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# Pre-Sleep Routines in Adult Normal Sleepers

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# PRE-SLEEP ROUTINES IN ADULT NORMAL SLEEPERS

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Requirements for the Degree of
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Jean Satomi Koketsu
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**EASTERN KENTUCKY UNIVERSITY**

**COLLEGE OF HEALTH SCIENCES**

**DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY**

Certification

We hereby certify that this Capstone project, submitted by Jean Satomi Koketsu, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the project requirement for the Doctor of Occupational Therapy degree.

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This project, written by Jean Satomi Koketsu under direction of Doris Pierce, Faculty Mentor, and approved by members of the project committee, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF OCCUPATIONAL THERAPY

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## Executive Summary

Sleep is the most important restorative occupation, and pre-sleep routines, which precede sleep, have not been explored in normal adult sleepers. Routines are an important construct in occupational therapy, but it is not well-researched.

The purpose of this project is to add to the body of knowledge regarding pre-sleep routines through description by normal sleepers. This research can inform occupational therapists in regard to the usual patterns and dynamics of pre-sleep routines. Open systems theory, a grounded theory approach, and graphic and interview methods were used in this qualitative study

The participants were 16 adults from a sample of convenience, between the ages of 23 and 60, who were considered good sleepers, based on scores from the Pittsburgh Sleep Quality Index (PSQI). People drew pictures of their pre-sleep routines and were interviewed afterwards. Drawn activities were categorized and compared with transcribed interview data.

Participants in the study showed variances in how they described pre-sleep routines in terms of time and activities. Similarities were also found. This group of normal adult sleepers described pre-sleep routines as occurring in specific locations, under certain sensory and environmental circumstances, without much thought, usually in a solitary fashion, in a predictable sequence, and on a regular basis in the same way almost every day. People described activities that were essential to include every day and those that were not. Participants report that they do specific activities before bedtime in order to ensure that sleep is not disturbed and to prepare for the next day. Drawings were found to be a useful method to collect data on routines.

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**CERTIFICATION OF AUTHORSHIP**

Submitted to (Faculty Mentor's Name): Doris Pierce
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Title of Submission: Pre-Sleep Routines in Adult Normal Sleepers

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Student's Signature: Jean Satomi Koketsu

Date of Submission: 8/15/18

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### Introduction

**Sleep is important across the lifespan**. Sleep is considered the most important restorative occupation in which humans engage (Pierce, 2001, 2003). Without sleep, people cannot thrive, let alone survive. Sleep is vital to health, and it is known that modern society is deprived of it and that sleep disturbances pervade (Cappuccio, Miller, & Lockley, 2010). Insomnia is the most common sleep problem that people have globally (Edinger et al., 2015) and is the most common sleep issue seen in primary care settings (Senthilvel, Auckley, & Dasarathy, 2011). Another common sleep disorder in the population is obstructive sleep apnea (OSA) (Franklin, & Lindberg, 2015; Punjabi, 2008).

David Dinges, a well-known sleep researcher, in the forward to one of the first comprehensive textbooks on sleep epidemiology (Cappuccio et al., 2010), points out that of the billions of people on Earth, every single one of them is subjected to the "biological imperative of daily sleep" (p. vii). Sleep is so important to the biology of humans that there is a specific part of the brain, the suprachiasmic nuclei (SCN) that orchestrates the management of daily patterns of behaviors into daily rhythms (Gillette, 2013). Sleep and wakefulness is considered the most important daily rhythm controlled by the SCN (Gillette, 2013). Throughout the lifespan, people sleep, but its patterns, the quality, and the amount of sleep required changes with age (Ohayon, Carskadon, Guilleminault, & Vitiello, 2004).

Sleep varies across cultures in terms of environmental and social factors such as the surface on which it occurs, tolerance for noise levels, number of and variety of bed partners, fluidity of bedtimes and wake-times, and whether it occurs in a single nocturnal bout (Worthman

& Melby, 2002). Despite cultural differences, there are global concerns regarding sleep health (Cappuccio et al., 2010).

Sleep takes up one-third of our lives and is the occupation with the strongest tie to health (Pierce, 2014a). Also, as Pierce (2014a) describes, sleep is the only occupation that has its own medical specialty and its own set of medical diagnoses. At the person level, people who have sleep problems describe lower quality of life, poorer health, depression, anxiety, and cognitive issues (Krystal, 2007). Even suicide risk is higher for those with sleep issues (Bernert, Kim, Iwata, & Perlis, 2015).

**Sleep as a national and global public health concern.** At the societal level, poor sleep is implicated in 328,000 car crashes annually in the U.S.: 109,000 crashes that result in injuries, and 6,400 crashes that result in at least one fatality (Tefft, 2014). Sleep is considered an important public health issue by the U.S. government. Healthy People 2020 (U.S. Department of Health and Human Services, n.d.) is an initiative by the U.S. Department of Health and Human Services to help the populace to live longer and more healthfully. A total of 26 leading health indicators were identified. Out of these 26 high priority health issues, at least 11 (over 42%), can possibly be improved if sleep is improved. Better sleep can help decrease:

- blood pressure (Robillard, Lanfranchi, Prince, Filipini, & Carrier, 2011),
- diabetes risk (Wong, Manuck, DiNardo, Korytkowski, & Muldoon, 2015),
- injury deaths (American Automobile Association Foundation, 2014; Ferrie, Kivimaki, & Shipley, 2010),
- infant deaths (American Academy of Pediatrics, 2005),
- adult suicides (Kim, Park, Cho, Park, Choi, Chang, 2013),

- teen suicides (Fitzgerald, Messias, & Buysse, 2011; Lee, Cho, Cho, & Kim, 2012),
- obesity among adults (Cappuccio et al., 2008; Fernandez-Mendoza et al., 2015),
- obesity among children (Cappuccio et al., 2008),
- the use of alcohol or illicit drugs among adolescents (Nadorff et al., 2014), and
- the use of alcohol among adults (Johnson, Roehrs, Roth, & Naomi, 1998).

Improvement in sleep may also increase the intake of healthier foods (Spiegel, Tasali, Penev, & Van Cauter, 2004).

Sleep deprivation and disturbance is considered to be a common international issue (Cappuccio, Miller, & Lockley, 2010). Major global human disasters have been attributed to the lack of alertness and fatigue of sleep-deprived workers such as the Three Mile Island nuclear meltdown in 1979, the Exxon Valdez oil spill in 1989, the Bhopal chemical spill in India in 1984, and the Challenger space shuttle crash in 1986 (Zupancic, Swanson, Arnedt, & Chervin, 2010).

**Sleep and occupational therapy**. Unlike any other occupation, which can be replaced, sleep cannot. It needs to be experienced as best able by the person engaged in it. Green (2012) points out that "Sleep occupies more of our time than any other activity and is the single most important natural act around which we structure our everyday occupation" (p. 121). Occupational therapists regularly work with people who are at high risk of having sleep issues across the lifespan (Green & Brown, 2015) and are well-placed to help people with it.

The third edition of the *Occupational Therapy Practice Framework* by the American Occupational Therapy Association (2014) separated occupations into eight different categories, with one category being sleep and rest. This categorization is important as the *Framework*

represents occupational therapy's central concepts to internal and external audiences. If occupational therapists are stating in official documents that sleep is an area in which they help people, it is important for educators, therapists, and researchers to examine it. Successful participation and engagement in sleep at the person, group, community, and global level should be of interest to a profession that touts the importance of occupation.

***Role of occupational therapy and sleep***. Although pointed out by one of the founders of occupational therapy as important to have proper balance in life (Meyer, 1922), sleep and other restorative occupations are not given much attention in research or practice (Green & Brown, 2015; Pierce, 2014a). Occupational therapists have educational backgrounds that are ideally suited to help people with sleep, and they work in settings where people are at high risk of having issues with it.

***Occupational therapy intervention for sleep issues***. Leland and colleagues (2014) completed a scoping review of current evidence for interventions to improve sleep for older adults. The researchers found that four of the recommended treatments can be applied by occupational therapists, including cognitive behavior therapy for insomnia (CBT-I), physical activity, multi-component interventions, and other strategies.

A meta-analysis found multicomponent CBT-I to be an effective treatment for insomnia (Geiger-Brown, Rogers, Liu, Ludeman, Downton, & Diaz-Abad, 2015). In addition, the American College of Physicians came out with a position statement that CBT-I should be the initial treatment for adults diagnosed with chronic insomnia, rather than medication (Qaseem, Kansagara, Forciea, Cooke, & Denberg, 2016). Multicomponent CBT-I includes a combination of approaches: stimulus control, sleep restriction/consolidation, cognitive therapy, with the option of including relaxation training and sleep hygiene education (Ong, 2017). The utilization

of this approach directly addresses people's routines. Generally speaking, this approach involves replacement of unhelpful or inaccurate beliefs with helpful ones, and ineffectual habits and behaviors with more effective ones.

A feasibility and pilot study was completed to determine whether a multicomponent CBT-I program could be carried out by occupational therapists with college students who were also post-911 military veterans with service injuries and sleep disturbances (Eakman et al., 2017). Eakman and colleagues developed the program, Restoring Effective Sleep Tranquility (REST), which included seven sessions of group therapy and eight 1:1 sessions with occupational therapists trained in CBT-I. The REST participants also received meditation practice with a trained yoga therapist and mindfulness expert who started and ended each group session with those activities. Eight veterans participated in the pilot program, and by the end of treatment, they had reductions in sleep difficulties, decreased dysfunctional ideas about sleep, and improved participation in social roles and activities. Eakman and colleagues report that the 1:1 sessions included discussions of specific daily routines to build sleep-drive in the participants and to adhere to stimulus control techniques. In their discussion section, Eakman and team proposed that qualitative research on sleep routines can address bed partners' support or hindrance to helping with behavior changes that will affect the nightly routines of couples. The researchers pointed out that the CBT-I protocol often entails a change in bedtime, which affects the couple-pairs' alteration in routines.

No intervention studies were found in the occupational therapy literature on OSA, however, O'Donoghue and McKay (2012) completed a qualitative study of nine people living with the condition and found wide-ranging impacts on life and occupational engagement. The

authors suggested that occupational therapists can help via education, support, lifestyle redesign, occupational engagement, and sleep hygiene.

**Routines and pre-sleep routines.** Moss, Carney, Haynes, and Harris (2015) found that the daytime routines of adults with insomnia were less regular than those of people without insomnia. Research on pre-sleep behaviors, such as screen time, indicates that some pre-sleep activities can negatively impact children and teenagers, delaying sleep onset and affecting sleep duration (Foley et al., 2013). Another study with adolescents found that engagement in pre-bedtime behaviors such as video games and social media were risk factors for shorter and poorer sleep (Harbard, Allen, Trinder, & Bei, 2015). Harbard and colleagues also found that spending time with family on school nights resulted in earlier bedtimes and longer sleep durations. A small study in adults with insomnia showed that treatment focused on ritualizing pre-sleep routines may improve sleep and daytime function (Wickwire, Schumacher, & Clarke, 2009).

Royeen (2014) points out that occupational therapists regularly discuss routines as an important part of intervention, but that have very little knowledge about it. Noteworthy efforts have been made to synthesize and understand the concept of routine and habits (Clark, 2000; Luebben, & Royeen, 2007), but Royeen (2010, 2014) points out that confusion about the term routine persists and more elaboration on the topic is needed. In occupational therapy, morning routines have been studied (Royeen, 2010; Thompson, 2017), but pre-sleep routines have not. A few recent studies were found specifically on pre-sleep routines in other disciplines (Foley et al., 2013; Harbard et al., 2015; Henderson, & Jordan; Wickwire et al., 2009).

## Problem Statement

Although the concept of routines is important to the occupational therapy profession as both an intervention and an outcome of effective intervention, routines have been little

researched in the profession (Royeen, 2014). In addition, no research was found on the specific topic of pre-sleep routines within occupational science and therapy. Occupational scientists and therapists (Green & Brown, 2015; Pierce, 2014a) recognize the importance of the topic of sleep to study and address. Helping people with routines (Leland et al., 2014) is one approach that has been presented as an intervention approach to help older adults with sleep issues. Occupational therapists may also be trained in CBT-I (Eakman, 2017), which includes strong components of alteration of routines, both before and during the nocturnal sleep time.

In order to make effective use of pre-sleep routines in intervention, it is important to first describe the occupation of pre-sleep routines in typical individuals. Such a description of sleep routines in typical sleepers supplies knowledge with which to structure interventions and set treatment goals in the area of sleep. Pierce (2014a) argues that, in order for occupational therapy to effectively apply occupations, there is a need to understand how occupations are typically experienced and perceived, how they interact with other phenomena, how they develop, and how they are used to make change or serve as an outcome of intervention. Pierce terms these four distinct types of research on occupations as Levels 1 (descriptive), 2 (relational), 3 (predictive), and 4 (prescriptive). Key topics in the profession, such as routines, should be studied at the descriptive level so that research designs at other levels are better informed by this basic descriptive work on the occupation of interest (Pierce, 2014b; Royeen, 2014). This project, the investigation of pre-sleep routines in persons with normal sleep, can be considered to be level 1, descriptive, occupational science research.

**Purpose of the Project**

The purpose of this project is to add to the body of knowledge regarding pre-sleep routines in adult normal sleepers. This type of research can inform occupational therapists and

other professionals who help people with sleep issues in regard to the patterns and dynamics of typical pre-sleep routines.

**Project Objectives**

The research question is as follows: What are the pre-sleep routines of normal adult sleepers?

