, 2004). Overall people with greater subjective well-being tend to have better skills at managing distress (Park, 2004). The research on subjective well-being has historically involved adults, but the research on subjective well-being in children suggests that children with increased subjective well-being may have a decreased chance of developing



mental health problems (Park, 2004). Authors have found that children demonstrate subjective well-being through their affect and mood, which can be observed during play (Fiorelli & Russ, 2012). Pretend play specifically has shown to relate to the development of creativity and improved cognitive functioning (Fiorelli & Russ, 2012). This may be due to the unstructured nature of pretend play that allows children to “think outside of the box” when creating games or stories. Proponents for homeschooling argue that having a less controlled environment allows children to develop a stronger sense of autonomy over their education, encourages the development of creative problem solving skills, and fosters the ability to find novel and unique solutions to problems (Colfax & Colfax, 1988). Therefore, if children tend to have greater subjective well-being when given the opportunity to play and work in unstructured and creative environments, this may suggest that children who are homeschooled may have greater subjective well-being due to the flexible homeschool environment.

### **Emotional Intelligence and Subjective Well-Being**

The relationship between emotional intelligence and subjective well-being has been demonstrated empirically (Gallagher & Vella-Brodrick, 2008; Koydemir & Schütz, 2012; Salovey, Mayer, Caruso & Yoo, 2009). Emotional intelligence and subjective well-being are important and well-studied constructs in the field of positive psychology. The aim of positive psychology is to research the “strengths and virtues that enable individuals and communities to thrive” (Positive Psychology Center, 2019, para. 2). Therefore, when investigating factors that contribute to students having positive educational experiences, it also makes sense to explore how these constructs may relate to “thriving” in academic environments.

According to Blanchette and Caparos (2013), positive emotions have an interesting function: they improve reasoning. Their paper provided a review of the literature on reasoning and they investigated how emotions impact our ability to reason. Others have found that simply thinking about things that make you happy, such as a significant other, can increase the experience of positive emotions (Poerio, Totterdell, Emerson, & Miles, 2015). This suggests that thriving in academic environments and emotional experiences might be more highly connected than originally perceived. According to Chater and Oaksford (2001), reasoning is a part of the cognitive process related to rational thinking, and emotions have an impact on our ability to reason, think logically, and use deduction. Therefore, it makes sense that factors which facilitate positive emotions in an academic environment, such as obtaining more sleep, or having more emotionally intelligent instructors, could therefore lead to students having higher cognitive abilities and a better academic experience in general.

Conversely, some researchers have found that negative emotions may decrease our ability to think logically and use deductive reasoning (Blanchette & Leese, 2011). Positive emotions have been found to provide greater utility for reasoning, and also indicate to people when they are making helpful progress towards achieving goals (Blanchette & Caparos, 2013). This suggests that positive emotions have many functions besides offering basic feelings of happiness. Additionally, since individuals are typically able to facilitate positive emotions, or “thriving,” after their basic physiological needs have been met, it could be concluded that sleep deprivation may negatively impact experiences of subjective well-being.

## **Sleep and Subjective Well-Being**

The relationship between sleep and well-being in children has been supported empirically (James & Hale, 2017; Lemola, Ledermann, and Friedman, 2013). Lemola, Ledermann, and Friedman, (2013) found that individuals who experienced much day-to-day variability in their sleep duration reported less subjective well-being (Lemola et al., 2013; Lemola et al., 2011). Brans et al. (2010) learned that satisfaction with life contributes to more favorable sleep experiences and fewer sleep complaints. They also found that emotional and physical exhaustion, as a result of work-related burnout, was related to sleep complaints.

Perkinson-Gloor et al. (2013) explored sleep duration as it relates to school success, positive attitudes toward life, daytime sleepiness, and self-discipline among adolescent participants. The researchers also looked at whether later start times were related to better functioning. The study was conducted in Switzerland, and the researchers obtained 2,716 participants with a mean age of 15.4 years. Their results indicated that students who started school later were less tired and that the relationship between positive life attitudes and sleep duration was mediated by daytime sleepiness (Perkinson-Gloor et al., 2013). This suggests that later start times, in addition to improving academic performance by allowing students to obtain more sleep, may also relate to students' having a positive experience and thus more feelings of subjective well-being while at school.

## **Subjective Well-Being and Academic Achievement**

Some may argue that academic performance is the result of student attitudes towards academics and the degree of importance they place on achieving educational

goals. However, this may be a question of cause and effect, as student attitudes may also be the result of having either a positive or negative experience in the educational environment. Other factors, such as parental involvement, or support received from parents, teachers, and peers may also contribute to whether students have positive experiences at school. According to McNair and Johnson (2009) adolescents who have a more positive perception of the quality of their school environment and parents who spend more time with them have better academic performance. Therefore, it could be argued that differences in academic performance, and the emotional and subjective well-being of students, may be significantly related to students' enjoyment of the environment, and the amount of one-on-one attention they receive in each setting. This effect may be especially true for students who are homeschooled, because they may have more opportunities to receive more one-on-one guidance from their parents.

Pietarinen, Soini, and Pyhältö (2014) investigated well-being in school as being a mediating factor between students' emotional and cognitive engagement. To explore this mediating relationship, the researchers hypothesized that students' emotional engagement and well-being in school resulted in more cognitive engagement (perceived by others) and higher academic achievement. The researchers surveyed 170 students from three schools and the results indicated that cognitive engagement was highly dependent upon the relationship between characteristics of the students and the schools' environments, including the features of each school's unique educational practices (Pietarinen et al., 2014). Additionally, students with greater feelings of well-being in their school's environment had better academic achievement, which was mediated by students' emotional and cognitive engagement. Pietarinen et al. (2014) suggested that the social

contexts of school environments can significantly contribute to student learning and their emotional well-being. The study recommended that future research directions further explore the impact that school environment may have on students' well-being. The present proposal is hoping to add to the literature in this way by looking at the relationship between different school environments (public/private school and homeschool) and students' well-being.

Other researchers have found that positive emotions may improve our ability to hold attention and may also broaden our ability to think about concepts in new and creative ways (Fredrickson & Branigan, 2005). Fredrickson and Branigan (2005) completed a study with 104 college students during which they tested the hypothesis that positive emotions may help to broaden our scope of thought and help us attend to more information. The researchers tested this hypothesis by having the participants watch film clips that were meant to elicit a variety of emotions (e.g., amusement, contentment, neutrality, anger, or anxiety). Then the participants' ability to attend to detail was measured by asking them to complete a visual processing task. They were also asked to report their emotional states by writing the strongest emotion that was elicited by the film. They were then asked to imagine they were in a situation that would cause them to feel the same emotion they just described and then write a list of activities they would like to participate in after feeling the emotion. The purpose of this task was to determine if certain emotions allowed individuals to brainstorm more or less activities that they would like to participate in (i.e., did certain emotions elicit more creativity than others). The results of Fredrickson and Branigan's (2005) study indicated that those who watched films that elicited "positive" emotions (amusement and contentment) were able to attend

to their visual task longer than those who were in the “neutral” condition. Those participants who had negative emotions elicited by the film they watched had narrower thought repertoires (i.e., they listed fewer activities on their list, thus indicating less creativity in developing their list) than those in the neutral condition (Fredrickson, & Branigan, 2005). This suggests that individuals who experience more positive emotions may have the opportunity to obtain higher levels of academic achievement due to the opportunity for more creativity and attention that is elicited by positive emotions.

Similar studies found that when participants were trying to attend to a target picture in a visual processing task, they were worse at detecting the target when they were first exposed to an emotionally negative image (Most, Chun, Widders, & Zald, 2005). This suggests that when we experience negative emotions, our ability to attend to detail may be inhibited by the negative emotional experience.

Others have looked at the basic cognitive processes related to positive emotions and feelings of subjective well-being (Sanchez & Vazquez, 2014). Sanchez and Vazquez (2014) asked 83 undergraduate participants to complete questionnaires that measured positive and negative mood states including the five item self-report, Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). Sanchez and Vazquez (2014) then asked the participants to focus on faces depicting sad, angry, happy, or neutral emotions and used eye-tracking devices to measure how long the participants fixated on each face. The results of their study suggested that both the emotional and cognitive features related to subjective well-being were also related to participants looking at happy faces longer. Those participants who scored higher on the measure of positive emotions were more likely to attend to the faces depicting positive emotions. This further supports the idea of

a strong relationship between subjective well-being and academic performance, simply because our cognitive abilities appear to be improved by the experience of positive emotions. Therefore, educational environments that foster more positive emotions could also lead to those students having the capability for higher academic achievement. The present study hopes to explore this concept further by studying an aspect connected to educational environment (sleep) that may contribute to increased positive emotions.

### **Summary of Literature**

Research has shown that sleep is important for not only our health, but also our functioning in academic or work settings (Ming et al., 2011; Perkinson-Gloor et al., 2013). Sleep also impacts emotional health, including the development of emotional intelligence and subjective well-being in both children and adults (Killgore et al., 2008; Lemola et al., 2013). Emotional intelligence and subjective well-being have been shown to relate to performance in academic settings as well (Malik & Shujja, 2013; Pietarinen et al., 2014). The school start time literature has highlighted the impact that school schedules may be having on sleep, well-being, and academic performance (Wolfson et al., 2007). To add to the literature on sleep and educational settings, researchers have looked at differences between students who are homeschooled and attend public/private school and found that homeschooled students seem to get more sleep (Meltzer et al., 2016). Because educational environment, sleep, subjective well-being, and emotional intelligence have been studied independently of one another, the present study's intent was to tie these concepts together by exploring relationships among all of these variables.

## **Present Study**

In reviewing the literature available on sleep, educational environment, subjective well-being, and emotional intelligence, a number of important factors have been identified. School start times were recognized as adding to the discussion about students receiving sufficient sleep, suggesting that students who have the opportunity to obtain more sleep may have better functioning. When looking at emotional intelligence in an educational setting, it was discovered that having an educational environment that fosters emotional intelligence can lead to positive student outcomes. Subjective well-being was explored as an additional factor from positive psychology that relates to emotional intelligence and adds to the discussion about the relationship between sleep and positive life experiences. Therefore, students who attend educational environments that allow them to get more sleep could have greater emotional intelligence, and higher levels of subjective well-being. The current study aimed to explore whether being in an educational environment that allows students to get more sleep is also related to students having higher scores on emotional intelligence and subjective well-being measures.



### **III. Method**

#### **Design**

The present study utilized a between-subjects design to explore the relationships among sleep (i.e., sleep duration, sleep hygiene, daytime sleepiness), well-being, psychosocial health, and emotional intelligence in participants from two independent educational groups (e.g., children who attend public/private school and children who are homeschooled). This study included one independent variable with two groups (educational environment: public/private school and homeschool). The dependent variables were sleep duration, sleep hygiene, daytime sleepiness, well-being, psychosocial health, and emotional intelligence. Data was collected via anonymous online survey, where students answered demographic questions, and completed self-report measures of sleep duration, sleep hygiene, daytime sleepiness, well-being, psychosocial health, and emotional intelligence. Qualtrics software was used to administer the measures. After the demographic questions, the following measures were presented randomly to prevent order effects: The Children's Report of Sleep Patterns, Children's Report of Sleep Patterns - Sleepiness Scale, the Stirling Children's Well-Being Scale, the Pediatric Quality of Life Inventory - Child Self-Report, Psychosocial Scale and the Trait Emotional Intelligence Scale - Child Short Form. The goal was to recruit an equal number of participants representing each of the two educational groups. A power analysis was conducted which indicated at least 150 total participants should be recruited for the study. Quantitative data gathered via these self-report questionnaires was analyzed using a variety of statistical analyses. Qualitative information about student's typical schedules and parent job titles were also collected and trends were noted in this

data that added to the discussion. The following research questions were explored in this study:

Q1: Do children who are homeschooled have better outcomes in the following areas of sleep health than children who attend public/private school?

- d. Sleep duration
- e. Sleep hygiene
- f. Daytime sleepiness

Q2: If children who are homeschooled have better outcomes in sleep health, do they also have better outcomes in the following areas of emotional health than children who attend public/private school?

- c. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- d. Emotional Intelligence

Q3: For all participants, do children who obtain more hours of sleep each night and engage in healthier sleep hygiene practices have better outcomes in the following areas?

- d. Daytime sleepiness
- e. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- f. Emotional Intelligence

### **Participants**

The Auburn University Institutional Review Board approved the study and participants were recruited through schools and online educational groups. The survey was started by 431 children, and of those, 149 were excluded from participating because they were not in the appropriate age range (8 - 12), or they did not identify as belonging to one of the educational groups (i.e., public/private school, or homeschool). Of the 282

participants who were eligible to participate, 69 either dropped out or did not complete all the questions, leaving 213 participants included in the study. Of the 213 participants, 112 (52.6%) were female, 101 (47.4%) were male, and they were all between 8 and 12 years old ( $M = 10.11$ ,  $SD = 1.44$ ). Regarding educational environment, 15 (7%) children attended private school, 90 (42.3%) children attended public school, and 108 (50.7%) children were homeschooled. The participants who attended public and private schools were combined into one category, public/private school ( $n = 105$ , 49.3%). Participants fell into the following race categorizations: White (84.5%), Hispanic or Latino (3.8%) Black or African American (3.3%), Native American or American Indian (.5%), Asian or Pacific Islander (2.3%), and “Other” (5.6%). Data were collected from across the United States, with the majority of the participant representation from the following states: Alabama (24%), Florida (6.6%), Georgia (19.2%), Maryland (5.2%), Minnesota (3.3%), North Carolina (6.6%), Ohio, (5.2%), Pennsylvania (3.8%), Tennessee (3.8%), Texas (6.6%), Virginia (4.7%), and Wisconsin (2.8%). The education levels of the children’s parents were measured as well to gather some information about SES. The average mothers’ education levels were: High school or less (14.6%), College degree (Associate degree, Bachelor’s degree; 51.6%), Advanced college degree (Master’s degree, Doctorate degree; 29.1%), and Professional degree (Law degree, Medical degree; 1.9%). The average fathers’ education levels were: High school or less (26.8%), College degree (Associate degree, Bachelor’s degree; 40.4%), Advanced college degree (Master’s degree, Doctorate degree; 23.9%), and Professional degree (Law degree, Medical degree; 3.3%). Independent samples  $t$ -tests were conducted to compare the means of the two groups on the demographic variables mentioned above. The results of these analyses

indicated the two participant groups had no significant differences on demographic variables. A summary of participant demographic characteristics can be found in Table 1.

Table 1

*Demographic Information of Participants*

Variable	Public/Private School	Homeschool
Sample Size	105 (49.3%)	108 (50.7%)
Age (Years)	$(M = 10.14, SD = 1.43)$	$(M = 10.07, SD = 1.45)$
8	20 (19.0%)	19 (17.6%)
9	16 (15.2%)	25 (23.1%)
10	22 (21.0%)	20 (18.5%)
11	23 (21.9%)	17 (15.7%)
12	24 (22.9%)	27 (25.0%)
Gender		
Male	47 (44.8%)	54 (50%)
Female	58 (55.2%)	54 (50%)
Ethnicity		
White	88 (83.8%)	92 (85.2%)
Hispanic/Latino	5 (4.8%)	3 (2.8%)
Black/African Amer.	5 (4.8%)	2 (1.9%)
Native Amer./Amer. Indian	0	1 (.9%)
Asian/Pacific Islander	1 (1.0%)	4 (3.7%)
Other	6 (5.7%)	6 (5.6%)
Mother's Education Level		
High school or Less	6 (5.7%)	25 (23.1%)
College Degree (A.A., B.S.)	59 (56.2%)	51 (47.2%)
Adv. Degree (M.A., Ph.D.)	36 (34.3%)	26 (24.1%)
Prof. Degree (J.D., M.D.)	3 (2.9%)	1 (.9%)
Not Applicable	1 (1.0%)	3 (2.8%)
Missing	0	2 (1.9%)
Father's Education Level		
High school or Less	29 (27.6%)	28 (25.9%)
College Degree (A.A., B.S.)	43 (41.0%)	43 (39.8%)
Adv. Degree (M.A., Ph.D.)	27 (25.7%)	24 (22.2%)
Prof. Degree (J.D., M.D.)	3 (2.9%)	4 (3.7%)
Not Applicable	0	3 (2.8%)
Missing	3 (2.9%)	6 (5.6%)

## Measures

**Demographic questionnaire.** Demographic information from the participants was gathered and the demographics questions can be found in Appendix A. These data were used to describe the sample and assess the possible contributions of demographic data to the results.

**Children's Report of Sleep Patterns (CRSP).** Developed by Meltzer, Avis, Biggs, Reynolds, Crabtree, and Bevans in 2013, the CRSP is a self-report measure of sleep to be used with children between the ages of 8-12 years old. The CRSP includes three modules that measure three distinct areas: Sleep Patterns, Sleep Hygiene, and Sleep Disturbance. The measure includes 62 items total and can be used as an overall measure of sleep, or the three modules can be administered separately to look at the distinct areas of sleep functioning. To test the hypotheses in the present study, the sleep hygiene index was utilized and sleep duration was calculated for each participant using the CRSP questions about typical bedtime and wake times. The CRSP has been shown to have acceptable to excellent reliability with alpha values ranging from .60 - .91 (Meltzer et al., 2013). Construct and convergent validity was confirmed with significant associations demonstrated between child and parent-reported daytime sleepiness and the CRSP. Discriminant validity was determined when the scale was compared to a measure of anxiety and significant associations were not found between sleepiness and anxiety. It was additionally demonstrated that the children who were recruited to explore the psychometrics of the scale provided valid information about their sleep as the results of the self-report data were compared to Actigraphy and Polysomnography measures to confirm the valid and reliable nature of the scale (Meltzer et al., 2013).

**Children's Report of Sleep Patterns - Sleepiness Scale (CRSP - S).** The CRSP - S is a scale that is part of the CRSP (described above) that specifically measures daytime sleepiness in school-aged children. It is a five-item self-report measure that asks children about five situations during which they should not feel sleepy (eating, talking, at school, playing, and a short car ride). Their answers are recorded using a five-point scale ranging from 1 (never) to 5 (always). Thorough methods were used to test the psychometric properties of the CRSP - S that indicated strong test-retest reliability ( $r = .82, p < .001$ ), and good internal consistency ( $r = .77, p < .001$ ). The scale also demonstrated acceptable construct validity when significant relationships were found between the CRSP - S and a parent report measure of daytime sleepiness ( $n = 159; r = 0.20, p = 0.01$ ; Meltzer et al., 2012). The CRSP - S also demonstrated convergent validity when both objective and subjective measures of sleep were compared to the measure. Using actigraphy (wearing a monitor to bed to measure sleep), it was found that children who obtained less than 8 hours of sleep reported more sleepiness on the CRSP - S (2.04) than children who obtained more than 8 hours of sleep (1.60). There was a medium effect size found between these two groups ( $p = 0.08$ , Cohen's  $d = 0.57$ ; Meltzer et al., 2012). There was a significant difference in daytime sleepiness among children whose bedtime was before and after 10 PM (mean = 1.42, SD = 0.40,  $p = 0.006$ , Cohen's  $d = 0.88$ ; Meltzer et al., 2012).