**Theoretical Framework**

The theoretical framework for this study is from systems theory, in which entities cannot be understood only by looking at separate parts and living organisms are viewed as open systems (Cole & Tufano, 2008). An open system is in constant interaction and exchange with its environment. As Cole and Tufano point out, an important principle of open systems theory is that a change in one part of a system may alter the whole. Although this research sought to describe only the pre-sleep portion of a person's routine, research on one aspect of a person's day is important to understanding the functioning of the whole person and how routines impact the whole days and lives.

A grounded theory approach was used. This inductive method constructs, or discovers, theory through intensive iterative analysis of raw qualitative data in search of descriptive patterns and categories (Charmaz, 2014; Luborsky, & Lysack, 2006). This approach aims to have theory emerge from the data itself, rather than from preconceived ideas of what the data is likely to show.

Another theoretical perspective of this study asserts that art or graphic expression can be used as a means to express experience, especially liminal experiences (Elliot, 2011). Elliot explained how the term liminal originated from the Latin limen, which referred to a boundary or threshold, a place of transition from one state to another. Rituals are a good example of liminal

states. As Elliot further explains, states of liminality are subjectively experienced and gives as examples the transitions from sleep to wakefulness and from wakefulness to sleep.

Royeen (2010), in her art-based inquiry into morning routines, collected data using the process of interpretive graphics, which refers to looking at drawings to discover meaning. Royeen studied the morning routines of 46 people (35 females, 9 males, 2 did not indicate gender) who ranged in age from 17 to 53 years old. Each research participant drew pictures of their morning routines. The data were analyzed by counting the frequency of frames in a drawing and the number of objects used in the morning routine. Each frame was labeled as an activity category. Comparisons were made, and themes were developed by investigating the pictures. The average number of frames was 10 (median and mode was 11), which indicated that this group had 10 to 11 sets of activities in their morning routines. An average of four different settings were depicted in the drawings. On average, 9 to 10 categories of objects, such as toiletries or clothes, were depicted in a typical morning routine. The majority of activities were performed in solitude, there were clear depictions of the sequence of activities, and most of the routines started in a bed and ended in a car. Additionally, most of the subjects depicted the act of waking up as difficult, as evidenced by haggard eyes or grumpy faces.

Morning routines, which can be considered a liminal state, were described by Royeen as a state that can prepare people to "undertake participation in life" (p. 39). Royeen described the issue of trustworthiness in qualitative research and how to determine it by explaining Charles Taylor's (1971) definition of it. To Taylor, an interpretation is correct if it illuminates things that are puzzling or contradictory. Royeen queried readers of her research on morning routines on whether the method itself provided some understanding of morning routines, which it did.

Liou (2017), quoting others (Haney, Russell, & Bebell, 2004), described how the use of drawings to describe attitudes of aging have increased in recent years as drawings can provide a "different glimpse into human sense making than written or spoken texts because they can express that which is not easily put into words: the not-yet-thought-through, the subconscious" (p. 269). Liou (2017) investigated and compared attitudes on aging by studying the drawings done by college students in the U.S. and Taiwan. Liou found that this medium of expression resulted in multifaceted themes, including positive attitudes and respect towards elders, which were not found in quantitative studies. Liou described the abstract and complex themes that emerged from the graphic data and how the adage, "a picture is worth a thousand words," was reinforced through this research.

**Significance of the Study**

This capstone project is important for the field of occupational therapy and to occupational science, since the profession often utilizes the construct of routines, "when we talk of our theory and explain our practice" (Royeen, 2010, p. 31). Though routines are discussed often by researchers and clinicians in the field, little research has been done on routines. More specifically, pre-sleep routines require further description by its participants in order to be understood at the experiential level that is essential to a client-centered approach to practice.

**Summary**

Sleep is a health imperative for all humans. Occupational therapy seeks to help people with their occupations, and sleep, which is the occupation most closely tied to health, is undervalued by both society and the profession (Pierce, 2014). Insomnia is the most prevalent sleep disorder (Edinger et al., 2015) while OSA is also common (Franklin, & Lindberg, 2015; Punjabi, 2008). Multicomponent CBT-I, which includes a change in sleep routines to reset sleep

physiology, rhythms, and behaviors, is now considered to be the first-line treatment for adults with chronic insomnia (Qaseem et al., 2016). The concept of routines is not well defined or understood, although occupational therapy researchers and clinicians refer to it often (Clark, 2000; Royeen, 2010, 2014). In adults, preliminary qualitative studies on morning routines have been conducted in occupational therapy (Royeen, 2010; Thompson, 2017), but the routines prior to sleep have not been examined. Research into pre-sleep routines can inform occupational therapists and other practitioners who help people with sleep. This study will also add a substantive theoretical description to the limited sources of occupational science theory in regard to routines.

**Definition of Terms**

**Circadian Rhythm**: "An innate daily fluctuation of physiological or behavioral functions, including sleep-wake states generally tied to the 24-hour daily dark-light cycle. Sometimes occurs at a measurably different periodicity (e.g. 23 or 25 hours) when light-dark and other time cues are removed" (Pelayo & Dement, 2017, p. 446).

**Cognitive Behavior Therapy for Insomnia (CBT-I)**: "Treatment package consisting of stimulus control, sleep restriction, and cognitive therapy (core), with the option of relaxation training and sleep hygiene" (Ong, 2017, p. 36).

**Cognitive Therapy**: "Therapeutic techniques to address maladaptive thoughts and beliefs that interfere with sleep and daytime functioning" (Ong, 2017, p. 36).

**Habits**: Occupations that are "performed repeatedly, relatively automatically, and with little variation." It also "interacts with time, agency and context" and are not performed exactly the same way every time. This does not include "non-occupations" such as unconscious automatic motor acts, or "habits" such as "living life to the fullest" (Clark, 2000, p. 126S).

Habits are also “embedded in daily routines,” which are considered the building blocks for occupation (Royeen, 2010, p. 31).

**Interpretive Graphics**: “Looking at drawn depictions in order to assess meaning” (Royeen, 2010, p. 35).

**Insomnia**: A sleep disorder that includes a difficulty of initiating or maintaining sleep, despite adequate opportunity. It also includes daytime consequences. To be considered chronic, the duration of the issue is three months with a frequency of at least three times a week (American Academy of Sleep Medicine, 2014).

**Liminal Experience**: A boundary or threshold or a “transition from one state to another, a between state that leads to change, something new. Changes may be consciously chosen, or may, involuntarily” be “thrust upon individuals, communities, or nations. Between these two stages, the condition of liminality suspends a person or a system in what may appear to be an amorphous and ill-defined state” (Elliot, 2011, p. 96).

**Obstructive Sleep Apnea (OSA)**: A chronic sleep disorder that is characterized by repeated upper airway collapse during sleep. Oxygen levels drop, which puts strain on the heart, which can lead to high risk of a host of cardiac diseases, including stroke (American Academy of Sleep Medicine, 2017). Daytime consequences include sleepiness and daytime fatigue, which can impact occupational engagement (O’Donoghue and McKay, 2012).

**Pre-Sleep Routines (Nocturnal)**: A sequence of discernable behaviors and activities that occurs prior to engaging in a proposed single bout of consolidated sleep at night.

**Routines**: a “sequenced set of discernable behaviors in a linear continuum of time that are repeated as an approximate pattern or configuration over time” (Royeen, 2010, p. 30). “Structure through which occupation is organized” (Clark, 2000, p. 127S).

**Sleep Drive**: The propensity to sleep, or not, based on how long one has been awake and our body's desire for homeostasis between sleep and wake, and the circadian biological clock, which dictates certain times of the day (middle of the night and mid-afternoon) when a person should be sleepy. The longer one is awake, the stronger the desire to sleep (more sleep drive). Sleep drive is highest when a person is awake for a long time, and when the clock dictates when the body should be sleepy. Based on the Two-Process Model of Sleep (Borbély, 1982).

**Sleep Efficiency**: The ratio of total sleep time to actual time in bed (Pelayo & Dement, 2017).

**Sleep Hygiene**: Daily behaviors and environmental conditions that promote good sleep health. It is a "set of instructions to eliminate habits that are counterproductive to sleep" (Ong, 2017, p. 36). Note: Ong does not agree that elements of sleep restriction or stimulus control should be included under sleep hygiene. Others have generalized the term to include sleep restriction or stimulus control.

**Sleep**: It is a "reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment" (Carskadon, & Dement, 2004, p. 13). It occurs periodically and naturally, and people can come out of the state easily. It is usually characterized by closed eyes, lying in a recumbent position and quiet (Carskadon, & Dement). Sleep is an occupation in which humans engage for extended periods of time on a daily basis, provides necessary restoration, is foundational to the quality of waking occupations, and has the occupation with the strongest tie to health (Pierce, 2003).

**Sleep restriction**: "Sleep schedule used to reduce time in bed to increase homeostatic sleep drive, thereby improving sleep efficiency" (Ong, 2017).

**Stimulus control**: Based on classical conditioning principles and entails associating the bed with sleep versus wakeful activities so that stronger ties will be built for sleep with the bed.

## Section 2: Literature Review

### Occupation of Sleep and Health

An occupation is a person's "personally constructed, non-repeatable, experience" (Pierce, 2014, p. 3). It is also "a subjective event in perceived temporal, spatial, and sociocultural conditions that are unique to that one-time occurrence. An occupation has shape, a pace, a beginning and an ending, a shared or solitary aspect, a cultural meaning to the person, and an infinite number of other perceived contextual qualities" (p. 3-4). According to this definition, sleep is an occupation.

Clark (2000) stated that unlike other species, humans are not biologically programmed to engage in specific occupations. Nonetheless, humans have a circadian clock, housed in the brain, which can be considered a biological programmer that dictates wakefulness and sleepiness. Thus, sleep differs from other occupations, because all humans have a mechanism to engage in it at some point. Clark (2000) refers to the work of Yerxa and colleagues (1989) who stated that humans, to a large extent, make choices to decide what occupations to engage in. Humans, then, are biologically programmed to engage in sleep, but they make choices on how, when, where, how much, and whether to participate in it to an extent. But, to survive, they cannot make a life choice on whether to engage in it at all. As the only occupation that has its own medical diagnoses and its own medical specialty (Pierce, 2014), it is also the only occupation that has its own specialty in psychology (American Academy of Sleep Medicine, 2013; American Psychological Association, n. d.).

As the occupation with the strongest tie to health (Pierce, 2014), sleep is important to address in occupational therapy. People with sleep issues describe lower quality of life, poorer health, depression, anxiety, and cognitive issues (Krystal, 2007), and they are at higher risk for suicide (Bernert, Kim, Iwata, & Perlis, 2015).

Research has also shown that people with self-reported sleep issues while in inpatient rehabilitation settings had a higher mortality one year after discharge (Martin et al., 2011). Martin and colleagues recommended that research should focus on helping people who are in inpatient rehabilitation settings to improve their sleep quality. Since occupational therapy practitioners work regularly with people who are at highest risk of sleep issues, such as in inpatient rehabilitation settings, the profession needs to pay attention to the occupation of sleep.

**Sleep Issues and Routines**

Insomnia is the most common sleep problem (Edinger et al., 2015). In addition to the negative health impacts, the economic consequences of untreated insomnia are estimated to be $100 billion per year in the U.S. alone (Wickwire, Shaya, & Scharf, 2016). Efficacious treatment (CBT-I) is recommended for adults with chronic insomnia before use of medications (et al., 2016). The benefits of non-pharmacological treatment of insomnia include findings that CBT-I improvements are present in the long term, even after treatments have ended (Bootzin, & Manber, 2013). In contrast, the benefits of treatment with medications for insomnia are short term.

Unfortunately, few practitioners (usually psychologists) are trained or even available to be trained to deliver CBT-I (Espie, 2009). Alternative models have been suggested to use professionals with various skill levels to meet the need to treat the vast numbers of people with chronic insomnia (Espie, 2009). Espie proposed five levels of care in his pyramid with the

bottom level representing the lowest level of training required for CBT-I, which included things such as self-administered CBT-I using booklets, CD/DVD, or the internet. The next four levels included healthcare professionals with increasing experience and background to treat. The top level would be provided a psychologist and behavioral sleep medicine specialist who was an expert in CBT-I. The level of severity of insomnia and complexity would determine the level of treatment that was obtained by a client. Espie did not mention occupational therapists in his model, but occupational therapists have also been successfully trained to utilize this approach (Eakman, 2017). In acute insomnia, even a single session of CBT-I was found to be effective in helping people (Ellis, Cushing, & Germain, 2015). An important aspect of these non-pharmacological treatments for insomnia is addressing dysfunctional routines surrounding sleep.

Green, Hicks, Weekes and Wilson (2005) discussed their involvement in group treatments for people with chronic insomnia, using cognitive behavioral approaches, which involved occupational therapists. Green and colleagues (2005) argued that the management of chronic insomnia was a "natural territory" (p. 521) for occupational therapists to be involved because of the effects of sleep on daytime activities and waking activities on sleep. Green's team points out that adherence to routines and habits is particularly important to follow good sleep hygiene practices. More recently, a scoping review by researchers of current evidence for treating older adults with sleep issues found that several evidence-based interventions that entail modification of routines can be applied by occupational therapists (Leland et al., 2014). Recent research by Eakman and team (2017) showed that occupational therapists can design and successfully implement multicomponent CBT-I treatments for injured veterans who are college students. The sessions that the college students had with the occupational therapists involved setting goals regarding stimulus control and sleep hygiene, both of which involved changes in

habits and routines. Discussions about daily routines to build sleep drive and strategies to adhere to sleep restriction treatment also occurred during those sessions.