**Stirling Children's Well-Being Scale (SCWBS).** The Stirling Children's Well-Being Scale (SCWBS) is a 15-item scale that was developed by Liddle and Carter in 2010 to measure children's emotional and psychological well-being for children aged 8 - 15 years old. The scale was standardized in the United Kingdom using 18 schools and

1849 children (Liddle & Carter, 2010). The scale is a self-report measure of emotional and psychological well-being and social desirability and uses holistic, positively worded items that are rated with a five point Likert scale. This is an open source scale that is offered for researchers wanting to promote the measurement of children’s emotional development and well-being (Liddle & Carter, 2015). The measure has strong psychometric support with a Cronbach’s alpha of .85, indicating excellent internal reliability. The SCWBS has strong construct validity as indicated by correlations of .70 and .69 with other measures of child well-being. The scale also has acceptable test re-test reliability ( $r = 0.75, p < 0.01$ ; Liddle & Carter, 2015). Two of the items on this scale use wording that are stylistic of UK English, rather than US English. Therefore, since the present study used this measure to collect data in the United States, these two items have been slightly revised to use words that would be more familiar to US English speakers. Those changes are mentioned below:

Original item	Edited Item
“I’ve been getting on well with people”	“I’ve been getting along well with people”
“I always share my sweets”	“I always share my candy”

**Pediatric Quality of Life Inventory - Child Self-Report, Psychosocial Scale (PedsQL - Child Self-Report, Psychosocial).** The PedsQL - Child Self-Report measures health-related quality of life in children and adolescents who are both healthy and have acute or chronic health conditions (Varni, 2017). This brief 23 item inventory takes less than four minutes to complete and can be used with school, community, and clinical populations. The child self-report version is developmentally appropriate for children ages 5 - 18, but was clinically normed for children between 8 - 12 years old. The PedsQL

- Child Self-Report has items that measure four domains of functioning: Physical (eight items), emotional (five items), social (five items), and school (five items). These items yield three scores: A total scale score, a physical health summary score, and a psychosocial health summary score. For the purpose of this study, only the items in the Emotional, Social, and School domains were used to obtain the psychosocial health score. The measure has strong reliability and validity with an alpha of .88 and has been demonstrated to distinguish healthy children from those with both acute and chronic health conditions, and also distinguishes disease severity (Varni, 2017; Varni, Limbers, & Burwinkle, 2007). The psychosocial subscale also has strong internal consistency with alpha levels ranging from .82 - .89 when measured across an age range of five to 16 years old. (Varni, Limbers, & Burwinkle, 2007).

**Trait Emotional Intelligence Scale - Child Short Form (TEIQue - CSF).** This measure was developed by Stella Mavroveli for use with children 8 - 12 years old (Mavroveli, Petrides, Shove, & Whitehead, 2008). The scale includes 36 items that utilize a 5-point Likert scale and produces a global trait emotional intelligence score (Mavroveli, Petrides, Shove, & Whitehead, 2008). The development of the scale serves the purpose of improving the availability of measures that look at the emotional life of children, which is different from that of adults (Mavroveli et al., 2008). The scale looks specifically at the construct of trait emotional intelligence in children in the form of self-perceptions, which the authors note is different than socio-emotional development of the childhood life stage (Mavroveli et al., 2008).

The scale was developed using a racially diverse sample population and extra steps were taken to ensure that the phrasing of the items is appropriate for children 8 - 12



years old. The psychometric properties of the TEIQue - CSF include satisfactory internal consistency (alphas of .72 - .76) and satisfactory test-retest reliability over a 3-month period ( $r = 0.79$  and  $r = 1.00$ , respectively; Mavroveli et al., 2008; Petrides, 2009). According to the authors, the satisfactory internal consistency suggests that the scale reliably measures emotional self-perceptions within this age group (Mavroveli et al., 2008). The scale has been shown to have construct validity in studies that found relationships among the emotional intelligence scale and related constructs, such as measures of emotional perception ( $r = .25, p < .01$ ) and social behavior ( $r = .19, p < .05$ ; Mavroveli, Petrides, Sangareau, & Furnham, 2009). The TEIQue - CSF has also been found to have criteria and incremental validity using a two-step hierarchical regression when compared to measures of anxiety (adj.  $R = 18\%$ ;  $F(1, 134) = 30.13, p < .01; \beta = -.43$ ) and depression (adj.  $R^2 = 35\%$ ;  $F(1, 134) = 72.99, p < .01; \beta = -.59$ ; Russo, 2012).

### **Procedure**

The data were collected through an anonymous online questionnaire via Qualtrics software. The link to the survey was advertised through schools that agreed to participate in the recruitment process and online educational groups where parents could be reached. Parents were also encouraged to forward the survey link to other parents they knew with children 8 - 12 years of age. If the parents had more than one child in their household in the recruitment age range, they were asked to only allow one child in their household to participate and to recruit the child in their home with the next upcoming birthday to complete the questionnaire. Recruiting in this way helped with unbiased sampling. The parents and the child participants were provided with information letters (Appendices B and C) and online consent and assent statements with a brief overview of the study that

explained participation in the study was anonymous and voluntary and there were minimal risks and no direct benefits to participate. The participants were informed that for each completed survey, the researcher would donate \$1 to the Lee County Humane Society in Auburn, AL. The parents were asked to be available to help their children if they did not understand a question, but were asked to have their children complete the questionnaire on their own in a private location if possible, and not to answer any questions for their children.

It was the intention of the researcher to gather data from participants from a similar socioeconomic background and region to control for effects that socioeconomic status and region may have on educational setting and well-being. However, enough participants could not be recruited in one geographic region, and the researcher recruited parents nationwide.

After starting the survey, participants were first asked about their age and educational environment. These questions were used as exclusion criteria to prevent any children from participating in the study who were outside of the 8 - 12 age range and who did not attend either public/private or homeschool. After completing the exclusion and demographic questions, the following instruments were presented to participants in random order to prevent order effects: CRSP, SCWBS, TEIQue-CSF, and PedsQL-Psychosocial. The participants were also asked about their parents' education level to offer some information about SES. The participants were then asked to write a brief description of their daily schedule. The qualitative information was gathered to provide information about differences in the typical schedule of children who go to public/private

school and homeschool. This information added to the discussion section of this manuscript and offered helpful information for future research directions.

**Pilot study.** A pilot study was conducted to ensure that the length of the questionnaire was appropriate for children ages 8 - 12 and that the children could read and understand all of the questions. The researcher recruited two children with parental consent to complete the questionnaire, one eight year old and one 12 year old. The children who practiced the questionnaire were able to complete it effortlessly and understood all of the questions. They completed the questionnaire in the approximated time frame: 20 minutes. After the questionnaire was initially launched, the researcher received feedback from parents that the questionnaire was too long and challenging for their children. The researcher completed a second IRB review to obtain approval to decrease the number of questions in the questionnaire. After the final version of the questionnaire was launched, data was collected in about three months.

### **Data Analyses**

To determine the appropriate sample size, a power analysis was conducted using the software G\*Power. The results of this analysis indicated that a minimum of 150 participants, would allow for significantly accurate statistical results. The Statistical Package for Social Sciences (SPSS) was used to analyze data. Descriptive statistics were gathered for the full range of demographic variables. Cronbach alpha coefficients were computed for each scale. MANOVAs and independent samples *t*-tests were conducted to look at differences between the two groups (private/public school and homeschool students). Pearson correlations among all scales were conducted to understand possible

correlations among the variables. To further explore the variable relationships, hierarchical regression analyses were conducted.

## IV. Results

### Overview

The results of the analyses conducted for this study are discussed in this chapter.

The research questions explored in this study were as follows:

Q1: Do children who are homeschooled have better outcomes in the following areas of sleep health than children who attend public/private school?

- g. Sleep duration
- h. Sleep hygiene
- i. Daytime sleepiness

Q2: If children who are homeschooled have better outcomes in sleep health, do they also have better outcomes in the following areas of emotional health than children who attend public/private school?

- e. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- f. Emotional Intelligence

Q3: For all participants, do children who obtain more hours of sleep each night and engage in healthier sleep hygiene practices have better outcomes in the following areas?

- g. Daytime sleepiness
- h. Subjective Well-Being (Children's Well-Being and Psychosocial Health)
- i. Emotional Intelligence

To answer these questions, first Cronbach's alphas were calculated for each measure to understand reliability. MANOVAs and independent samples *t*-tests were run to look at differences between the two groups (public/private school and homeschool).

Correlations to identify variable relationships were conducted. Hierarchical regression analyses were conducted to further explore variable relationships.

### **Description of Measures and Variables**

To measure the sleep duration variable, two of the preliminary questions from the CRSP measure were used. The CRSP includes questions about sleep patterns including typical sleep and wake times. The researcher calculated sleep duration manually for each participant based on their responses to the questions: “What time do you typically go to bed on weekdays?” and “What time do you typically wake up on weekdays?” The average sleep duration time of all participants was 10 hours with a standard deviation of 1.04.

Cronbach’s alpha levels were computed for each scale and are presented in Table 2. The CRSP is a multi-dimensional measure of sleep including three indices (sleep patterns, sleep hygiene, and sleep disturbances). For the purpose of this study, the sleep hygiene index was utilized. The sleep hygiene index asks questions about caffeine use, participating in sports or hobbies before bed, using technology before bed (texting, social media, TV, videogames), bathing or reading before bed (these items are reverse scored since they are considered “better” sleep hygiene practices), and sleep locations other than one’s bed. Therefore, a higher score on the sleep hygiene measure indicates poorer sleep hygiene practices before bed. To explore the internal reliability of the CRSP sleep hygiene index, the Cronbach’s alpha of this index was calculated and found to be .66. This result is similar to that indicated by Meltzer et al. (2013), who stated the CRSP indices have been shown to have reliability values ranging from .60 - .91.

Table 2

*Descriptive Statistics for All Measures*

Measure	N	Mean	SD	Skewness	Kurtosis	Cronbach's Alpha
1. CRSP - SH	211	37.01	7.32	.67	1.20	.66
2. CRSP - S	212	7.54	2.81	1.45	3.01	.74
3. SCWBS	213	56.96	7.80	-.21	-.07	.87
4. PedsQL - Psychosocial	213	10.68	2.16	-.54	-.22	.85
5. TEIQue - CSF	213	129.52	19.75	-.21	-.28	.93

1. Children's Report of Sleep Patterns - Sleep Hygiene Index
2. Children's Report of Sleep Patterns - Sleepiness Scale
3. Stirling Children's Well-Being Scale
4. Pediatric Quality of Life Inventory - Child Self-Report, Psychosocial Scale
5. Trait Emotional Intelligence Scale - Child Short Form

The CRSP - S was used to measure daytime sleepiness. Higher scores indicate sleepiness during activities when one should not be sleepy (talking to friends, eating, playing, doing schoolwork, briefly riding in the car). The CRSP - S had a Cronbach's alpha of .74, slightly lower than the alpha of .82 found by Meltzer et al. (2013).

To measure subjective well-being, two scales were used, the SCWBS and the PedsQL - Child Self-Report, Psychosocial. The Cronbach's alpha of the SCWBS was .87, indicating strong psychometric reliability. This is similar to the .85 found by Liddle & Carter (2015). The PedsQL - Child Self-Report has excellent internal reliability with a Cronbach's alpha of .88 (Varni, 2017). The present study found a similarly high Cronbach's alpha of .85. The last variable, emotional intelligence, was measured using the TEIQue-CSF. This measure was found to have a Cronbach's alpha of .93, which is higher than the .76 indicated in previous empirical work (e.g., Mavroveli et al., 2008).

## **Findings**

The null hypothesis stated that children who attend public/private school and homeschool have no significant differences in sleep duration, sleep hygiene, daytime sleepiness, children's well-being, psychosocial health, and emotional intelligence. The analyses conducted indicated the children who attended public/private school and homeschool did have significant differences in sleep duration, sleep hygiene, and daytime sleepiness. No significant differences were found between the two groups on children's well-being, psychosocial health, and emotional intelligence. However, other relationships among the sleep health and emotional health variables were found (discussed in more detail below). Therefore the null hypothesis was partially rejected. The analyses used to explore the variable relationships are outlined below.

### **Educational Environment, Sleep Health, and Emotional Health**

This study involved one categorical independent variable with two unrelated groups (educational environment: public/private school and homeschool) and multiple dependent variables measured with ordinal scales measuring sleep health (e.g., sleep duration, sleep hygiene, and daytime sleepiness) and emotional health (e.g., children's well-being, psychosocial health, and emotional intelligence). Therefore, one-way multivariate analyses of variance (MANOVAs) were conducted to determine the effect of educational environment on the sleep health and emotional health variables. MANOVAs were particularly helpful in this study because MANOVAs tend to have good power and help account for latent variables. The independent variable in this study (educational environment) may include latent variables that were not observable (e.g., differences in



school or home environments of participants in public/private school and homeschool settings).

A MANOVA looking at the effect of educational environment on the sleep health variables was conducted and homogeneity was determined by both Box's test of equality of covariance matrices ( $p = .36$ ) and Levene's test of equality of error variances ( $p > .05$ ). The results of this one-way MANOVA indicated educational environment did have a significant effect on sleep duration, sleep hygiene, and daytime sleepiness. A statistically significant difference between the public/private and homeschooled groups on the combined dependent variables was found,  $F(3, 207) = 13.27, p < .001$ ; Wilks'  $\Lambda = .839$ ; partial  $\eta^2 = .161$ . Follow-up independent samples  $t$ -tests were then conducted to explore mean differences between the two educational groups (e.g., public/private school and homeschool) on the sleep health variables (e.g., sleep duration, sleep hygiene, and daytime sleepiness). See Table 3 for a summary of the independent samples  $t$ -tests.

The  $t$ -test exploring sleep duration indicated the children who attended public/private school (denoted as group 1) obtained an average of 9.61 hours of sleep per night ( $SD = 1.01$ ), and the homeschooled children (denoted as group 2) obtained an average of 10.40 hours of sleep per night, ( $SD = .93$ ). This mean difference in sleep duration between the two educational groups was significant,  $t(211) = -5.79, p < .001$ . This result supports the first replication hypothesis that homeschooled students get more hours of sleep each night than children who attend public/private school.

Table 3

*Summary of Independent Samples t-Tests*

Variable	Public/Private School		Homeschool		<i>t</i>	<i>df</i>	<i>p</i>
	M	SD	M	SD			
Sleep Duration	9.61	1.01	10.40	.93	-5.79	211	.000
Poor Sleep Hygiene	2.04	.35	1.87	.40	3.28	209	.001
Daytime Sleepiness	1.63	.57	1.39	.53	3.12	210	.002
Caffeine Use	1.62	.51	1.45	.57	2.27	211	.024
Sports or Hobbies	2.94	.51	2.68	.52	3.64	209	.000
Technology Use	2.41	.69	2.09	.73	3.26	210	.001
Bath or Shower	3.83	.99	3.40	1.10	3.00	211	.003
Read Books or Magazines	3.38	1.33	3.71	1.15	-1.98	210	.049
Sleep Location Other than Own Bed	1.58	.58	1.45	.54	1.70	211	.091
TV on in Room	1.63	1.27	1.33	.96	1.92	211	.056

For overall sleep hygiene (where higher scores indicate poorer sleep hygiene), homeschooled students had a lower mean score on the poor sleep hygiene index, indicating homeschooled students engaged in better sleep hygiene practices before bed than public/private school participants,  $t(209) = 3.28, p = .001$ . This finding supports the second replication hypothesis, which stated homeschooled students have better sleep hygiene practices before bed than children who attend public/private school. Regarding specific sleep hygiene practices, significant differences were found between the two

groups using independent samples *t*-tests. Children who went to public/private school consumed more caffeine ( $t(211) = 2.27, p = .024$ ), had more sports or hobbies before bed ( $t(209) = 3.64, p < .001$ ), and used more technology (texting, social media, television, video games ( $t(210) = 3.26, p = .001$ ), than homeschooled children. Regarding healthy sleep hygiene practices before bed, public/private schooled children more often took showers or baths ( $t(211) = 3.00, p = .003$ ), and homeschooled children more often read books or magazines ( $t(210) = -1.98, p = .049$ ). There were no significant differences between the two groups in terms of sleeping in a location other than their own bed, or having a television on in their room when going to bed.

Regarding daytime sleepiness, significant mean differences were found between the two educational groups, indicating that the public/private school students had higher levels of daytime sleepiness,  $t(210) = 3.12, p = .002$ . The results of all analyses outlined above provide evidence to support the first research hypothesis in this study, which stated children who are homeschooled have better outcomes in the following areas of sleep health than children who attend public/private school: sleep duration, sleep hygiene, and daytime sleepiness.

Hypothesis two stated that, if children who are homeschooled have better outcomes in sleep health, homeschooled children will also have better outcomes in the following areas of emotional health than children who attend public/private school: subjective well-being (as measured by children's well-being and psychosocial health scales) and emotional intelligence. A MANOVA indicated no statistically significant difference between the public/private and homeschooled groups on the dependent

variables of children's well-being, psychosocial health, and emotional intelligence,  $F(1, 209) = 1.13, p = .338$ . Therefore, hypothesis two was rejected.

### **Other Variable Relationships**

To look for relationships among the continuous variables (e.g., sleep duration, sleep hygiene, daytime sleepiness, children's well-being, psychosocial health, and emotional intelligence) simple correlations were calculated (see Table 4). Correlations among the specific sleep hygiene practices during the hour before bed (caffeine use, sports or hobbies, technology use, etc.) were also conducted and can be found in Table 5.

The third replication hypothesis stated, for all students, poorer sleep hygiene is related to obtaining fewer hours of sleep each night. This hypothesis was supported through a significant negative correlation between poor sleep hygiene and sleep duration ( $r = -.19, p = .01$ ), indicating children with higher scores on the poor sleep hygiene index obtained fewer hours of sleep each night. To offer additional support for this hypothesis, a simple linear regression was conducted which indicated sleep hygiene was a significant predictor of sleep duration,  $F(1, 209) = 8.08, p = .005; R^2 = .037, \text{adj. } R^2 = .033; B = -.52, \beta = -.193, t = -2.84, p = .005$ . This indicates that the type of sleep hygiene practices before bed predicts the number of hours a child will sleep at night.

Research hypothesis three stated that, for all participants, children who obtain more hours of sleep each night and engage in healthier sleep hygiene practices will have better outcomes in the following areas: daytime sleepiness, subjective well-being (as measured by children's well-being and psychosocial health), and emotional intelligence. To test this hypothesis, first correlations were explored (see Tables 4 and 5).

Table 4

*Correlations among Study Variables (N = 213)*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Educational Environment	–										
2. Sleep Duration	.37**	–									
3. Poor Sleep Hygiene	-.22**	-.19**	–								
4. Daytime Sleepiness	-.21**	-.25**	.34**	–							
5. Children's Well-Being	.10	.15*	.04	-.17*	–						
6. Psychosocial Health	.11	.09	-.20**	-.35**	.58**	–					
7. Emotional Intelligence	.07	.07	.01	-.14*	.77**	.61**	–				
8. Age	-.02	-.33**	.04	.10	-.13	-.02	-.16*	–			
9. Gender	-.05	-.01	-.04	.12	.09	.10	.11	-.09	–		
10. Mother's Ed. Level	-.11	-.11	.02	-.01	-.02	.13	.11	.06	-.06	–	
11. Father's Ed. Level	.06	.06	-.13	-.10	.02	.14*	.08	-.02	-.03	.56**	–

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

Table 5

*Sleep Hygiene Component Correlations (In the Hour Before Bed) (N = 213)*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Educational Environment	–												
2. Caffeine Use	-.15*	–											
3. Sports or Hobbies	-.19**	.10	–										
4. Technology Use	-.22**	.38**	.09	–									
5. Bath or Shower	-.20**	.25**	.23**	.17*	–								
6. Read Books or Magazines	.14*	-.24**	.01	-.32**	.10	–							
7. Sleep Location Other than Own Bed	-.12	.25**	.16*	.35**	.11	-.03	–						
8. TV on in Room	-.13	.25**	-.01	.61**	.14*	-.21**	.19**	–					
9. Sleep Duration	.37**	-.21**	-.07	-.27**	-.15*	.19**	-.06	-.18*	–				
10. Daytime Sleepiness	-.21**	.16*	.16*	.24**	.17*	-.15*	.31**	.12	-.25**	–			
11. Children's Well-Being	.10	-.07	.11	.03	.04	.21**	.05	.06	.15*	-.17*	–		
12. Psychosocial Health	.11	-.17*	.03	-.09	-.06	.12	-.18**	-.04	.09	-.35**	.58**	–	
13. Emotional Intelligence	.07	-.08	.09	.03	.05	.22**	.02	.04	.07	-.14*	.77**	.61**	–

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

A significant negative correlation was found between sleep duration and daytime sleepiness ( $r = -.25, p < .001$ ), indicating children who got more sleep at night were less sleepy during the day. Sleep duration was significantly correlated with children's well-being at the  $p < .05$  level ( $r = .15, p = .03$ ), indicating that children who got more sleep at night had higher scores on the children's well-being measure. Sleep duration was not significantly correlated with psychosocial health ( $r = .09, p = .18$ ), or emotional intelligence ( $r = .07, p = .29$ ).