Another common sleep disorder is OSA, which is a condition where a person's upper airway collapses during sleep. This results in fragmented sleep throughout the night, lack of oxygen to the brain, intrathoracic pressure and increased sympathetic activity (Epstein et al., 2009). Because of this, despite adequate hours of sleep, a person may feel unrested and sleepy throughout the day. Other more severe consequences of untreated OSA include increased risk for stroke, a variety of cardiovascular disorders, and mortality (Budhiraja, Budhiraja, & Quan, 2010). The current gold standard treatment for OSA is the use of continuous positive airway pressure (CPAP), delivered via a device that forces air directly into the airway to keep it open (Epstein et al., 2009). The CPAP device is considered a lifelong prescription unless technology changes, the OSA resolves, or other treatments are discovered. The use of this device requires a change in nighttime and morning routines. Adherence rates for CPAP are sub-optimal, and when defined as four hours or more a night, 46%-83% of users are considered non-adherent (Weaver & Grunstein, 2008).

Lettieri and Walter (2013) studied the problem of poor adherence to CPAP that showed that CPAP adherence was better for those instructed in groups versus individual sessions. Occupational therapists are trained in group protocols and patient education and can easily fill the role of one who helps lead education groups on sleep hygiene, environmental set-up, use of the device, and incorporation of its use into daily routines. A focus on routines and habits to help people sleep well is important and may help people with both insomnia and OSA, the two most common sleep disorders. Unfortunately, confusion about a definition of the construct of routines and habits still exists in occupational therapy and science.

**Occupational Therapy and Occupational Science: Routines and Habits**

Two decades ago, Ludwig (1998) proposed three reasons why routine should be studied in occupational therapy. Ludwig pointed out that occupational therapy and occupational science considered routine "a temporal structure that relates to well-being," but it needed further study. Ludwig also described how very little had been written about routines throughout the life course, especially in old age. Ludwig further asserts that occupational therapy practitioners often encourage people to establish and follow routines. The researcher discussed the importance of determining the appropriateness and effectiveness of these types of interventions and how it needs to be further explored.

All these reasons to study routines still hold true today, and there are other concerns and social changes that call for its study, especially as they relate to sleep. Examples include advancement in technology, the ubiquity of social media, research supportive of non-pharmacological approaches to insomnia, and the alarming rates of autism spectrum disorder (ASD) in children, who are known to be at risk of sleep issues. Another reason is the increasing aging population (U. S. Census Bureau, 2017), especially when considering that older adults are at a higher risk for major sleep issues (Ohayon, 2002). As previously mentioned, the recent publication of the American College of Physician's recommendations (Qaseem et al., 2016) that first-line treatment should be CBT-I, adds more urgency to the need to study routines.

Florence Clark (2000) synthesized the information presented at a 1999 conference on habit and routine, which was held in Asilomar, California. Clark acknowledged that construction of theory begins with definitional work, so she examined both habits and routines, described their similarities and differences, and relationship to occupation. Clark described how habits are performed repeatedly, are done relatively automatically, and without much variation.

Temporality, agency and context can also interact with habits, so they are not always performed the same way every time. According to Clark, habits are not all occupations. She gave examples of automatic motor acts and things such as chewing on a pencil, which may be habits, but not occupations. Clark mentions that some habits are "macrolevel," so cannot qualify as occupations. She points out that "habits" such as "trying one's best" are too broad to be considered occupations. Habits are also hard to break and can become an addiction.

Clark (2000) described routines as having a regular, somewhat unvarying customary nature, and as a kind of habit. Routines also may be "a structure through which occupation is organized, and occupations (both habitual and non-habitual), in turn, can be thought of as the building blocks of one kind of routine, daily routines" (Clark, 2000, p. 127S). Clark refers to the work of Corbin (1999) who pointed out that words such as procedure, ritual, ceremony, rite, and protocol all have social processes that have a routine. Corbin posits that routines vary in type, frequency, are not only one act, may be fixed or flexible, are always being adjusted, involve a mind-body connection, are dynamic, and can be boring.

Gallimore and Lopez (2002) published an article on daily routines and habits in an occupational science journal but did not specifically define those terms. The authors' goals were to discuss the ecological and cultural contexts that shape routines. The authors pointed out that clocks and time are a part of daily life and how this was not always the case before Europeans devised timepieces in the 14th century to become "master of his time" and not remain "slaves of the sun" (Boorstin, 1983, p. 36). The authors stated that "daily routines are themselves a form of habitual behavior, one largely unavoidable" (p. 71S). When looking through a cultural model in terms of routines, the authors pointed out that expected values and activities can enable or constrain habitual behaviors in daily routines. The writers recognized that daily routines were a

combination of social order and human agency. They gave examples of how even the most determined efforts to change daily routines may be hindered by the ecological-cultural surroundings. They discussed the importance of therapists acknowledging that families already have established routines before initiating any intervention. They emphasized the need for healthcare professionals to acknowledge the ecological and cultural factors that are already embedded in the daily routines of people when treatment recommendations are made.

Luebben and Royeen (2007) noted the lack of clarity in the occupational therapy profession of key terms in the field: habit, routine, occupation, and participation. They proposed a conceptual model to understand the concepts better. They suggested using a metaphor of a wave to describe the four concepts. In this model, habits are ripples and "bits of behavior that form routines" (p. 86S). Together, habits and routines are the swell for occupation. Occupation would be the umbrella term, which encompasses routines which are made of habits, which become the wave crest. The actual surf from the waves are the activities at the individual level and participation at the societal level.

Royeen (2010) reported that no single discipline or field of study dominates the research on routines. In a literature review to present her study of morning routines, Royeen grouped the topics in her review of routines under several categories: temporality, planning, medication management, families and communities, disease states, learning, and outcomes on routines.

Regarding temporality, Royeen (2010) mentioned chronobiology, which is a biological factor influencing daily routines such as sleep. As previously mentioned, a structure in the brain, the suprachiasmic nuclei, houses the master clock, which determines when humans should sleep and when they should be awake, among other things. So, our biology has a built-in system to manage wakefulness and sleep. In the discussion about planning, Royeen gave examples of how

teachers (Earle, 1996) engage in routines to organize their days, how mothers use daily routines to promote self-care skills in children (Kellegrew, 2000), and how mothers use routines to organize and plan (Larson, 2000). Medication management was also recognized as a topic covered in routines of older adults (Bytheway, 2001) and contraceptive use (Oakley, Yu, Shang, Zhu, Chen, & Yao, 1999).

The recent publication of occupational therapy's role in medication management (American Occupational Therapy Association, 2017) highlights the importance of practitioners helping clients to establish habits and routines in order to appropriately manage medications. Schwartz and Smith (2017) discussed occupational therapy's potential to help people with medication management, since interventions for medication management are often behavioral. In a study by Sanders and Van Oss (2013), 149 community-living older adults who took four or more medications were interviewed about their routines around medication management. Habits regarding medication were embedded in mealtime, wake-up, and sleep routines for 91% if those interviewed. The study participants had individualized strategies to take their medications, which were within broader daily routines. In addition to daily routines, weekly and monthly routines were also instituted and followed regarding medication management.

When she examined the research on families and routines, Royeen (2010) concluded that routines seem to organize actions in families, neighborhoods, and communities. In the examination of disease states and routines, Royeen pointed out that routines can be used to improve health conditions such as Alzheimer's disease (Cornman-Levy, Gitlin, Corcoran, & Schinfeld, 2001) and that illness such as cancer can disrupt routines (Sanden & Huyden, 2002). Royeen stated that daily routines can provide learning opportunities for children (Fenichel, 2002) and even opined that a "strong link" seems to be present between routines and learning. Adding

to that, Royeen considered that participation in routine itself can result in positive outcomes such as learning about time (Barclay, Benelli, & Wolf, 1997), bonding with family (Segal, 2004), and making meaning.

After analyzing the literature on routines, Royeen (2010) came to the following conclusions about them:

- Routines can impact future participation in occupation.
- Routines can assist in transitioning from one activity to another.
- Routines have a role in helping families and professionals to plan daily activities.
- Routines can help with medication adherence.
- Routines seem to organize families and communities to maintain social support.
- Routines can improve health conditions and conditions can interrupt routines.
- Routines and learning seem to be connected.

Matuska and Barrett (2014) gave an overview of patterns of occupations. The authors considered that roles, habits, routines, rituals and lifestyles can be healthy or harmful. Habits were defined as specific, automatic behaviors which are performed repeatedly, relatively automatically, and with little variation. They used Clark's (2000) definition of routines as "a type of higher-order habit that involves sequencing and combining processes, procedures, steps, or occupations and provided a structure for daily life" (p. 128S). Routines were described as providing a "useful daily structure" (p. 166) and it was explained that loss of routines can be disruptive. The authors point out that management of routines can be an important component of managing one's overall health, but that it could also be damaging. Examples were given of how people with chronic illness may get into patterns of non-engagement in occupation, or long term sedentary life. New routines or habits may also be created by people with disabilities to optimize

performance. The authors pointed out that rituals are different from routines because they have strong elements of symbolism and culture and may involve a strong sense of meaning and identity. Rituals can also create a sense of order and a way to carry out roles.

**Habits, neuroscience, and sleep.** Dunn (2000) described habits from a neuroscience perspective. Dunn described habits as "patterns of human behavior" (p. 7S) and explained how habits can be complex or simple and can support routine task performance. She described how neurological thresholds are required for actions to occur, how there is a modulation of excitation and inhibition for adaptive responses to occur, and how the nervous system exhibits a system where homeostasis is sought which incurs action or inaction. The habit continuum that Dunn proposed included three states: habit impoverishment, habit utility, and habit domination. Habit impoverishment describes a state where a person does not perform habits to support life. Habit domination is a state where habits are so intrusive in a person's life as to cause problems with life satisfaction. Habit utility is a state where a person has the "ability to follow rhythms of daily life" (p. 8S).

An example of a habit in sleep may be a favored position in bed, such as lying on the left or right side, or supine or prone positions. Many people with OSA have positional sleep apnea, a condition where sleep-disordered breathing events primarily occur in the supine position. Researchers found that 50% of people with mild OSA and 19% of people with moderate OSA had fewer apnea events when lying in non-supine positions (Mador et al., 2005). Clients with positional OSA are advised to sleep on their sides and not their backs because a supine position may increase tendency towards apneas. Altering long-engrained habits such as preferred sleep positions may involve significant alteration in routines in order to attain a state of habit utility.

**Routines and older women.** Ludwig's (1998) qualitative study on routines found that older women sought less obligation and more freedom in their schedules as they aged. Therefore, though research shows that more regular routines may benefit sleep for some people, others may not welcome more structured routines. Although routines were used by the women to help with their well-being, those interviewed purposefully decreased their routines and sought more flexibility in their schedules. Ludwig described this process of "unpackaging" of their routines, which is a metaphor for how the women purposely looked at their routines and decreased them. Ludwig pointed out that interventions with older women should align with existing routines and family themes and link to well-being.

Dickie (1998), in her commentary to Ludwig's study, pointed out occupational therapy's long heritage of focusing on routines. Dickie noted that most people in the profession would consider women deliberately and contentedly decreasing their routines as surprising because tradition and research usually supports keeping and maintaining routines. Dickie explained how the loss of routine was not always a distressful situation for everyone and how person-centered approaches are required.

**Routines and children with autism.** The Centers for Disease Control reports that one in 68 children have autism (Christensen et al., 2016). Children with ASD are also at high risk of having sleep issues, with settling issues being the most commonly reported problem (Richdale & Schreck, 2009). This settling time includes the pre-sleep time. Research on children with ASD and sleep found that use of media devices prior to sleep can negatively influence sleep (Mazurek, Engelhardt, Hilgard, & Sohl, 2016).

The American Occupational Therapy Association (AOTA) (2013) has a tip sheet on bedtime routines for children to optimize sleep. The information is not specifically geared

towards children with autism but offers advice on routines, environments, and activities that would help children of all ability levels. Recommendations were also specifically made regarding sensory issues that may interfere or help with the sleep of children who may have issues with it.

Researchers explored the lived experiences of how sensory-related behaviors of children with autism affected family routines (Schaaf, Toth-Cohen, Johnson, Outten, & Benevides, 2011). Four primary caregivers were interviewed regarding the meaning and impact of their child's sensory-related behaviors on family routines that occurred inside and outside the home. Findings indicated that sensory behaviors are one factor that limited family participation in work, family, and leisure activities. Parents also used specific strategies to manage individual and family routines in ways that considered the child's sensory-related behaviors.

Bagatell (2016) looked at the routines of five families with a teenager with ASD. Maintaining family routines was important to the families as children with ASD grew into teenagers. Some routines, such as bedtime routines, were maintained even as the child with ASD went through puberty and entered the adolescent years. These types of routines were considered meaningful to families and enabled families to get things done. Families accommodated the needs of the teenager with ASD to maintain routines to help the family unit.

**Pre-sleep Routines and Occupational Therapy**

**Adults**. Regarding a study of bedtime routines in occupational therapy, one study on medication management found that older adults had routines of taking medications at certain times of the day, including during pre-sleep times (Sanders & Van Oss, 2013). No studies were found to specifically describe or investigate pre-sleep routines in adults in occupational science or therapy. One small study studied whether healthcare professionals and residents in a nursing

home should include a sleep routine protocol to help residents (Taiwade & Meriano, 2016). Other studies looked at morning routines, which usually follow sleep (Royeen, 2010; Thompson, 2017).

Taiwade and Meriano (2016) surveyed 34 health care professionals and 27 residents of a nursing home. Ninety-one percent of the professionals agreed that occupational therapy should include a sleep routine protocol in the setting to help with balance in life. Nineteen of 27 resident-participants (70.37%) were open to work with an occupational therapist to develop a sleep routine protocol. Twenty-six of 27 residents (96.29%) were willing to alter or change sleep routines. Just as routines, in general, need to be better studied in occupational therapy, pre-sleep routines also require research.