Poor sleep hygiene was positively correlated with daytime sleepiness ( $r = .34, p < .001$ ), suggesting that children with poorer sleep hygiene habits before bed had higher levels of daytime sleepiness. Poor sleep hygiene was negatively correlated with psychosocial health ( $r = -.20, p < .001$ ), indicating children who engaged in more poor sleep hygiene habits before bed had lower psychosocial health. Poor sleep hygiene was not significantly correlated with children's well-being ( $r = .04, p = .57$ ), or emotional intelligence ( $r = .01, p = .90$ ).

There were significant negative correlations between daytime sleepiness and children's well-being ( $r = -.17, p = .01$ ), psychosocial health ( $r = -.35, p < .001$ ), and emotional intelligence ( $r = -.14, p = .04$ ). These results indicate children with more daytime sleepiness may have less well-being, psychosocial health, and emotional intelligence. Significant correlations were also found among the emotional health variables: children's well-being and psychosocial health ( $r = .58, p < .001$ ), children's well-being and emotional intelligence ( $r = .77, p < .001$ ), and psychosocial health and emotional intelligence ( $r = .61, p < .001$ ). This indicates the emotional health constructs in this study were all highly related.

To further explore hypothesis three, hierarchical regressions were conducted (see Tables 6 - 9). These regressions explored whether sleep duration and poor sleep hygiene significantly predicted daytime sleepiness and also if the sleep health variables predicted the emotional health variables. Demographic variables including parent education level, age, gender, race/ethnicity, and educational environment were entered as controls.

When daytime sleepiness was entered as the dependent variable, age ( $B = .05, \beta = .14, p = .047$ ), race/ethnicity ( $B = .07, \beta = .17, p = .011$ ), and educational environment ( $B = -.26, \beta = -.24, p = .001$ ), significantly predicted daytime sleepiness in model one,  $F(6, 195) = 4.57, p < .001, R^2 = .123, \text{adj. } R^2 = .096$ , and accounted for 12.3% of the variation in daytime sleepiness. In model two, sleep duration was added and race/ethnicity ( $B = .07, \beta = .17, p = .012$ ), educational environment ( $B = -.18, \beta = -.17, p = .021$ ), and sleep duration ( $B = -.11, \beta = -.20, p = .011$ ), significantly predicted daytime sleepiness,  $F(7, 194) = 4.98, p < .001, R^2 = .152, \text{adj. } R^2 = .122$ . Adding sleep duration accounted for an additional 2.9% of the variance in daytime sleepiness. Sleep hygiene was added in model three, and race/ethnicity ( $B = .06, \beta = .15, p = .027$ ), sleep duration ( $B = -.09, \beta = -.17, p = .027$ ), and sleep hygiene ( $B = .30, \beta = .20, p = .005$ ), significantly predicted daytime sleepiness,  $F(8, 193) = 5.51, p < .001, R^2 = .186, \text{adj. } R^2 = .152$ . Poor sleep hygiene accounted for an additional 3.4% of the variance in daytime sleepiness. The results of this analysis indicated sleep duration and poor sleep hygiene significantly predict daytime sleepiness when controlling for demographic variables. Since much of the research on children's sleep focuses on sleep duration, adding sleep hygiene last helps explain that other factors beyond sleep duration account for daytime sleepiness (see Table 6).



Table 6

*Hierarchical Regression Analysis for Variables Predicting Daytime Sleepiness (N = 201)*

Variable	Model 1		Model 2		Model 3	
	B	$\beta$	B	$\beta$	B	$\beta$
Mother's Ed. Level	.01	.01	-.01	-.01	-.01	-.03
Father's Ed. Level	-.05	-.08	-.04	-.06	-.02	-.04
Age	.05*	.14	.03	.07	.03	.07
Gender	.14	.13	.14	.13	.14	.13
Race/Ethnicity	.07*	.17	.07*	.17	.06*	.15
Educational Environment	-.26**	-.24	-.18*	-.17	-.14	-.12
Sleep Duration			-.11*	-.20	-.09*	-.17
Poor Sleep Hygiene					.30**	.20
<i>F</i>	4.57**		4.98**		5.51**	
<i>R</i> <sup>2</sup>	.123		.152		.186	
$\Delta R^2 F$	4.57**		6.66**		7.98**	
$\Delta R^2$	.123		.029		.034	

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

Gender: 0 = Male, 1 = Female; Race/Ethnicity: 0 = White, 1 = Non-White; Educational Environment: 0 = Public/Private School, 1 = Homeschool.

Table 7

*Hierarchical Regression Analysis for Variables Predicting Children's Well-Being (N = 201)*

Variable	Model 1		Model 2		Model 3		Model 4	
	B	$\beta$	B	$\beta$	B	$\beta$	B	$\beta$
Mother's Ed. Level	.00	-.00	.00	.00	-.00	-.01	-.01	-.01
Father's Ed. Level	.01	.02	.01	.02	.02	.04	.02	.03
Age	-.05	-.13	-.04	-.11	-.04	-.12	-.04	-.10
Gender	.08	.08	.08	.08	.09	.08	.11	.11
Race/Ethnicity	-.03	-.07	-.03	-.07	-.03	-.08	-.02	-.06
Educational Environment	.12	.12	.10	.10	.13	.12	.10	.10
Sleep Duration			.03	.06	.04	.07	.02	.04
Poor Sleep Hygiene					.16	.11	.21	.15
Daytime Sleepiness							-.18*	-.19
<i>F</i>	1.56		1.40		1.49		2.03*	
<i>R</i> <sup>2</sup>	.046		.048		.058		.087	
$\Delta R^2 F$	1.56		.48		2.07		6.00*	
$\Delta R^2$	.046		.002		.010		.029	

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

Gender: 0 = Male, 1 = Female; Race/Ethnicity: 0 = White, 1 = Non-White; Educational Environment: 0 = Public/Private School, 1 = Homeschool.

Table 8

*Hierarchical Regression Analysis for Variables Predicting Psychosocial Health (N = 201)*

Variable	Model 1		Model 2		Model 3		Model 4	
	B	$\beta$	B	$\beta$	B	$\beta$	B	$\beta$
Mother's Ed. Level	1.27	.09	1.35	.10	1.50	.11	1.38	.10
Father's Ed. Level	1.39	.09	1.31	.09	1.03	.07	.86	.06
Age	-.30	-.03	-.10	-.01	-.09	-.01	.14	.01
Gender	3.00	.10	3.04	.11	2.98	.10	4.18*	.15
Race/Ethnicity	.20	.02	.22	.02	.36	.03	.88	.08
Educational Environment	4.30*	.15	3.68	.13	2.92	.10	1.76	.06
Sleep Duration			.88	.06	.63	.05	-.13	-.01
Poor Sleep Hygiene					-4.87	-.12	-2.32	-.06
Daytime Sleepiness							-8.48**	-.33
<i>F</i>	2.00		1.80		1.93		4.07**	
<i>R</i> <sup>2</sup>	.058		.061		.074		.160	
$\Delta R^2 F$	2.00		.61		2.71		19.69**	
$\Delta R^2$	.058		.003		.013		.086	

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

Gender: 0 = Male, 1 = Female; Race/Ethnicity: 0 = White, 1 = Non-White; Educational Environment: 0 = Public/Private School, 1 = Homeschool.

Table 9

*Hierarchical Regression Analysis for Variables Predicting Emotional Intelligence (N = 201)*

Variable	Model 1		Model 2		Model 3		Model 4	
	B	$\beta$	B	$\beta$	B	$\beta$	B	$\beta$
Mother's Ed. Level	.07	.12	.07	.12	.06	.12	.06	.11
Father's Ed. Level	.00	.01	.00	.01	.01	.02	.01	.01
Age	-.06*	-.16	-.06*	-.17	-.06*	-.17	-.06*	-.15
Gender	.11	.10	.11	.10	.11	.10	.13	.12
Race/Ethnicity	-.00	-.01	-.00	-.01	-.01	-.01	.01	.01
Educational Environment	.11	.109	.12	.11	.13	.12	.11	.10
Sleep Duration			-.02	-.03	-.01	-.03	-.03	-.05
Poor Sleep Hygiene					.01	.05	.13	.08
Daytime Sleepiness							-.17*	-.17
<i>F</i>	1.91		1.65		1.50		1.90	
<i>R</i> <sup>2</sup>	.056		.056		.059		.082	
$\Delta R^2 F$	1.91		.16		.45		4.84*	
$\Delta R^2$	.056		.001		.002		.023	

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

Gender: 0 = Male, 1 = Female; Race/Ethnicity: 0 = White, 1 = Non-White; Educational Environment: 0 = Public/Private School, 1 = Homeschool.