Children**.** Evans and Rodger (2011) conducted a qualitative study in Australia of 10 mothers of typically-developing children under six years old and looked at mealtime and bedtime routines and rituals of the children. Family routines were defined as the "occupations that occur in the home on a daily basis and assist in organising time, that is, they provide structure to family life" (p. 98). Family routines were characterized by communication within families where there were specific instrumental goals and tasks to accomplish. Family rituals had some symbolic features to them and used communication that centered around family identity and boundaries.

For this write-up, descriptions of findings from Evans and Rodgers' study (2011), will focus on bedtime routines. Several activities occurred prior to bedtime and were described, such as oral care, toileting, story-time, and kiss and cuddles, followed by a period of settling down and tucking the child into bed. These activities primarily occurred in the child's bedroom and bathroom. Mothers described this time as a time when they most felt like a family and as a time of emotional closeness and affection. For most, bedtime stories became meaningful rituals. On

the other hand, two of the mothers who oversaw bedtime duties alone, did not consider bedtime and story time to have the same meaning. They considered this as a time to accomplish tasks and not so much a time of more positive feelings. When two parents were home at bedtime, both parents were usually involved in the process. When there was an only child, both parents described doing the night-time routine together, while families with multiple children divided tasks. All families described specific routines around bedtime with their children. There were also descriptions of objects that provided comfort, such as teddy bears or dolls that the children slept with to help transition from wakefulness to sleep. Most commonly, children had nightlights and hallway lights. Music was also used for soothing. Routines helped mothers to orchestrate family daily activities while rituals contributed to a sense of connectedness and belonging.

**Other Disciplines on Routines Related to Sleep**

**Social rhythms.** Psychologists refer to social rhythms as daily routines. Social rhythms refer to the frequency and consistency with which daily activities occur (Moss et al., 2015). Generally, research indicates that sleep quality is affected by the frequency and regularity of daily activities (Moss et al., 2015). Moss and colleagues had 69 participants fill out the Social Rhythm Metric, a diary instrument that quantifies routine regularity. The Social Rhythm Metric was developed to quantify how regular or irregular a person's life was in terms of timing of activities (Monk, Flaherty, Frank, Hoskinson, & Kupfer, 1990). Several other measures for anxiety, dysfunctional attitudes about sleep, and a 2-week sleep diary were also collected.

The final sample from Moss and team's research (2015) included 33 people with insomnia disorder (using a commonly used diagnostic interview to determine the diagnosis) and 36 normal sleepers. The results showed that good sleepers had less variability in daily activities when compared to the insomnia group. This result was consistent with previous research where

good sleepers had more regularity in schedules when compared to poor sleepers. In this study, it was found that people with insomnia did not engage in fewer daily activities than the good sleepers. Another finding was that normal sleepers had less variability in the timing of when they woke up, when they went to bed, their first beverage and breakfast, evening snack, lunch and time of watching television. Those with insomnia had more variable rise times and bedtimes. Meals were also more variable for the insomnia group, with lunch being the most variable for this group. Meals have previously been shown to act as an important time cue in the absence of light. Researchers in this study point out that regular timing of meals may be important to help those with insomnia to align their circadian clock. This regularity of mealtime routines is usually not a part of training for CBT-I.

Other research has shown differences in outcomes of regularity in routines and sleep outcomes based on age. Dautovich, Shoji, and McCrae (2013) did an observational study using 14 consecutive-day sleep diaries for 50 younger (average age 19.88 years) and 50 older (67.81 years) adults in Florida. The study participants completed assessments on daily activities (going outside, starting work, and eating dinner) and sleep. Dautovich and colleagues (2013) found that higher levels of intraindividual variability in the timing of work and dinner activities was related to poorer sleep outcomes for younger, but not older, adults, which was a surprising finding.

A specific approach to help with social rhythms exists for people with bipolar disorder called the Interpersonal and Social Rhythm Therapy, which was developed to help regulate social circadian rhythms. The goal in this approach was to increase regularity of routines such as sleep/wake cycles, timing of meals, and timing of rest or activity (Frank, Swartz, & Boland, 2007).

**Pre-Sleep Routines**

The bedtime routines of older women who live in the community have been investigated in the past (Johnson, 1986; Johnson, 1988). The construct of bedtime routines was defined in the study as a series of activities and included mostly self-care activities: "bathing; brushing of teeth; combing, curling, or washing of hair; watching television; listening to the radio; reading; writing; eating; drinking; talking to someone; praying; having a backrub; doing relaxation exercises; and taking bedtime medication" (Johnson, 1986, p. 118). Out of the 47 women in the community, 27 stated having bedtime routines, whereas 15 reported they did not. Twenty-five of 27 who reported having routines reported that their routine was important to them. Of those who reported not to have a routine, three lived alone, while 12 lived with adult children. Nine of those who lived with their children stated that they used to have routines but abandoned them reason because it was too time-consuming and would have bothered others. This was especially in homes where there were grandchildren in the home under 3-years-old. The women who had routines had fewer subject sleep complaints than the women who said they did not have routines.

An approach to address insomnia, the pre-sleep routines approach, which would be a modified approach to CBT-I, was developed by Wickwire, Schumacher, and Clark (2009) in response for calls for improvements to current CBT-I treatments. Though CBT-I is effective, many people are unable to tolerate the sleep restriction protocols in the traditional approach. The pre-sleep routines treatment employed a strict boundary of behaviors to separate out daytime from nighttime activities and a protected sleep environment, which only allowed two activities to be associated with the bedroom (sleep and sexual activity). This approach included coming up with sleep-promoting behaviors and even a "marker" to signal a transition to bedtime. After this nighttime marker was set, only pre-determined pre-sleep behaviors were allowed after this point.

The study sample was small, with only nine participants in the study, but results were favorable in terms of treatment satisfaction and sleep quality. The subjects reported the most satisfaction with setting aside time to unwind before bed, and the least preferred component of the study as developing the pre-sleep routine. Subjects were found to have decreased insomnia severity, daytime sleepiness, and trends towards decrease in fatigue, and dysfunctional beliefs about sleep when following this approach.

**Children and Teens**

Currently, there is a groundswell of interest in teenagers and sleep possibly because of the research on the deleterious effects of sleep deprivation. Information is being disseminated among the public and in the healthcare community about the risks of short sleep, which may be a positive result of recent national initiatives to improve population sleep health such as the National Healthy Sleep Awareness Project (2017), a collaboration of the American Academy of Sleep Medicine and the Centers for Disease Control and Prevention.

The American Academy of Pediatrics (AAP) recognizes the serious threat of the consequences of chronic sleep loss on adolescents and young adults on academic success, health, and safety (Owens, 2014). Owens referred to global epidemiologic studies on adolescents and found that across studies, both younger and older teens were not getting enough sleep and called it a "chronic problem worldwide" (p. e923). Adolescents tend towards more evening-type circadian rhythms and tend to favor late-nights. Night screen use and social networking have increased markedly in the past decade and appear to negatively affect sleep health of adolescents. These pre-sleep behaviors have been a recent concern of sleep researchers and have resulted in copious research on the topic.

**Technology, screens and media use before sleep.** Studies on the topic of the effects of use of devices prior to bed and its presence in sleeping environments, have been done around the world and have found the detrimental effects on sleep of use of media prior to bedtime. Only a few studies will be highlighted.

Harbard, Allen, Trinder, and Bei (2016) studied the activities before bedtime of 146 adolescents in Australia during the last week of school and two weeks of vacation. The researchers found that a variety of activities occurred before bedtime including activities that were related to technology and those that were not. Playing videogames was associated with later bedtimes and fewer hours of sleep during school and during vacation times. Using social media was also found to be a risk factor for shorter and poorer sleep of the teens. Spending time with family was associated with earlier bedtime and longer total sleep times during school.

Researchers studied the impact of the use of electronic social media (ESM) on 3139 teenagers in the U.S. (Polos et al., 2015). The term "Sleep Time-Related Information and Communication Technology" (STRICT) was proposed to describe social media use just before bedtime and after lights went out. Respondents filled out a 38-item survey on their media use and were asked how much time was spent using ESM (e.g. cell phones/texting, Facebook/Twitter/Instagram, online gaming, etc.) after dinner time but before bedtime. The teens were also asked about their use of ESM after bedtime started. This study showed that the use of ESM was common both before and after bedtime. The use of in-bed texting was particularly common in the high school students and in girls. The use of STRICT was significantly related to insomnia, daytime sleepiness, and tendency towards eveningness among the teenagers. The use of STRICT was also related to poor academic performance, later

bedtimes, and less sleep time during school nights. The findings from this study are consistent with findings that American teenagers are chronically deprived of sleep.

Woods and Scott (2016) studied 467 Scottish teenagers (11 to 17-years-old) and the impacts of social media use and on mental health. The results showed that greater overall social media use, specifically nighttime social media use, and emotional investment in social media were related to poorer sleep quality and higher anxiety and depression levels. Results may indicate that late night social media use results in later bedtimes and poorer sleep, which then, can lead to anxiety and depression.

The more recent proliferation of the use of electronic social media and screens prior to bedtime, and finding that these types of activities prior to sleep do not promote sleep among already-sleepy teenagers, adds up to more rationale that pre-sleep routines need to be investigated.

**Sleep Effort and Routines**

Sleep effort is the voluntary effort to control sleep, which may make insomnia worse (Broomfield & Espie, 2005; Green & Hicks, 2015). Among sleep experts, sleep effort has been recognized as a relevant perpetuating factor in maintaining problematic sleep (Broomfield & Espie, 2005). People with insomnia often have heightened need to control sleep ("sleep effort"), although sleep is an "involuntary physiological process, which cannot be placed under full voluntary control" (Broomfield & Espie, 2005, p. 401). More knowledge of pre-sleep routines may help to understand what more typical conditions look like to allow for people to just sleep, without unhealthy effort to alter routines, which may make matters worse.

**Summary of Literature Review**

Sleep is an important occupation in which all humans must engage. Biologically, humans are made to rest and sleep, though they may make attempts to thwart that biological need. Without sleep, people are not as healthy as they could be and do not function as well as they could. Sleep problems are a global issue with the most common sleep issues being insomnia and sleep apnea.

Efficacious treatments for insomnia are available, such as multi-component CBT-I. Recently, occupational therapists have started to be trained in CBT-I techniques and have demonstrated promise in helping people with insomnia (Eakman et al., 2017). Newer approaches to address insomnia, such as the pre-sleep routine approach, and the Interpersonal and Social Rhythm Therapy, have been developed by disciplines outside of occupational therapy to help people with sleep, and both focus on routines. Sleep apnea also has efficacious treatment in the form of the CPAP machine. Incorporation of the CPAP into daily routines can also be a challenge as evidenced by poor adherence rates. To increase adherence to CPAP, a focus on helping with incorporating the device into daily routines may be helpful.

The relatively recent proliferation of social media, and advancements in technology, has resulted in many studies on teenagers and their sleep and media use prior to and during sleep. The high rates of autism in children and the aging population should also be a considered when recognizing that people with autism and older adults are at higher risk of sleep issues than the general population.

Occupational therapists have a long history of helping people with routines and habits. Non-pharmacological approaches to help people with sleep use a focus on routines. Descriptive research on routines in occupational therapy are scant and research on pre-sleep routines are non-

existent in the profession. Royeen (2010) also pointed out that though things are known about routines, we know very little about it in terms of its actual description and construct. She also found the types of research done on routines to be limiting and constraining. Thus, she embarked on a unique qualitative study of routines using graphic methods, which this study will also incorporate.

## Section 3: Methods

### Project Design and Philosophical Assumptions

In this qualitative study using graphic and interview methods, a theoretical assumption of this study was that living organisms are open systems and that entities can be understood only by looking at it as a whole (Cole & Tufano, 2008). A general principle with open systems is that a change in one part of the entity will affect the whole.

Grounded theory methods were used in this qualitative study. A grounded theory approach consists of a systematic yet flexible approach to data collection and analysis (Charmaz, 2014). Data analysis began immediately after the first data was collected; insights produced from data analysis was used to refine data collection methods. A comparative approach is central to analysis in grounded theory, usually progressing from comparisons of more extreme to less extreme differences in the data (Charmaz, 2014), so this approach was used. This research was exploratory and sought to describe understandings constructed or produced by the participants. Since the goal of this study was to describe the construct of pre-sleep routines in adults, this approach was well-suited.

As Dickie (1998), who was describing a clinical application of a qualitative study on the routines of older women, pointed out, qualitative studies "challenge our assumptions and beliefs about occupation and human development by illustrating the particular--the usual and unusual,

the expected and unexpected" (p. 177). Dickie further described how qualitative studies help readers to be "confronted by our own stereotypes as well as by the limitations of normative data" (p. 177). This would be especially valuable in a study of routines, which has been described as a construct that has had a history of inconsistency in its use and definition in the occupational therapy profession (Luebben & Royeen, 2007). Another benefit to qualitative research, when compared to typical quantitative methods, is that insights and "new pieces to the research puzzle" or the ability to "conjure entire new puzzles" can occur during the data collection and analysis process (Charmaz, 2014, p. 25).

The role of the investigator in this approach to analysis was to keep an open mind to allow the data to speak and lead the direction of the research throughout the process. The investigator's role in data collection was to guide the participants to reveal their conceptualizations of pre-sleep routines in order to add richness to the collected data. Using both graphic and interview methods to cross-check the data helped to increase the trustworthiness of the produced theoretical descriptions. An assumption in this study was that graphic methods would be a useful mode of expression that helped participants to illuminate their personal ideas regarding a research focus. Research has shown that drawings can be a useful adjunct to providing rich data when combined with traditional approaches (Cheung, Saini, & Smith, 2016).

**Setting**

The participants were 16 community-dwelling adults between the ages of 23 and 60 who live in California. A convenience sample of both males and females were recruited for this study by the researcher from personal connections and contacts. The data was collected from the participants in a face-to-face meeting with the investigator.

**Inclusion Criteria**

Participants who were included in this study were adults between the ages of 18 and 60 who lived in the community. This age range of adults between the ages of 18 to 60 years-old was chosen to correlate with age ranges used by the American Academy of Sleep Medicine (AASM) to determine what constitutes an "adult," based on their sleep recommendations (Watson et al., 2015). The participants were to be fluent in the English language, live in California, be cognitively intact, be able to understand and follow directions, live independently, and not to have children that they are responsible to care for in the home. Other inclusion criteria included adequate upper extremity function to draw simple pictures using a pencil, not diagnosed with a chronic disability or illness, ability to verbalize audible answers to questions, and adequate vision to draw pictures. Only people considered "good sleepers," as determined by scoring on the PSQI (Buysse et al., 1989), were included in the study.

The PSQI was filled out by the potential study participants to correctly identify them as either good sleepers or not. The PSQI has 19 self-rated items, which assesses sleep quality and issues over a one-month period. The PSQI is widely used in research and clinical practice (Green & Hicks, 2015) and measures seven components of sleep (sleep quality, latency, duration, efficiency, and disturbances, use of sleep medications, daytime dysfunction) that differentiate poor sleepers from good ones. Those who scored five or below on the PSQI met inclusion criteria for this study as this score is associated with good quality sleep (Buysee et al., 1989).

**Exclusion Criteria**

Those who were not cognitively intact, unable to follow directions or draw simple pictures, lived in institutions, under hospice or palliative care, required caregivers for their care,

cared for children in the home, were excluded from the study. Persons with diagnosed disabilities or chronic illness, not conversationally fluent in the English language were excluded. People with severe visual impairment or were blind, unable to speak audibly, or unable to understand or clearly express spoken language were also excluded. People who scored six and above (up to 21) on the PSQI were excluded from the study. Those who scored six and above on the PSQI were notified about the results of the PSQI and were referred to see their primary care provider for assessment for a possible sleep issue and were provided resources to obtain help as needed.

**Recruitment Procedures**

A convenience sample of acquaintances of the investigator, as well as their contacts, were approached to participate in the study. The people were contacted in person, through a phone call, or via electronic mail. If a person reported interest in participating in the study, he or she filled out the consent form and PSQI. Once the PSQI was scored, and that person met the cut-off score for good sleep, the person was contacted to participate in the full study. Those who scored on the PSQI as having a possible sleep issue were instructed to notify their primary care providers and were informed that they did not meet to criteria to participate in this study. They were also provided a website supported by the American Academy of Sleep Medicine to learn more about sleep. The following demographic data was collected from each study participant: age, gender, race/ethnic background, employment status, educational level, and whether they were diagnosed with a sleep issue. Other demographic information collected was gathered from the PSQI: usual bed time, number of minutes of sleep, wake-up time, hours of sleep per night, and whether they have a bed partner or roommate.

**Project Methods**

Data c**ollection.** Generally, data collection and analysis used a four-phase cycle like that used by Royeen (2010) in her study of morning routines using graphic methods. The phases were 1) sampling, 2) data collection, 3) data analysis and 4) generation of theory. Active analysis for this study began immediately following initial data collection. Data collection and analysis overlapped throughout the process, which helped to bring emerging analytical insights to refine data collection.

During the sampling phase, the language used to collect the data was tested and clarified through their use with two people. One person was well-known, while one was a new acquaintance of the principal investigator. These two people were not considered study participants. After the methods for collection were clarified during the sampling phase, the data were gathered from study participants.

Once the PSQI was scored, eligible study candidates were contacted. These study candidates were given the option to draw the picture of the pre-sleep routine at home or in a meeting with the investigator. Each participant was asked to draw pictures of their pre-sleep routines using a pencil on a white, 11 in. x 14 in., heavy weight, 100 lb., paper. Like Royeen's (2010, p. 35) instructions to her study participants regarding their morning routines, the verbal instructions were the following: "Using pictures and on this paper, tell the story of what you do before you go to bed at night." Those who chose to draw their pictures at home were given the paper and two pencils with erasers on it in a large envelope to take home. For the home drawers, instructions were written on a sticky-note, which was attached to the paper, so that they would not forget the instructions. Whether they drew the pictures at home or not, participants were allowed to take as long as they wished to draw the pictures. All study participants were

instructed that the purpose of the study was not to judge or critique their artwork but to give them another way to give information. All participants were aware that an interview would follow after the drawings were completed.

For those who drew their pictures at home, an appointment was made, at a quiet location of convenience, to conduct the interviews. The study participants held onto their drawings until the time of the interviews, and the drawings were not available for perusal and analysis prior to the interviews. For those who chose to draw the picture and have the interview conducted at the same time, interviews were conducted immediately after the drawings were completed. After they drew the pictures, semi-structured interviews using both close and open-ended questions by the researcher was completed. See Appendix B for set-up, instructions and sample interview questions. Informational, intensive, and investigative interviewing is frequently used when collecting qualitative data (Charmaz, 2014). All three types of interviewing techniques were used, as needed, to gather information. Informational interviewing was primarily used for participants to accurately describe their pictures, chronologies, and to give clarification.

The interviews were audiotaped and transcribed by the primary investigator soon after the interviews were conducted. The original drawings were kept by the investigator, and digital photographs were taken of the drawings to keep as a back-up. Physical photocopies of the drawings were also obtained to have a back-up to the original. All data were kept in a secured physical (locked file) and digital location that were accessible by key or password by the investigator.

Two electronic and one bound field journal were used to keep of record of observation notes. One digital journal and one bound journal did not have a pre-formed outline but was just a blank page for the investigator to write down thoughts, questions, and ideas as they arose

throughout the research process. Notes included comments on the data collection process, thoughts of the researcher about the research question during data collection, insights, frustrations, or any other pertinent information. The notes in the bound journal were typed up and combined with the digital journal. The third journal, which had a digital template of prompts, was used to remind the investigator to consider and address points such as thoughts on reflexivity, methods and logistics (see Appendix C). This journal with the prompts also included information such as length of interviews, date, time and location of interviews, and particularly intriguing statements by the participant. This field journal template was filled out for each study participant the day of or day after the interview was conducted. All observation journals and notes were included as a secondary form of data available for analysis.

Data a**nalysis.** Analysis of the data began immediately after the first data collection session and continued until theoretical saturation was reached. A software coding program by Researchware, called HyperRESEARCH, was used to assist in analysis of the data. Researchware's HyperTRANSCRIBE was used to transcribe the data.

Charmaz (2014) described two phases in the coding of data in grounded theory, which was used in this study and also included this type of coding with drawn data: 1) an initial phase where each picture, frame, location and object in the pictures were named in a text document and observation notes and transcribed interview data were labeled, 2) a more focused analysis of the visual and interview data using coding software was used to identify and sort the most important or frequent initial codes.

Similar to Royeen's (2010) study, and like standard terms used when discussing comic strips, each drawing represented a "frame," while the collection of frames was considered a "strip." The strip was considered the routine, while each frame was considered an activity in that

routine. The number of frames/activities was counted, as was the number of objects used, and locations/environments. If people wrote words, these were considered. The data was analyzed by each frame, and each type of activity was chunked into naturally-occurring categories. Sequencing of activities was noted, if they were present.

A coding sheet (see Appendix D) was created based on the information above as well as other areas of interest that arose during the collection of data. This coding sheet was used to enter information and to decode the drawn information into words and numbers. Each participant drawing had its own coding sheet. After the data from the drawings were coded onto the sheets by hand, the investigator listened to the audiotapes two times with the coding sheet in front of her to confirm accuracy of the drawn and interview data. The transcriptions were also analyzed to ensure that information transferred onto the form was accurate. Any new or clarifying information from the interviews were added to this coding sheet by hand. After the drawn and interview data were combined, the information was typed into digital format and coded using HyperRESEARCH.

Though counter to the ideals of grounded theory, where there are usually no preconceived ideas on coding or categories (Charmaz, 2014), there were pre-conceived categories used, based on Royeen's (2010) research, such as the presence of types of frames (activities), objects, or locations, and the sequencing of events in the drawings. Similarly, these categories were used to code the observation record and interview data. Discovered concepts differing from those used by Royeen were added to the coding scheme.

As analysis progresses, it shifted from use of the initial (open) coding scheme, which was a listing of highly evident and concrete concepts, to a broader, axial, and more explanatory set of codes that supported theoretical description of the dynamics of the pre-sleep routine system. As

broader and more abstract themes arose, the raw data was investigated again to ensure accuracy of interpretations. The sequence of coding work was constructed by the researcher along a path that moved from maximum contrast between examined participants, data types, and coding categories, to more examination of subtler differences. Analysis concluded with a search for disconfirming instances in the data regarding the emerging theoretical description, in order to refine its final content.

Summary memos were produced periodically, from early in the data collection and analysis process until the end, supporting the researcher's planning, procedures, and emerging theoretical description of pre-sleep routines. These summaries were shared with the faculty mentor. Initially, the memos included comments on data collection or analysis procedure refinements. Towards the end of the process, memos approached a format resembling draft reports of the final theory. Visual models were produced to represent emergent theories, and a scene from nature was ultimately chosen to represent pre-sleep routines.

Based on recommendations by Krefting (1991), the field journals (Appendix C) and summary memos incorporated several topics in it to ensure the trustworthiness of the data. Reflexivity, which refers to the assessment of the influence of the investigator on the research process was used throughout. Also, information on the logistics of the study, methods log, and personal thoughts, ideas and hypotheses, other strategies were used to further ensure the trustworthiness of the data. Examination of the data with the faculty mentor, coding and re-coding of the data, and thorough descriptions of the research methods occurred (Krefting, 1991). Efforts were made to ensure that auditability was possible so that the progression of events can be readily followed. For example, the raw data, field notes, summaries, hypotheses, themes,

process notes, and various iterations of instruments used with reasons for changes made, if needed, were clearly documented so that the information can be readily retrievable.

**Locations and Length of Interviews**

Five interviews were held at the participants' place of work in a private office or space, six occurred in the interviewer's home, two at their parents' home, one at their home, one at a quiet room at an exercise club, one at the library. There were no pressures to limit the time as interviews were conducted before or after work hours, or during work breaks, to accommodate the participants. One interview was completed with each study participant. Interviews lasted from 7 minutes to 23 minutes. An Olympus digital voice recorder (WS-853) was used to record the interviews. The average time for the interviews was 13.75 minutes, and total interview time was 220 minutes.

**Drawings**

While three people elected to draw their pictures at home, thirteen participants chose to draw their pictures with the interviewer, the primary investigator (PI), present. The interviewer excused herself to an adjacent area so that participants did not feel they were being monitored or watched while drawing the pictures. The drawing times were not timed using a timer, but it was monitored in general. On average people took an estimated 20 minutes to draw their pictures. The time to draw the pictures ranged from three minutes to about 120 minutes. The two people who took the longest amount of time to draw the pictures (45 minutes and 120 minutes) drew their pictures at home. The person who took about 120 minutes stated that she did not draw the pictures in one sitting, but she drew the pictures as she went about her pre-sleep activities. All the other people drew their pictures in one sitting. Nine people who drew their pictures with the

PI present took 10 minutes or less to draw them. All people knew that an interview would follow the time after the pictures were drawn.

## Description of Study Participants

**Demographics.** Thirty people filled out informed consent forms as approved by the EKU IRB (see Appendix A for IRB Approval and Revision Approval) to participate in the survey and were verbally notified of the criteria for inclusion prior to filling out the forms. Nine people did not meet the PSQI cut-off scores as good sleepers and were notified via electronic mail or in person that they did not meet criteria to participate. Five of those people met criteria to participate but were not included as they had similar demographic background to those already selected to participate.

The study participants were recruited through convenience sampling but appeared to represent a broad spectrum of adults who live in the San Francisco Bay Area of California. The 16 participants included nine females, seven males, six single, and 10 married people (none to each other), with one married person who did not live with her spouse. Six people were of Asian descent, five were White, two Asian-White mix, two Hispanic, one was Black. Eleven of the participants worked full-time, with one who worked the night shift, and 10 who worked customary day-time hours. One person worked part-time, one was a college student with several part-time jobs, one was retired, one semi-retired, one was unemployed. For the highest level of education, three graduated from high school, two had an associate degree, six had a bachelor's degree, four had a master's, and one had a doctorate. The average PSQI was a score of 3, and scores ranged from 1 to 5. Nine people had bed partners, and seven slept alone. Start of bedtimes ranged from 9:00 p.m. to 1:00 a.m. One person's bedtime was 10:00 a.m. Morning wake-up time was also variable and ranged from 4:45 a.m. to 8:30 a.m., with one person waking

at 6:00 p.m. The average consolidated sleep time was 7.5 hours and ranged from 7 to 9 hours. See Table 1, Demographic and Sleep Characteristics of Participants, which lists each participant with their pseudonyms.

**Relationship to primary investigator and incentives.** Six people were current or former co-workers, two were friends, one was a neighbor, one was a family member, two were casual acquaintances, and three were unknown to the PI and referred by others. No incentives or rewards were promised or provided to study participants. People participated in the study by their own free will and only with a desire to help the PI and to contribute to research. Small unexpected thank-you gifts were given to participants after the interviews.