The hierarchical regression of variables predicting children's well-being had no significant predictors in models one, two, or three. In model four, daytime sleepiness ( $B = -.18, \beta = -.19, p = .015$ ), was added and was a significant predictor of children's well-being,  $F(9, 192) = 2.03, p = .038, R^2 = .087, \text{adj. } R^2 = .044$ . Adding daytime sleepiness accounted for an additional 2.9% of the variance in children's well-being (see Table 7). The hierarchical regression of variables predicting psychosocial health indicated educational environment was significant in model one ( $B = 4.30, \beta = .15, p = .034$ ), but the overall model was not significant. There were no significant predictors of psychosocial health in models two or three. In model four, daytime sleepiness ( $B = -8.48, \beta = -.33, p < .001$ ) was added and was a significant predictor of psychosocial health,  $F(9, 192) = 4.07, p < .001, R^2 = .160, \text{adj. } R^2 = .121$ . Adding daytime sleepiness accounted for an additional 8.6% of the variance in psychosocial health (see Table 8).

The hierarchical regression looking at the variables predicting emotional intelligence indicated age was significant in model one ( $B = -.06, \beta = -.16, p = .028$ ), model two ( $B = -.06, \beta = -.17, p = .028$ ), and model three ( $B = -.06, \beta = -.17, p = .028$ ), but these overall models were not significant. In model four, age was significant ( $B = -.06, \beta = -.15, p = .040$ ) and daytime sleepiness was added and was also significant ( $B = -.17, \beta = -.17, p = .029$ ).  $F$ -change was significant in model four ( $\Delta R^2 F = 4.84, p < .01$ ), indicating daytime sleepiness significantly improved the prediction of emotional intelligence, however the overall regression equation was not significant,  $F(9, 192) = 1.90, p = .054, R^2 = .082, \text{adj. } R^2 = .039$  (see Table 9). The results of the four regression analyses outlined in this section indicated that hypothesis three was partially supported, in that relationships among some of the variables were significant.

## Environmental and Qualitative Data

To collect more information about environmental factors related to sleep and well-being, the two participant groups (public/private school and homeschool) were asked about daytime napping behaviors using a quantitative question:

“Some kids take naps in the daytime every day, others never no. Do you nap?”

1. I never nap
2. I never nap unless I am sick
3. I sometimes nap
4. I nap almost every day”

An independent samples *t*-test was conducted, which found the two groups had similar daytime napping behaviors and there were no significant differences between the two groups,  $t(211) = -.088, p = .93$ . Both groups typically either never napped (public/private school: 47.6%; homeschool: 41.7%) or only napped if they were sick (public/private school: 39.0%; homeschool: 47.2%).

To gain additional information about environmental differences between the two groups, qualitative data was gathered. The participants were asked to write a few sentences to answer the following question about their typical weekday and weekend schedules:

“Tell us about your school schedule each week, and how your schedule might be different on the weekends. For example, ‘During the week I usually wake up at 9 am every day and do schoolwork until 2 pm, and sometimes on the weekends I also do schoolwork.’ It's okay if your parent helps you with this question if you need help.”

A few examples of participant responses are as follows:

*Homeschool participant example responses:*

“Monday and Wednesday and Friday I do school from 10 am to 2 pm and Tuesday and Thursday I do school from 10:30 am to 3 pm.”

“I wake up about 7:00 and read or play on my computer. I do home school in the morning and then I have P.E. and swimming in the afternoon. We go on field trips sometimes on Fridays and Saturdays. On Sunday I go to children's church instead of school and then play with my friends in the afternoon.

“I wake up at about 7:30 am and do school work until around 1:00 pm on weekdays because I'm homeschooled. I don't do schoolwork on the weekends.”

*Public/private school participant example responses:*

“I wake up at 6 am each day. Get ready for school and do school until 2:30 PM. I never have homework.”

“During the week I usually wake up between 6:45-7:15AM. I eat breakfast at home. School starts at 8:40AM and ends at 3:00PM. I always stay in aftercare until ~5:30PM. I get my homework done in aftercare. After I get picked up we have dinner and sometimes I play with my sister before going to bed at 8:30-9:00PM. On the weekends I wake up and go to sleep at the same time but don't go to school. Rarely we will stay up late on the weekend if there is something special happening.”

“On weekdays I wake up at 7 and get the bus at 7:40. I go to school and get home at 2:40. I do my homework after supper around 6:30pm.”

Trends in the responses were noted and there were a few distinct differences between the two participant groups. Participants who identified as attending public/private school had similarly structured schedules each day. They typically woke up between 5 - 7 am and arrived at school at about 8 am. They tended to be at school

until about 2 - 4 pm, sometimes staying in after-school programs and sometimes having homework after school. Public/private school students also sometimes reported participating in sports or other hobbies in the evenings. They reported typically not doing homework on the weekends, sleeping later in the weekend mornings, and having more time with family and friends on the weekends.

Homeschooled students typically woke up between 7- 9 am and their school schedules had much variability. Some students reported being done with schoolwork by lunch time and spending the rest of the day playing outside, doing chores, spending time with friends and family, reading, running errands with parents, participating in sports activities or going on field trips. Some students reported doing schoolwork in one to two hour increments at various times throughout the day (mornings, afternoons, and evenings) and spending other time participating in the various activities mentioned above. Some homeschooled students reported doing some schoolwork for a few hours on the weekends as well.

The information obtained from the question about schedules was similar to the information gathered by the 2016 Meltzer et al. study regarding participant wake times and school start time. In the Meltzer et. al (2016) study, their homeschooled participants typically woke around the same time that public/private schooled children were arriving at school. The present study found a similar trend.

Participants were also asked to briefly describe their parents' job titles; this helped gather information about how parent schedules may also impact children's environments. Participants were asked to write a response to the following question:



“Please write your parent's job titles. For example: ‘My mother is a dentist, and my father is a salesman.’ It's okay if your parent helps you with this question if you need help.”

A few examples of participant responses are as follows:

*Homeschool participant example responses:*

“My mother works in medical billing and my father works in IT.”

“My mom is a stay-at-home mom. My dad is a computer scientist.”

“Dad is a firefighter chief, mom is my homeschool teacher.”

“My dad stays home and teaches us. My mom works at a job.”

*Public/private school participant example responses:*

“My mom is an auditor. My dad is a professor.

“My mother is a stay at home mom and my dad works at a food company.”

“My mom and dad are a nurse.”

“My mom is a waitress and my dad is a carpenter.”

The main trend found in these responses was that homeschooled participants more often reported having a stay at home parent in the home. Some responses were vague and included information about parent job titles that could involve working from home (e.g., “My mom is an editor, and my dad works in IT”). However, the information provided here about stay at home parents only includes responses that explicitly stated a stay at home parent was in the home. Of the 101 public/private schooled participants who answered this question, 15 (14.9%) reported having a stay at home parent. Of the 106 homeschooled children who answered this question, 61 (57.5%) reported having a stay at home parent.

## V. Discussion

The primary goal of the present study was to look at the differences in sleep that can be observed among children who attend different educational settings (e.g., public/private school and homeschool). The study explored how these variations in sleep may be related to subjective well-being and emotional intelligence. The study also aimed to explore replication hypotheses for the study on sleep differences between public/private school and homeschool students conducted by Meltzer et. al (2016). The information gathered in this study may add to the knowledge about factors in educational environments that impact sleep and well-being. To answer the research questions, data was collected through an online survey. MANOVAs and independent sample *t*-tests were used to measure differences between the two subject groups (public/private schooled and homeschooled children). Simple correlations were conducted to understand variable relationships. A hierarchical regression was used to further understand the strength of the relationships among sleep hygiene, sleep duration, daytime sleepiness, subjective well-being, psychosocial health, and emotional intelligence. Lastly, trends were found in qualitative data about typical daytime schedule and parent job titles. This qualitative data provided additional information about other environmental variables that could contribute to the sleep differences between the two groups.

### **Sleep**

In this study, it was found that there was a significant difference in hours of sleep obtained each night (sleep duration) among participants in the two groups, with homeschooled children obtaining an average of 10.40 hours of sleep per night, and public/private school children obtaining an average of 9.61 hours of sleep per night.

Additionally, students who were homeschooled engaged in healthier sleep hygiene habits the hour before going to bed. For example, students who were homeschooled drank less caffeine, used less technology the hour before bed (texting, email, social media, video games, and TV), participated less in sports or hobbies the hour before going to bed, and engaged in more leisurely reading before bed. Homeschooled students reported less daytime sleepiness (were less sleepy during daytime activities such as playing, talking to friends, and eating) and public/private school students reported higher levels of daytime sleepiness. More daytime sleepiness was related to sleeping less during the night and poorer sleep hygiene habits (more technology use before bed, more sports or hobbies before bed, and more caffeine use). Participants who engaged in more leisurely reading before bed also had less daytime sleepiness ( $r = -.15, p = .03$ ). Based on the qualitative data gathered about typical daytime schedules, homeschool children tended to wake up around the same times that public/private schooled children were arriving at school.

This information is consistent with what has been found in the literature. Particularly, the present study was successful at replicating many of the results from the Meltzer et. al (2016) study, which also found that homeschooled students obtained more hours of sleep each night and tended to wake up around the same time that public/private schooled children arrived at school. The present study also replicated the Meltzer et. al (2016) findings that homeschooled participants engaged in better sleep hygiene practices the hour before bed (less caffeine use, less technology use, more leisurely reading, fewer extracurricular activities before bed). The Meltzer et. al (2016) study found that public/private school children more often went to bed with a television on in their room, which the present study did not find (Measured with the following question: “When you

are trying to fall asleep at night, is a television on in your room?” Response options: Never, Not very often, Sometimes, Usually, or Always). However, the present study did find that, in general, children who more often went to bed with a television on in their room obtained fewer hours of sleep ( $r = -.18, p = .01$ ). Other researchers have also supported the findings that more technology before bed (tablets, games, etc.) was associated with obtaining less sleep at night and more daytime sleepiness among children (Calamaro, Mason, & Ratcliffe, 2009; Nathanson & Beyens, 2018). The relationship between more caffeine use and daytime sleepiness has also been supported empirically (Calamaro, Mason, & Ratcliffe, 2009). Obtaining more sleep at night and having less daytime sleepiness has also been supported by the literature (Wolfson et al., 2007).