## Ethical Considerations

There were minimal risks to the research participants. A possible risk was that through the research process, the investigator discovered that a study candidate may have sleep issues, which may have caused distress to the person(s). Study candidates who did not meet the cut-off for being good sleepers as determined by the PSQI instructed to consult with their primary care provider. If they wanted, they were also provided educational resources or referrals to obtain appropriate assistance.

Because the subjects were be recruited using a convenience sample of possible acquaintances, one ethical consideration included the fact that some of the research participants may have known each other and may be able to identify each other in the later write-ups of the report. No names are attached to the participants, and the investigator did not divulge who participated in the study. Efforts were made to recruit subjects from a variety of settings.

Since there was less than minimal risk to participants and this study was on individual characteristics or behavior, which met one of nine criteria according to federal regulations

(Galvez, Rose, Hagemann, & Aburto, 2017), an expedited review was sought from the Eastern Kentucky University (EKU) Institutional Review Board (IRB) for approval. The EKU IRB approved the use of human subjects on February 1, 2018 (see Appendix A for approval documents). After this approval was received, the recruitment of subjects began.

### Timeline of Project Procedures

The sampling phase commenced on February 18, 2018 when the first pilot subject drew his picture and was interviewed. The second pilot subject drew her picture and was interviewed on March 7, 2018. These two people, who were not be part of the study, individually went through the steps of data collection including filling out the forms, drawing the pictures, and being interviewed using a recorder. Feedback sought from those two people and language was clarified to ensure a smooth process and optimal conditions for data collection. Photos were taken of the drawings, and the audio-recordings were transcribed to ensure that all the equipment, procedures, and programs were working properly for transcription and analysis.

In the meantime, a list of potential study participants was compiled and people were contacted to fill out the consent forms and the PSQI. The first study participant drew her pictures and was interviewed on March 19, 2018, and the last participant was interviewed on May 1, 2018. Analysis of the data occurred throughout the process, but a more focused analysis of the graphic and interview data using the coding program occurred from May to July 2018. Theory was generated throughout the process but occurred in earnest in June and July of 2018.

## Section 4: Results and Discussion

### Introduction

Results of whether project objectives were met, description of study participants and drawn data will be described. Broad themes regarding pre-sleep routines that were identified

will be explained. Theories that were generated regarding pre-sleep routines will be reviewed and a discussion section with an analogy comparing pre-sleep to a visual of nature will follow. In addition, strengths and limitations of the study, implications for occupational therapy practice, and future research ideas, and a summary section will be presented.

## Results of Evaluation of Project Objective

The project objective was to answer this question: What are the pre-sleep routines of normal adult sleepers? The project objective was met, as this study arrived at several descriptions of pre-sleep routines from this sample of adults.

## Results

**Drawn data.** Since graphic data is not a typical means of inquiry in qualitative research, a description of the data seems warranted to give insight into its use.

***Description of first thing people drew and did***. Each person drew a picture of a different thing in their first picture. The first picture that people drew coincided with the first thing people did in their pre-sleep routine.

***Last thing people drew***. Although beginning activities were highly variable between people, most people ended the pre-sleep routine the same way (falling asleep). The last thing that 12 of 16 people drew in their pictures was a bed with a person falling asleep or sleeping, a face of a person asleep as indicated by "zzz" written next to it, the bedding itself, or a clock with "zzz" written. The last thing that three people drew were a pile of laundry and clothes on a person. Two drawings were not clearly sequenced, so the last picture in the drawing was not evident.

***Clarity of drawings***. Twelve of the drawings were clearly sequenced and read like a graphic novel or comic strip. Three pictures (two by those who enjoyed drawing and one who

did not), were not clearly sequenced while one was somewhat clearly sequenced in terms of activities performed. Ten pictures were in order from left to right, 12 went from top to bottom, four had arrows drawn from one scene to the next, two had numbered frames, two had each frame (activity) with a time indicated. The clarity with which the drawn activities depicted pre-sleep routines was similar to what Royeen (2010) found in her study of morning routines using graphical methods.

***Words***. Two people used no words in their drawings and did not have clear sequencing of the routine. Fourteen used words to varying degrees. Seven people used words to describe objects in the pictures. Four people used "Zzz" to symbolize themselves sleeping. Two people wrote words to describe each frame, two people labelled the rooms, two indicated the time of day in the frames. One person used more words than pictures.

***Process of drawing***. Seven people indicated that they were not especially good at drawing, but they expressed that they were fine with doing the activity. Six people (two men, four women) expressed that they had creative tendencies and enjoyed the process of drawing. Four people, who were not the ones who stated they were artistic, said that drawing the pictures helped them to think about their pre-sleep routines, and it taught them something about themselves. Two people said that the drawings represented their routine. Not one of the potential study candidates approached declined to complete consent forms or participate in the study based on their drawing ability. The drawing abilities of the 16 participants were not known to the PI prior to their participation in the study.

**Defining "pre-sleep routines."**

***Time***. The time in which pre-sleep routines occurred were mentioned by all study participants when analyzing the drawn and interview data. Pre-sleep routines mean different

things to people in terms of time. Some people described their pre-sleep routines from the time they got home from work, which may have been over 4.5 hours of time while others only focused on the time within the 15 to 30 minutes before going to bed.

Some people seem to think that "having a regular routine" meant doing things at the same time every day. When the interview first started, Daniel explained that he did not have a pre-sleep routine. Towards the end of the interview, he realized that he had a regular sequence of particular activities, something he did not know about himself.

PI: So, what are some things you learned about your pre-sleep routine?

Daniel: That I have one. (Laughing). I didn't really think of myself as having a routine! Umm, but, yeah, I guess I do. I think of routines as being so much more structured.

It seems Daniel changed his definition of what it means to have a routine in the course of the interview itself.

***Sequence.*** When describing their pre-sleep routines, every person described a sequence in which events occurred. People seemed to describe their routine as routine when what they did in the beginning of the routine and at the end was consistent. It seems some of the imperative occupations ("must-dos," described below) could go out of sequence a bit between the start and finish of the routine for people to still consider a pre-sleep routine to be static. In addition, the occupational electives ("may-dos," described below) could be dropped for people to consider their routines as stable.

***Space.*** People described their pre-sleep routine in terms of the space in which pre-sleep routines occurred. In this cohort, unless they were on vacation or travelling, these adults had one stable location in which they performed their pre-sleep routines, or where they slept every night. They all had roofs over their heads and protection from the elements, Western-style beds in

which they slept, and adequate bedding materials. Nobody switched from home to home or described an unstable living situation. People also described sharing spaces with the same people day after day. Different people were not described as entering or leaving their homes regularly. See section on "Environments" below on more specific descriptions of spaces in which pre-sleep routines occurred.

**Pre-sleep routine characteristics.**

***Activity types.*** There were a large variety of activities which were described with 60 different types of activities drawn or discussed in the interviews. According to the combined drawn and interview data, there were an average of eight activities that occurred during the pre-sleep routine. The combined data revealed a range of five to 13 activities that were performed in the pre-sleep period.

Of all the activities that people mentioned performing during the pre-sleep time, 22 were basic self-care or activities of living (ADL), 14 were instrumental ADL (IADL), 11 activities involved technology or screens, seven were leisure activities, and eight had to do with communication or socialization.

*Self-care*. Brushing teeth (12 people), using the toilet (9 people), and changing clothes (8 people), were the most commonly mentioned activities that occurred during the pre-sleep time. Showering and going to bed were mentioned by six people each, drinking water was mentioned by three people, and face care/washing the face were mentioned by four. Other self-care activities performed included clearing out phlegm from the throat, intimacy with a spouse, drinking coffee, and putting on lip balm. These activities seem so well-embedded into some people's routines that they did not always separate them out from each other, or they did not mention them at first. For example, Ashley said she performed "brushing my teeth, all that

stuff," without going into too much detail, until asked. Not all study participants mentioned basic self-care when describing their pre-sleep routines while others focused primarily on self-care when describing pre-sleep routines.

*Instrumental ADL (IADL).* Six people mentioned charging the phone as an IADL that they performed prior to going to sleep. The next most commonly mentioned occupations were washing dishes and tidying up. Other IADL included cleaning up the kitchen, using a night guard for teeth grinding, getting lunch ready for the next day, and taking medications.

*Technology and screens*. Twelve people engaged in some type of screen or technology-related activities during the pre-sleep period. The types of screen and technology activities that occurred during the pre-sleep time included watching television (TV) (in bed or living room, 6 people), browsing on the phone (3 people), using a tablet, such as an i-Pad, or computer, and playing videogames.

*Leisure*. Eleven people reported engagement in leisure occupations during the pre-sleep time. Reading in bed and watching TV or movies were mentioned by six people and were the most frequently mentioned leisure activities performed in the pre-sleep period. Listening to music and exercising were mentioned three times each. Unique leisure occupations occurring during the pre-sleep time included singing in the shower and drawing. Jessica made it clear that there was no place for work-type reading or phone-use during the pre-sleep period: "not work-related things. I don't do any of that in bed." She described reading materials only for her own pleasure.

*Communication/Socialization.* Six people mentioned performing communication with others during the pre-sleep routine. The types of communication included looking at the phone for messages, saying "good night" to pets, spouses or family members, hanging out with friends,

catching up with loved ones, and praying. Amanda said, that during her coffee-time before sleep, she and her husband, "sit there and talk for a bit and whatever we have in mind, maybe what we're planning to do the next day, or within that week, or whatnot, or what happened during the day, just to catch up there."

Chris, who participates in online gaming with friends said,

> A lot of my friends work full-time and, so you know, we're not going to each other's houses on a weekday and hang out, and what-not. Whereas, on a videogame, it's kind of like a way where we can all hang out even though we have work or something the next day. So, I mean, it's just a way to socialize more when we're not able to just drive all the way over to each other's house and go do something.

**Unique characteristics of pre-sleep activities.**

***Must-dos.*** There were definite activities that people had to do daily and others that could be dropped off the list. Seventeen varied activities made up the list of must-dos. People dropped may-dos quickly and without much thought. Some must-dos were so important to Petra that she went out of her way to continue doing them even when ill, or when on vacation.

All study participants talked about at least one must-do activity. The most common must-do was oral care with 13 people mentioning it as something they had to do during the pre-sleep time. Eight people mentioned showering and using the toilet as important occupational imperatives in the pre-sleep time. Four people each mentioned setting water next to the bed and washing the face as must-dos. Some people were emphatic about their must-dos. Kim said that she, "must clean my (her) kitchen before to go to bed. I never [emphasis added] leave any dish, any cup, anything!" This task was so important to her that if she did not do it, she said she could not sleep. The two dog-owners discussed the importance of taking the dog out as an important

part of the pre-sleep routine, “If I don't walk the dog, I'll wind up having this wet nose on my face about two in the morning when she's ready to go outside.”

***May-dos.*** People also talked about occupations as electives or as “may-dos.” The most common activity that could be dropped was reading and watching TV. Other may-dos were using an essential oil diffuser, tidying the house, or browsing on the phone. One person’s must-do was another’s may-do. While Daniel said that he sometimes went to bed in his clothes, Andrew said, “I’ve never understood someone going straight to sleep in clothes that they just had that day. So, I...that's like, a definite ‘must.’"

***Beginning***. All study participants indicated a beginning to their pre-sleep routine. There were 14 different ways people started their pre-sleep routines: five involved basic ADL (e.g. oral care, toileting, drinking water), two were feelings in the body (tiredness and sleepiness), two involved taking dogs outside, and the other categories included things such as time on the clock, communication with others, locking the front door, starting something (video games), ending something (turning off the TV), and putting keys into a bowl after a work shift. Nine people reported more than one start to the routine. For example, Karen mentioned three possible starts: a feeling of sleepiness, the time (followed by a thought), and washing her face.

Most people, like Jessica, described clear beginnings to the pre-sleep routine.

> Well, the start time is like having my face clean, like my bathroom, you know the bathroom routine like brushing my teeth, washing my face. That's my like, ‘start.’ That's when I'm like, ‘I'm starting to get ready for bed now.’”

Ashley said, “The beginning, I count it more towards after we walk the dog, and when I start locking the door, 'cuz that's when I know, ‘I'm going to bed.’ So, that's my starting point.”

Lisa reported, “That is the beginning of it...it's when I go in the bathroom, brush my teeth...” Amanda said, “It does have a beginning. Usually, I always, I don't know, but for some reason, I always want to prepare my clothes first. Yeah, so it's always that…” James said, “I'll say the beginning of it is the dog-walk.”

Chris was very clear on when he started his pre-sleep routine.

> That would definitely be once I start playing video games. Because once I start playing video games, that's when everyone (housemates) else goes do their own thing. So, I'm inside my room, and once I start playing, that's when it's like, "Okay, this is the end of the night." After this, it's time to get ready for bed.

David considered the time of the night as the beginning of his pre-sleep routine: “like I said on the questionnaire, about 10, or 10:30 is when I start prepping for bed.” Petra has a long-standing practice of considering that turning off the TV signals the start of the pre-sleep routine: “I always turn the TV off because I think once you turn the TV off it's like, ‘It's time to go to sleep.’”

Some people, like Andrew, were not so clear about the beginning of the pre-sleep routine, but they relied on feelings of tiredness or sleepiness that determined when the pre-sleep routine started.

> I think the beginning would be, I don't know, just when we realize it's late, or we're tired...umm, cuz sometimes we sleep really early. Maybe as early as 7 or 8:00. Other times, we're up til like 2, so it just really depends on how we're feeling that day, and what we're doing the following day.

***End of pre-sleep.*** Nine people described the end of their pre-sleep routines. Like five other participants, Ashley stated when describing the end to her pre-sleep routine, “the end is

definitely when I fall asleep. The other three people said that the end of the pre-sleep routine was the time of day, going to bed, and turning off the light. When asked about the end of the pre-sleep routine, Amanda said, "…my end would be just falling sleep."

***Last pre-sleep activity.*** The last pre-sleep activity was categorized separately from what participants considered to be the end of the routine. Four people said that their last activity before falling asleep was reading a book in bed, three people mentioned connecting with spouses by kissing them "good night," cuddling or having "intimacy." Three others considered brushing their teeth as the last activity before falling asleep. Out of the 12 activities considered as the final activities reported, seven involved possible use of technology and/or screens. Counted in this seven was the use of devices such as Kindle or a tablet (i-Pad).

***Activities to help with sleep***. People in this study do things to improve sleep initiation and maintenance. For example, six people mentioned using the toilet to void prior to sleep and four people talked about keeping a glass of water next to the bed, if needed, if a wake-up occurred. Others reported setting auto-shut off timers on TVs if they fall asleep with the TV on, changing phone settings, and taking the dog outside to void so as not to be awoken with a "wet nose" (of the dog) in the middle of the night. Lisa, who is going through menopause, said she ensures she is lightly dressed when sleeping just in case she gets over-heated. Some people also did things to help their spouses to improve sleep initiation. Ashley occasionally used an aromatherapy machine to help her husband, who has anxiety and sleep problems: "I might diffuse some essential oils, which is just mainly lavender oil, and then...mostly for my husband, though. But, also a mix of, called 'Stressed out' for him!" Lisa summed up the prime importance of her activities: "I want to do everything I can *not* [emphasis added] to wake up."

***Preparing for the next day.*** Seven participants mentioned performing particular activities to prepare for the next day. Three people, who did not have regular full-time employment, emphasized the importance of changing the timing of sleep based on the next day's events. Currently unemployed, Andrew stated, "Yeah, so, the next day usually affects, so if I have to get up way early, let's say like 5 am, or 6 am, I'll add in like a shower, so I'll shower the night before, rather than in the morning." Chris, who works part-time and has a varied day schedule, said he delayed his sleep time based on the next day's activities.

Though he changed his mind later about having a routine, Daniel, a college student who has five part-time jobs said,

> I wouldn't really say that I don't 'get ready for bed' so much. It really...my schedule varies so much from day to day. That, one day I might have to get up at 6 a.m., the next day I won't have to get up until noon. So...pre-sleep routine, is heavily dependent on what's happening the next day. So, like for example, last night, I had almost no routine, I was at my friend's house playing videogames until 3:00 a.m., cuz I didn't have to get up early today. Whereas, yesterday, I had to get up early, so the night before, showered, got ready, was in bed by a decent time.

Two full-time employed people mentioned getting lunch ready for the next day, three people (all employed full-time in one primary job) reported setting their clothes out for the next day, and others mentioned setting alarm clocks. Reasons given for preparing for the next day included maximizing sleep time, increasing efficiency in the morning and as Lisa stated, "I want everything ready to go." Amanda also reported she gets her clothes and lunch ready for the next day because, "I don't have to be in a rush" in the morning.

**Staying the course or making changes.**

***Automatic pilot.*** Eleven participants discussed the automaticity of performing activities prior to sleep-time, whether they were male, female, younger, older, married, or single. One participant Ashley, a 30-year-old married woman said, “I just go and do it,” while Chris, a 28-year-old single man said, “this is just what I do, and so I don't really feel anything particular other than it's my normal routine like...you know, all my hanging out is done, this is my time. Like, you know, this is what I do before I go to bed.” David, a 60-year-old, said, “It's a routine for me, and it's almost automatic that it occurs. I don't think about it. I just do it.” Thirty years-old and married, Michael said, “I haven't really thought about what I spend time on...just kind of see things and do things until I end up in bed.” People, like James, also did not put much thought into what they do before they go to bed until they were queried about it.

> I haven't given the level of reflection of "This is my sleep routine," until you asked me to think about it! But, it was...I can recognize when I'm doing it, or when you ask me to think about it. But, I probably made adjustment to my sleep routine, but the only thing I had consciously done was try to "unplug" from, you know, those illuminated devices.

***Purposefully changing sleep routines***. Though most people in this study appeared to go through their current pre-sleep routine without much thought, those same people also mentioned purposefully making changes to their pre-sleep routines to accommodate life changes such as James quoted above, who decided to not use illuminated devices before bed-time. Michael, the night-shift worker, who says he does things without thinking, “until I end up in bed,” also explained making decisions to alter routines when he took on the new night-shift schedule. Emily said that after she went away to college and moved back home with her parents, she decided to start announcing to her parents that she was going to bed so that they would not enter

her room once she got on the path to go to sleep. Other examples included James, when he became a new dog-owner, when he had to take the dog for a walk just prior to sleep, and Lisa, undergoing menopause who wears lighter clothing during sleep to accommodate difficulties with temperature regulation.

The participants also discussed knowledge of situations during the pre-sleep time that hinder or help sleep and purposefully avoid or participate in activities. At some point, people reported making deliberate choices in what to include and not include in their pre-sleep routines. For example, Michael said he decided to avoid overstimulating activities, while Matt made choices to not bring screen-type activities into the sleep environment. At some time in her life, Ashley made it a point to avoid spending too much time on any one particular activity in the pre-sleep routine. She said, "I just try to keep is as simple as possible. I think that's it for me! Like, I don't want it to be dragging on." It appears that once a decision such as keeping the pre-sleep time as short as possible, to avoid or perform certain activities, people followed through with their pre-sleep routines without much thought.

**Knowledge and awareness of "good sleep hygiene" tips.** Thirteen participants brought up awareness of standard good sleep hygiene habits. It is unclear where people learned those sleep hygiene tips. Once people learned behaviors and environments that promoted sleep, they tended to follow them, such as Michael who learned the importance of keeping a stable schedule and avoiding overstimulating activities for good sleep. Jessica, the 27-year-old single woman agreed.

> I think I like to have consistent habits, and it throws me off if I vary a lot, like if I'm always going to bed at a different time every night, or if I skip like brushing my teeth or

> washing my face, it throws me off the next day. So, this is like, I think this is optimal for like waking up feeling rested and ready to start my work day.

Kim stated, “I feel like this is the ‘daily routine.’ You know, the work, the ‘what you should do.’" She did not say how or why she felt it was her “work” and that she “should” follow a consistent routine, but she did.

> James made a choice to leave screens and work outside of his bedroom.
>
> I made the decision sometime back about...reduce the amount of electronic devices and i-Pads, and what else? Computers and things. I made a decision about it a year ago, I suppose it was, where I set up a table with computers, and most of my books, or articles when I'm working on a specific paper. So, I go into the other room and I type on that.

Other people discussed awareness of typically reported habits that may disrupt sleep, but they did not necessarily follow them. For example, Amanda has a daily habit of drinking a cup of coffee with her husband before bedtime, and she acknowledged that, “I know a lot of people can't drink coffee before a certain amount of hours. But, I'm fine with a regular coffee, a non-decaf.” When he was a college student, Chris heard that, "Oh, you should not watch TV before you going to bed, you get a lot less rest, yada, yada, yada..." But, he tried following that advice, before final exams and, he said, “I just couldn't fall asleep without having the noise in the background. So, that's probably why I just always have a show going.”

**General purpose of pre-sleep routine.**

***Closing the day, getting ready for the next day.*** When queried about what they considered the main purpose of their pre-sleep routine, six people discussed the importance of closing the day before going to sleep. Four people discussed the importance of getting ready for the next day. Emphasizing both being finished with her self-care activities to be clean and also

to go to sleep in a tidy home, Petra said, "…at the end of the day, you want to close the day, as much as you can do, you know?" Daniel said, "Finishing any sort of unfinished business for the day, so I could start the new day," was important to him so that he could start the next day afresh.

The consequences for Daniel for not being ready for the day would be troublesome.

> Because if I didn't do any of this, and I woke up in the morning, I would be flustered! I'd be like, 'Aw, shoot, I need to charge my phone, I'm really thirsty, I have to go to the bathroom, my laundry...' like that sort of thing.

Daniel reported that if he did not have things ready for the next day, it would mainly be an inconvenience to him and not something that would ruin his whole next day, and "I think worst-case scenario, if I didn't do any of this. I'd just be, like, annoyed with myself."

Four people mentioned that having consistency was the purpose of the routine. Being relaxed enough to fall asleep was mentioned by three people, while others said that the purpose of the pre-sleep routine was to go to sleep clean, to maximize the amount of sleep time, and as Amanda stated, "ending my day in a good way."

**Purpose of separate activities.** Taking care of their own body during the pre-sleep time such as exercising, getting clean, moisturizing, satiating thirst, emptying the bladder, and taking out contact lenses were important to many participants. Karen stated, "If I didn't brush my teeth, if I didn't take my contacts out, my eyes might get infected, I didn't wash my face, I'm sure that it would start to break out, or, something." Jessica's statements concurred with Karen regarding the importance of face care. Nine people specifically discussed getting clean as an important purpose of the individual activities. Though getting clean seemed very important to many, not all the people considered it as such. Five people mentioned re-connecting with loved ones and

God, whether through catching up on the day's events, physical intimacy, praying, and even doing nice things for others and socializing. Two people mentioned taking care of pets and one person her plants as important parts of their routines. Regarding her plants, Amy said, "I feel like I need to take care...like a child, I need to take care of it first."

**Description of experience of pre-sleep and sleep.** The pre-sleep period seemed to be described as a positive experience by all 16 study participants as evidenced by things such as smiling faces in the pictures, enthusiastic descriptions of their experiences prior to sleep such as Kim who said, "I love to be in my house! So, whatever (sic) I go home, and I do those routines, and watch movies, I really enjoy (it)." Study participants described leisure pursuits such as reading, listening to music, playing video games, exercising, watching TV, and singing in the shower. The pre-sleep time also included connecting with friends in person or through technology, touching base with loved ones (including pets) through talking or physical intimacy, and getting refreshed and spiritually renewed. Relaxing baths, enjoying nature, and the satisfaction of going to sleep in a tidy home were described. All in all, it seems these 16 study participants have positive experiences prior to sleep.

**Regularity, flexibility, adaptation and change.** Most people in this study discussed having more regularity than variability in their routines. Besides dropping the occasional "may - do" from the list or changing the sequence of an activity, people did similar things night after night before they went to sleep. Lisa said, "That is the sequence: brush my teeth, change my clothes, go to the bathroom, get in bed. It's 90% of the time. And that's my routine."

All study participants mentioned variances in their pre-sleep routines. Variances occurred in sequencing of activities, whether an activity occurred at all, the start time and the end times of activities. Variances also occurred in the types of objects used during an activity. For

example, people changed reading materials when reading. Routines also had alterations when people had company, if they dined out and stayed out later, attended sporting events, or when they travelled.

Although some people slept in on weekends, most people did not vary much in terms of core activities that remained in the routines. Most described the ability to adapt and change when they needed without too much effort or thought. Michael is one who probably made the most effort to adjust to his new sleep schedule when adapting to working the night shift. Even though he said his life felt "upside-down" because his schedule was so different from the rest of the world, he was able to change the timing, not so much the content, of his pre-sleep routine. But, he said he had to add sleep aides (noise maker and fan for background noise) that he did not need when he had a more customary night and day schedule. Daniel described a highly variable day to day schedule, but he made changes to his routine almost daily to accommodate the next day's events.

**Routines have a function.** Routines provided reassurance to people to do things when they were supposed to such as taking medications: David said, "So, and again, going back to when I take my meds, it's kind of reassuring that this routine is there, because I just follow it. And, I'm assured that I'm on task, right?" Although Ashley said that she wakes up five minutes before her alarm clock goes off, she sets the alarm nightly: "…at least setting my alarm on the weekdays, it gives me comfort that I'll actually wake up for work on time, next day." Lisa said that having a routine gives her a sense of control knowing there is an order to things.

**Environment.**

***Locations***. Participants said they performed their activities in two to five (average 3.31) locations. Nine people said their activities occurred in two to three locations, while seven people

said they occurred in four to five locations. Royeen's (2010) study found that people performed their morning routines in a mean of 4 locations.

All 16 participants included the bathroom and bedroom when describing locations of their pre-sleep routines. Seven people performed parts of their pre-sleep routines in the living room and kitchen. Two people mentioned areas outside the home while walking the dog and doing sports. The dining room, stairs, the back-door area and separate office/computer room were also described as locations in which pre-sleep routines occurred.

***Grading the environment by decreasing stimulation***. Seven participants appeared to grade their environments during the pre-sleep time. People described activities that required higher energy, interacting with others either in person or virtually (on the phone or through gaming) prior to or early on in the pre-sleep routine, and in the time prior to engaging in the pre-sleep activities right before bed. The environments during the pre-sleep time were described as having less auditory and visual stimuli as it got closer to bedtime. Matt realized that he altered his environment as he started retreating into his pre-sleep routine phase of the day. At the very end of the night, Jessica described putting the "Do not disturb" setting on her phone, which she kept next to her bed. Ashley described how she browsed on the phone in bed prior to sleep, but that she was not actively seeking communication with others anymore. Once finished with her phone, Ashley flipped the phone over on her nightstand so that the light of the screen would not show. Petra's first activity in the pre-sleep routine is to turn the TV off. To her, she said, "'Turn off the TV' to me means, I don't want no more noise from anybody. I'm done for the day kinda thing."