In terms of factors that may have contributed to the sleep differences between the two educational groups, some of the qualitative data that was obtained provided some information. In addition to public/private schooled children arriving at school around the same time that homeschooled children woke up, the public/private schooled children also seemed to engage in “school time” for longer durations in the day (e.g., being at school from about 8 am to between 2 pm and 4 pm). They also often had homework to complete after their “school time,” whereas homeschooled children seemed to complete academic tasks in shorter durations of time each day. Additionally, homeschooled children seemed to have the opportunity for more variety in their daily schedules, as indicated by reported trends of having daily chores, fieldtrips, friend and family time, and outdoor play, in addition to school time. One of the features of homeschool environments is that parents are often able to include more flexibility and variety into their child’s education. Many homeschool parents see this as an advantage, and this may also be an advantage in terms

of sleep, since having a less rigorous daytime schedule could contribute to the opportunity to obtain more sleep. In the present study, children who were homeschooled were more likely to report having a stay at home parent in their home as well, which may offer more opportunities for variety in daily schedule. Families who can economically allow for a parent to stay home with children may also be more likely to consider homeschooling as an educational option. More information on how these factors impact sleep and children's well-being would be helpful to research further.

### **Relationships among Other Variables**

In addition to sleep outcomes (sleep duration, sleep hygiene, daytime sleepiness), the present study also explored variables related to emotional health and well-being, specifically children's well-being, psychosocial health, and emotional intelligence. The present study found the emotional health factors (children's well-being, psychosocial health, and emotional intelligence) were all significantly related to one another. There were no relationships between educational environment and children's well-being, psychosocial health, or emotional intelligence. However, these mental health variables were associated with some of the factors related to sleep and sleep hygiene. Even more specifically, participants who engaged in more leisurely reading before bed had higher children's well-being ( $r = .21, p < .001$ ) and emotional intelligence ( $r = .22, p < .001$ ). Also, children with less daytime sleepiness had higher children's well-being, psychosocial health, and emotional intelligence. Lastly, children who got more sleep at night reported higher levels of psychosocial health. These findings are similar to what has been supported in the literature. Many factors associated with mental health that have been explored in the positive psychology research, such as well-being, psychosocial

health, and emotional intelligence, are highly related to one another (Gallagher & Vella-Brodick, 2008; Koydemir & Schütz, 2012; Salovey, Mayer, Caruso & Yoo, 2009).

Studies have also supported the relationship between daytime sleepiness, mental health, and emotional well-being. For example, Nowack (2017) found that managers in work settings that had more daytime sleepiness engaged in poorer interpersonal communication and had less emotional insight than those who were not sleepy during the day. This information could be applied to children as well to suggest that children with more daytime sleepiness may struggle more with communication that involves interpersonal interaction and emotional expression. This suggestion has been supported by studies that have found that obtaining less sleep, and therefore being sleepier during the day, is associated with decreased functioning of the prefrontal cortex and lower levels of emotional intelligence, and that having adequate sleep is associated with more emotional and psychological strength (Killgore, 2013).

### **Limitations**

This study involved data collection using self-report. This may be a limitation in that the researcher could not fully ensure that participants answered all questions as honestly as possible. Additionally, parents were asked to have their child take the questionnaire by themselves, but be available to help if the child needed help understanding a question. However, because this data was collected online, it cannot be insured that parents did not help their children answer questions throughout the study, or even complete the questionnaire on behalf of their child. Parents may want to portray their child in a positive light, particularly regarding their child's emotional health and well-being. Therefore, if parents helped their children with the questionnaire, the results

could be skewed in a positive direction. When participants were recruited, parents were asked to select the child in their home with the next upcoming birthday to participate to help with unbiased sampling from individual homes. However, multiple participants were recruited and allowed to participate who attended the same school. As a result, the data collected from the public/private school participants may have resulted in a clustering variable whereas the homeschool data may have been more independent. However, some homeschooled participants may have attended the same homeschool groups, or lived in the same communities, which could have also created a clustering effect. The differences in the two groups may have resulted in a limitation of the study. Furthermore, the data collected from the homeschooled group may have included much variability due to the differences in the way that homeschool families structure their child's education. Due to the variety in homeschool scheduling, this research group may have been less homogenous than the children who attended public/private school. Additionally, this data was collected from different states in the US and states often have differing policies and regulations for homeschooling. Some states have few or no regulations, other states require attendance records or for homeschools to be registered with their county as a private school (Kreager, 2010). Therefore, the data collected from homeschooled families in this study could differ as a result of the varied state regulations. The present study also did not collect some demographic information such as religious affiliation. Studies have indicated that some families choose to homeschool their children for religious reasons, which may also impact variables such as caffeine use or daily activities (Meltzer et. al, 2016). In addition, other environmental factors that could impact sleep were not explored in this study, such as living or custody arrangements, having infant siblings, or type of

neighborhood where families live. For example, literature has found that living in neighborhoods with higher crime rates is related to having more sleep disturbances (Mellman, Bell, Abu-Bader, Kobayashi, 2018). This study also did not include a strong measure of SES, which limited the ability to explore the impact of SES on the results. Since the mentioned areas were not explored, this study may have limitations in generalizability and may also be limited in offering explanations for why some relationships among the variables may exist. However, because homeschooled children are a population that has less representation in research, gathering information from this particular population may add to the literature and contribute to the fields of education and psychology.

### **Recommendations for Future Research**

The information gathered through the present study supported many of the hypotheses suggested, and also opened doors for a variety of areas that could be explored further. Although it wasn't thoroughly explored in the results of this manuscript, the data collected indicated that there were also strong correlations between having more bedtime fears and having poorer sleep hygiene ( $r = .29, p < .001$ ), less children's well-being ( $r = -.22, p < .001$ ), poorer psychosocial health ( $r = -.45, p < .001$ ), and lower emotional intelligence ( $r = -.16, p = .02$ ). This suggests that further exploring the impact and possible causes of bedtime fears in children may offer a rich area of study.

The present study initially aimed to explore differences among three educational groups (public school, private school, and homeschool), however the researcher encountered challenges with collecting enough participants to represent the private school group. Therefore, it is recommended that if future researchers wish to better understand



how private school participants may differ from public school and homeschool participants, that they anticipate challenges with recruiting private school participants. It is recommended that more thorough or longer recruitment processes are utilized to recruit enough participants from private schools to look more closely at potential differences, especially those related to SES. It is also recommended that more information is collected regarding why parents choose particular educational settings for their children (e.g., cost, religious reasons, a desire for more autonomy over their child's education, etc.). More information about reasons behind educational choices may provide opportunities to study causal relationships among variables. It would be helpful for future studies to also gather more information about other environmental factors that could relate to sleep disturbances (e.g., neighborhood crime rates, having infant siblings, living in more than one home due to custody arrangements among divorced parents, etc.).

The majority of literature that looks at sleep duration and educational setting also discusses academic performance. Therefore, it is recommended that future research include a measure of academic performance since this relationship has not been studied between children who go to public/private school and homeschool. It may be challenging to measure academic achievement between these two groups, since a standardized measure of academic achievement may not be available. Therefore, future researchers may consider including an experimental component to measure academic achievement, such as asking participants to complete an age-appropriate academic task to see if there are performance differences among the two groups.

As mentioned in the literature review, the emotional intelligence of school administration officials has been studied. Therefore, looking at the emotional intelligence

of parents whose children attend public/private or homeschool may be an interesting area of study that could add to the literature on these topics as well. Additionally, the children who obtained more sleep (homeschooled children), also more often had a stay at home parent in their home. It would be interesting to further explore possible relationships between having a stay at home parent and children's health outcomes, while controlling for factors such as family income, which most likely influences whether having a stay at home parent is possible.

One factor that could relate to higher daytime sleepiness in school children is the possibility of burnout due to engaging in academic work tasks for longer periods of time each day as compared to homeschooled children, who seem to have more variety in their days in terms of school, play, outdoor time, chores, fieldtrips, and social activities. This is something that may be helpful to explore further in future research. A review of this topic did not yield any information about current measures available that look at burnout in children, therefore this may be an area where new measures could be developed. The topic of recess and lunch time periods in the public/private school day schedules is receiving much attention in news sources currently (Ettinger, 2019; Reilly, 2019). The present study did not ask any questions about activities that students participate in while in school and how such activities may relate to sleep and well-being. Continued study of the sleep and emotional health benefits of children having more variety in their daily schedules and having more opportunities for outdoor play and field trips for example, may be helpful as we work to learn more about children's health and well-being.

## **Implications**

Based on the information gathered during the present study, we can imply that, when given the opportunity, children may choose to get more sleep during the week than they usually receive with a typical school schedule. This implication particularly stems from the finding in both the present study, and the Meltzer et. al (2016) study, that many school children are arriving at school around the same time that homeschooled children start waking up. The school start time debate is a hot topic in sleep research and much of the literature on school start times suggests that schools start later so that children can get more sleep in the mornings. Studies on later school start times have found that students who attend schools with later start times get between a half an hour to an hour more sleep each night, have less daytime sleepiness, drink less caffeine, have less depression, and less tardiness (Minges & Redeker, 2016). Similar to the present study, students who get more hours of sleep at night drink less caffeine, which suggests that children who drink more caffeine may be doing so to help themselves stay awake while doing homework or participating in extracurricular activities after school. Research has suggested that higher caffeine use in children and adolescents is associated with more cases of adverse health outcomes such as diabetes, cardiac abnormalities, and mood or behavioral disorders (Seifert, Schaechter, Hershorin, & Lipshultz, 2011). Therefore, one implication of the present study is that, if students are given the opportunity to get more hours of sleep each night, they may be less likely to drink caffeine, and thus have better physical and mental health outcomes. One of the challenges with later school start times mentioned in the literature is transportation (changing bus schedules, being able to get students to school before parents have to be at work, etc.). If students get out of school later, this may also

alter after school activities, and create added stress on families due to changing schedules (National Sleep Foundation, 2019). It is possible that if public and private schools began a more universal implementation of later school start times, this could have an impact on other structures in society, such as the typical 8 - 5 work day. However, with the increase in online work and companies allowing employees to work from home, changes in the typical 8-5 work day may not be too far in the future. If parents were offered more opportunities for flexible work schedules, this could allow for the adoption of more flexible school schedules as well.

## **Conclusion**

This study was successful at replicating many of the results from the Meltzer et al. (2016) study, and also added to the literature by finding additional information about the relationships among daytime sleepiness, children's well-being, psychosocial health, and emotional intelligence. This study also contributed to the literature by further confirming the relationships among emotional intelligence, well-being, and psychosocial health. Additionally, in this study, it was determined that not getting enough sleep and not engaging in healthy habits before bed (sleep hygiene) does significantly contribute to daytime sleepiness, which the literature has suggested can highly impact other areas of functioning such as academic performance and overall physical health (Ming et al., 2011; Perkinson-Gloor et al., 2013). This has important implications; particularly since the school system as it is currently structured seems to be significantly impacting children's sleep duration, sleep hygiene, and daytime sleepiness. It will be important to consider the long-term impacts that childhood sleepiness could have on society as a whole, since sleep, achievement, and mental and physical health appear to all be highly related. The

school start time debate has started bringing this issue to light and this topic will most likely continue to be explored as we learn more about sleep and health.

This study also made room for future research directions, which could further explore variables and implications about sleep and health. For example, future researchers could collect data from a larger sample, or a sample that also includes more private school children to help strengthen results or find new results. In addition to studying emotional intelligence, future research could also look at emotion regulation and other areas that tend to be highly impacted by sleep (e.g., behavioral problems, arguments with peers, physical health factors, sicknesses, doctors visits, school tardiness, disciplinary action required at school or at home, etc.). Furthermore, the number of extra curricular activities between homeschool and public/private school participants and the impact of extracurricular activities on sleep wasn't measured in this study, but could offer opportunities for additional information in future research.

In conclusion, it appears that school schedules as they are currently structured may be contributing to children obtaining less sleep and having higher levels of daytime sleepiness. Some families, who have the option, may be choosing to homeschool their children due to the opportunity for a more flexible and varied schedule. Perhaps as our work force continues to engage in more online and digital services, new opportunities for our society to adopt a more variable schedule for both parents and children may be possible in the near future.

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## Appendix A

### Demographic Questionnaire and Qualitative Questions

1. Are you a
  - a. Boy
  - b. Girl
  
2. What is your race/ethnicity?
  - a. White
  - b. Hispanic or Latino
  - c. Black or African American
  - d. Native American or American Indian
  - e. Asian or Pacific Islander
  - f. Other
  
3. How old are you?
  - a. 8
  - b. 9
  - c. 10
  - d. 11
  - e. 12
  - f. None of the above
  
4. What kind of school do you attend:
  - a. Private school
  - b. Public school
  - c. Homeschool
  - d. None of the above
  
5. Tell us about your school schedule each week, and how your schedule might be different on the weekends. For example, “During the week I usually wake up at 9 am every day and do schoolwork until 2 pm, and sometimes on the weekends I also do schoolwork.” It’s okay if your parent helps you with this question if you need help.
  
6. What is your mother’s education level? It’s okay if your parent helps you with this question.
  - a. High school or less
  - b. College degree (Associate degree, Bachelor’s degree)
  - c. Advanced college degree (Master’s degree, Doctorate degree)
  - d. Professional degree (Law degree, Medical degree)
  - e. Not applicable
  
7. What is your father’s education level? It’s okay if your parent helps you with this question.

- a. High school or less
  - b. College degree (Associate degree, Bachelor's degree)
  - c. Advanced college degree (Master's degree, Doctorate degree)
  - d. Professional degree (Law degree, Medical degree)
  - e. Not applicable
8. Please write your parents' job titles. For example: "My mother is a dentist, and my father is a salesman." It's okay if your parent helps you with this question if you need help.
9. What state do you live in?

## Appendix B

### Information Letter

DEPARTMENT OF SPECIAL EDUCATION, REHABILITATION AND COUNSELING (NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

**INFORMATION LETTER for a Research Study titled:** Sleep and Educational Environment: How do Children in Public School, Private School, and Homeschool Settings Differ in Sleep, Subjective Well-Being, and Emotional Intelligence?

**Your son or daughter is invited to participate in a research study** to aid a graduate student in obtaining the data necessary to complete her dissertation requirements. The purpose of the study is to investigate the relationships among sleep, emotional intelligence, and subjective well-being. The study is being conducted by Melani Landerfelt-Ozbolt, M.A., under the direction of Joseph Buckhalt, Ph.D. in the Auburn University Department of Special Education, Rehabilitation, and Counseling. Your son or daughter is invited to participate because he or she is between the ages of 8 and 12 years old. Since he/she is age 18 or younger we must have your permission to include him/her in the study.

**What will be involved if your son/daughter participates?** If you decide to allow him/her to participate in this research study, he/she will be asked to give assent to participate and complete an anonymous online questionnaire. We ask that you allow your child to complete the survey in private without your help answering questions. However, we ask that you be available while your child is completing the survey if they need help reading a word or understanding a question. Your son's/daughter's total time commitment will be approximately 15 to 20 minutes.

**Are there any risks or discomforts?** There are no risks to participating in this research study. Your child may find that some questions are personal in nature since some of the questions ask about emotions and feelings, however your child will be encouraged to answer the questions privately and they will be reassured that their responses are anonymous. He/she also does not have to answer any questions that he/she does not want to, and your child can end his/her participation in the study at any point without penalty.

**Are there any benefits to your son/daughter or others?** There are no direct benefits for participating in this study. If your child participates in this study, he/she may experience some positive emotions knowing that his/her participation helped someone complete her dissertation requirements. They may also enjoy the learning experience of participating in a research study. We cannot promise you that your son/daughter will receive any or all of these positive outcomes described.

**Will you receive compensation for participating?** There is no compensation for participating in this research study.

**For every completed survey, the researcher will donate \$1 to the Lee County Humane Society in Auburn, Alabama.**

**Are there any costs?** There are no costs to you or your child for participating.

**If you (or your son/daughter) change your (or his/her) mind about his/her participation,** he/she can end his/her participation in the study at any time by closing the browser window. His/her participation is completely voluntary. If you choose to withdraw your son/daughter from the study, his/her data cannot be withdrawn once it is submitted because data are not identifiable. Your decision about whether or not to allow your son/daughter to participate or to stop participating will not jeopardize your or his/her future relations with Auburn University, the Department of Special Education, Rehabilitation, and Counseling or the investigator.

**Any data obtained in connection with this study will remain anonymous.** We will protect your son's/daughter's privacy. The data collected will be password protected and encrypted. Results from all children who participate will be aggregated and no individual's responses will be identifiable. Information obtained through his/her participation will be used to fulfill an educational requirement, and the dissertation will be read by the major professor and other committee members. After completion, it will be available to other researchers. Also, results may be published in a professional journal and/or presented at a professional meeting.

**If you (or your son/daughter) have questions about this study,** please contact Melani Landerfelt-Ozbolt, M.A. at [mrl0021@auburn.edu](mailto:mrl0021@auburn.edu) or Joseph Buckhalt, Ph.D. at [buckhja@auburn.edu](mailto:buckhja@auburn.edu) or (334) 844-2875.

**If you have questions about your child's rights as a research participant,** you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334) 844-5966 or e-mail at [IRBAdmin@auburn.edu](mailto:IRBAdmin@auburn.edu) or [IRBChair@auburn.edu](mailto:IRBChair@auburn.edu).

**HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WISH FOR YOUR SON OR DAUGHTER TO PARTICIPATE IN THIS RESEARCH STUDY. BY CLICKING THE "I AGREE TO ALLOW MY CHILD TO PARTICIPATE IN THIS RESEARCH STUDY" BUTTON BELOW, YOU INDICATE YOUR WILLINGNESS TO ALLOW HIM OR HER TO PARTICIPATE. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.**

Melani Landerfelt-Ozbolt, M.A. 12/03/2018  
Investigator Date

**The Auburn University Institutional Review Board has approved this document for use from 02/19/2019 to 12/02/2019. Protocol #18-420 EP 1810, “How do Children in Public School, Private School, and Homeschool Settings Differ in Sleep, Subjective Well-Being, and Emotional Intelligence?”**

## Appendix C

### Minor Assent Letter

DEPARTMENT OF SPECIAL EDUCATION, REHABILITATION, AND  
COUNSELING (NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB  
APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO  
THIS DOCUMENT.)

#### **Minor Assent for a Research Study titled:**

*Sleep and Educational Environment: How do Children in Public School, Private School,  
and Homeschool Settings Differ in Sleep, Subjective Well-Being, and Emotional  
Intelligence?*

You are invited to be in a research study to help us understand how some children sleep and how their sleep may relate to their feelings and health.

If you decide you want to be in this study, you will complete an online survey all by yourself. This will take you about 15 to 20 minutes. The information you provide will be anonymous, which means that no one will know what your answers are to the questions. While you are doing this, your parents/guardians will be available if you have a hard time understanding a word or question, but they will not be helping you answer the questions. You should answer the questions all by yourself.

**For every completed survey, the researcher will donate \$1 to the Lee County Humane Society in Auburn, AL.**

While we hope you finish the questions, you can stop at any time. Just tell your parents. If you don't want to do the survey anymore you can stop and close your browser window. No one will be angry with you if you stop.

If you have any questions about what you will do or what will happen, ask your parents or guardian.

If you have decided to help us by doing this survey, please click the button below that says "I AGREE to participate in this research study."

<u>Melani Landerfelt-Ozbolt, M.A.</u>	<u>12/03/2018</u>
Investigator	Date

The Auburn University Institutional Review Board has approved this document for use from 02/19/2019 to 12/02/2019. Protocol #18-420 EP 1810, "How do Children in Public School, Private School, and Homeschool Settings Differ in Sleep, Subjective Well-Being, and Emotional Intelligence?"