***Going into the cave***. Similar to the idea of grading the environment by decreasing stimulation, six participants described their time before bed as almost sacrosanct and cave-like.

One participant does not do any computer activities in his room. Matt said, "Yeah, so I kinda isolate it, so I, like when I go to sleep in my bedroom, I have less distraction." Once people entered the "cave" of their bedroom, they did not get out of it. Jessica said, "…so once I like shut my room door, I'm in my bathroom, I don't come back out of my room, until like the next morning." She not only does not leave her bedroom, she does not leave her bed, "I'm just in bed, and usually, once I get into my bed to read or you know be on the phone, or whatever, I don't leave my bed again. I just usually just shut-off the light and you know...Yeah, I stay in bed. I don't usually wake up in the middle of the night." Once, the cave is entered, at least six of the participants reported not getting out of it. James also said he does not spend much time in the cave, "I don't hang out in the bedroom most of the evening, unless I'm going to look for some clothes, or something. So, pretty much, when I'm in there, it's the end-of-the-night routine. You know? That's it."

People, like James and Chris, whose bedrooms were upstairs did not come back downstairs once they reached the end of the pre-sleep period. At least eight people described having master bedrooms where their bathrooms were attached to the bedroom.

These findings are in contrast to Royeen's (2010) study of morning routines, when she described doors being drawn in the pictures at the end of the morning routine, to demarcate going from personal to public spaces. Only one person in this study drew a door at the beginning of the pre-sleep routine, but the implication for that person, was that she was going from public to private spaces, which is a mirror image of research on morning routines.

***Safety and closing the house***. Closing the house meant anything from making the house tidy, setting house alarms, or locking the doors. It also had something to do with making the environment safe and clean for the next day. The people who tended to mention closing the

house were adults who were primarily responsible for the household and ensuring that the perimeter was safe. For example, Petra always ensured that the home's security alarm was on before going to bed. Ashley's nightly pre-sleep routine was to ensure that her front door was locked. The young adults who still lived with their parents did not mention this responsibility.

***Sensory environment***. Twelve people described the sensory environment of their pre-sleep routines. The need to be "comfortable" was reported by 10 people. This was described, in terms of tactile comfort such as wearing comfortable clothing, having good bedding and mattress. People also described needing to be physically comfortable such as not being thirsty, not having a dry mouth, having an empty bladder, not being too hot, not being in pain by having good pillow placement, and not having dry lips prior to sleep to optimize sleep conditions. Auditory conditions were also described with five people mentioning ambient noise prior to sleep as helpful, but not necessary.

Most people seemed to appreciate a darker environment for the very last part of the pre-sleep time. Some described turning on the "Do not disturb" setting on their cell phones. On the other hand, people also mentioned that they could easily fall asleep with the light or TV on. For example, James said:

> But, I'm pretty oblivious, to like, my surroundings. I can sleep whether the lights are on or off. You know, I don't have to have a specific condition, or set of circumstances. I grew up with siblings, so rarely was it ideal set-up.

Ashley also described being able to fall asleep at night in a bright environment and stated, "I could fall asleep with the light on."

Kim described in detail how it was important for her to turn her fireplace on while watching movies before going to bed. She described the visual appeal of the fire, which she turned on whether the it was hot or cold outside. “It's beautiful! So, I *love it* [emphasis added]!”

The two participants who occasionally used their essential oil diffusors discussed the joys of the smells and described which aromas were most pleasurable to them. Jessica said, “I like the smell, of like certain oils, like eucalyptus and lavender. So, sometimes, I'll mix it, sometimes, I'll just do one or the other, or something like that.” She also mentioned that she liked the white noise of the diffuser which helps her to fall asleep, though she pointed out that she did not need it to fall asleep.

***Objects***. People used a range of one to 10 different groupings of objects that were drawn or discussed in the interviews. A total of 43 groupings of types of objects were used by people according to the drawings and interviews. The objects drawn and discussed represented the various activities that were performed in the pre-sleep time. The most commonly mentioned or drawn objects were the bed and beddings (11 people) such as pillows and blankets. The toilet, cell phone, and clothes were drawn or mentioned by five people and books in bed and oral care objects were drawn or discussed by four people. There were an average of over five objects used by people in the pre-sleep routines, which is less than the number of nine groupings of objects used by Royeen’s (2010) participants for the morning routines. Everyone described using customary Western-style beds, bedding and pillows that they retreated to at night.

***Virtual environment and technology***. None of the study participants admitted to answering their phones in the middle of the night, though Daniel said that he slept with his phone next to his pillow, as did Jessica. Screen-time, which included use of a mobile phone, tablet,

computer or TV was mentioned by 14 of the study participants during the pre-sleep time, or the time just prior.

***Social environment of pre-sleep.***

*Solitary*. Thirteen of the study participants described performing their pre-sleep routines primarily in solitude, which is similar to what Royeen (2010) found in her study of morning routines. The three who did not perform their routines in solitude were all married and slept in the same bed as their partners. David explained how the presence of his wife was important to his routine, but he said that he engaged in his pre-sleep time by himself. Lisa also shared the same bed with her husband but considered that she went about her bedtime routine by herself. All the married couples shared a bed with their spouse, except Kim, whose husband does not live with her. Only one person discussed a period of physical intimacy with the spouse prior to sleep, while another drew a picture of her cuddling with her husband in bed, and another always kissed her husband "good night" prior to sleep.

*With others*. Three people in the study mentioned that they considered that they participated in their pre-sleep routine with others (spouses, pets). When asked about whether her pre-sleep routine was performed by herself, Amanda said, "It's usually with my husband as well. Yeah, usually, because he adapted to my routine. So, he's also getting, he gets his cloths ready, and then, when we're doing...we're packing our lunch together." James considers that he performs his pre-sleep routine with his wife and dog.

Like Amanda, Andrew also considers that he participates in his pre-sleep routines with his spouse and said that his routine and his wife's routines started to coincide once they lived in the same space.

> Yeah, usually with my wife. We may do the routine at different times than each other. Most nights, though, when one of us is ready to go to bed, the other one is like, "Okay, let me get ready also." But other times, if someone's like, if she's like studying or something, I'll get ready before her. But, she tends to go through most of the same routine. Like, our sleep routines became more in sync once we started living with each other.

Six people said that they performed parts of their pre-sleep routines with other people including housemates and loved ones through a variety of methods such as a phone call or through virtual gaming.

*Sleep within social norms*. Several people in this group mentioned how their pre-sleep routines were "boring," which seems to imply a negative connotation. Some people seemed surprised at the sameness of their night-to-night routines. Towards the end of the interview, Emily, who described an active, varied and busy life said about her routine, "I didn't realize I was so routine!"

Nobody described their pre-sleep routines as exciting, energizing, or stimulating. Michael described his pre-sleep routine as, "pretty boring bed routine by myself." James said his routine was, "Sad, predictable and pathetic." At 47, he said, "I've become that 'old person' who's just, 'It's 10 o'clock, I need to go to bed!!'" James likened himself to Mr. Rogers, the beloved fatherly TV personality to children who was known for his strict adherence to a routine of how he put his sweater on when he started the show.

Others considered that people besides themselves had similar routines to theirs: Karen said, "I think it's something that most people do before they go to bed, I would imagine." David described his pre-sleep routine in this way:

> Pretty 'normal routine,' I would say, in my eyes, right? It would be nothing out of the ordinary. I'm not doing anything that's, you know, burning candles, or meditating, or you know, doing yoga, or doing sit ups before sleep, right? So, it's like, 'get ready for bed.' I think it's pretty normal.

**Across the life-span.** Ten participants described persistence or changes in their pre-sleep routines from childhood to adulthood.

***Childhood and adolescence.***

*Persistence of habits, behaviors and activities*. Eight participants said some of their habits started in childhood. Lisa said that her habit of having the TV on before sleep started when she was in elementary school. She said, "I had a TV in my room as a child. It didn't have timers in those days, but it started that I always had to have the TV on before I go to sleep. So, it's been almost most of my life probably since I was in elementary school."

Emily, who lives in the same house as her parents, said that making an announcement that she was going to take a shower (which is a part of her current pre-sleep routine) started as a child to, "let the other siblings know that I was jumping in the shower before they were, or something." Now, she makes an announcement to her parents, even though she does not share a bathroom, primarily for privacy once she starts getting ready for bed.

Some participants said that some self-care activities, such as brushing teeth, were ingrained in them as children, and they continue to perform this activity. Jessica said, "I've always brushed my teeth before I went to bed, because you learn that as a kid, so I just can't go to bed without brushing my teeth." Amanda, who was born and raised in Mexico said that she has carried on the habit of drinking a cup of coffee before bed.

> When I was about 15, I started doing that with my Mom. Cuz she's always...I've always seen her with her coffee at night, watching her novellas. Yeah, so then, when I turned 15, she started let me drink coffee, so then, I would drink coffee with her. And, I guess I got used to it.

Amanda said that her husband, who came from the same town, shared this custom of drinking coffee before bedtime. She said, "…my husband, the same thing with him. He says he's done that with his mother too when he was really young." This participant stated that she was not sure if her habit of drinking coffee before bedtime was a common tradition in her place of birth, or if was a coincidence that her husband also grew up with the same tradition with his mother.

*Changes made*. Two participants said they currently follow pre-sleep routine habits that are counter to what their parents taught them. For example, while Chris stated that he continues to perform basic self-care tasks that were ingrained in him since childhood such as brushing his teeth, he now has a TV in his room and plays videogames up until very close to bedtime, something his parents would never have permitted. Petra reports that her upbringing in El Salvador was a "no routines home," and that she decided to set up bedtime routines as a teenager when she moved to the United States. Now, in terms of tidying her home before sleep, she says, "I have to have everything in place before I go to sleep, or else, I can't sleep!" Petra pointed out that her mother, like her, had a regimen of cleaning herself. Like herself, she said her mother, "never went to sleep with make-up on, or anything like that."

Andrew was embarrassed to say he didn't regularly brush his teeth when he was a teenager. Daniel said sometimes he opts to not brush his teeth now, even though he was raised to do so.

***Adulthood, changes, and passing the torch***. Some people looked back to earlier years (of adulthood) and said they've changed over the years based on stress in their lives, raising children, being in charge of the household, and going through menopause. People discussed how their pre-sleep routines were affected by their physical condition as they got older. Lisa discussed how going through menopause impacts her pre-sleep routine. To prepare for her hot flashes in the middle of the night, Lisa ensures she wears light clothing to sleep so that when she gets too hot, she will not wake up. This same participant also discussed how her need to take blood pressure medications also required a change and examination of her bedtime routine. David, at 60- years-old, mentioned that his bedtime routine includes taking medications. He reported that the routine itself comforts him knowing that having the habit would ensure good medication adherence. David said, "If I do it at the same time every night, I assure myself that I don't forget to take them, right? Because it's important to take them. I think that would be the importance of that routine."

James said that his pre-sleep routine 10 to 15 years ago, was completely different than it is now. He said if he does not have a regular bedtime routine or get enough sleep he cannot function.

> I don't know if that's so much the ritual, so how it has impacted is that I've kind of just become that "old codger" who goes to sleep at 10 every night, so it's a little embarrassing! You know, I used to be up until midnight every night, but not anymore.

James is not sure why he changed his pre-sleep routine through the years.

> I don't know if I did that consciously, but partly through trial and error, that you know, I couldn't function on a sleep deficit and do my job anymore. And, I don't know if it's that just aging, but I would guess that most of that is from aging, but some of it may also be

> that I have more stuff I'm asked to do during the day that just doesn't allow me to sleep-walk through my job as easily as I could in the past.

James, added, “I hadn't given it much thought, but our sleep pattern, and our activity pattern prior to sleep was much more varied, say, 10 years ago.”

At 57 years-old, Petra discussed passing on habits to her child, which made her happy. Petra said that her adult daughter has carried on the pre-sleep routine of cleaning herself and tidying the home before going to bed, which was something her own mother had passed onto her. Petra also talked about how her sleep changed when she became a parent.

> Oh, with a child, it changes! I mean you wake up. In the middle of the night. I used to wake up, making sure she was there. I don't know. So, your routines change. They're sick: your sleep is not 100% either because they come into your room, you know?

Kim also discussed how the habit of having a clean home before going to bed came from her mother. As a teenager, Kim admits that she used to argue with her mother about why the house needed to be clean before turning in. Now, Kim’s “must-do” activity prior to bed is to have a tidy home. It appears her mother’s routine of cleaning was passed on to Kim. Now, Kim’s own daughter, a college student, questions her mother about why a clean house is necessary before bed. Kim is hoping that her daughter will also eventually follow the path that her grandmother put her on.

> Maybe when she lives by herself, actually I didn't do that when I was a child. I was always angry with my mom, "Why? We're gonna sleep now! No one's is gonna come! Why we are doing this?" But, after you start living by yourself, you do whatever, you will see, when you are growing, now.

**Pre-sleep ability.** All people were independently able to engage in participating in their pre-sleep routines. People made their own decisions about how to go about their pre-sleep routines although those with bed partners had an awareness of what their spouses were doing during this period of time. Some described instances where they had to redesign or re-think their pre-sleep routines when their lifestyles changed such as the night-shift worker. Others mentioned carrying out strategies to transition to different pre-sleep routines as they changed their life circumstances, such as Petra, who was a single mother for several years before getting re-married later in life. Others learned along the way tips on how to improve their sleep and chose to incorporate them, or not.

**Sleep ability.** All participants discussed aspects of their ability to sleep. Seven participants described the ability to initiate and/or maintain sleep without a problem. Emily, who did not specifically mention sleeping well had smiling faces in her pictures, which may indicate a positive sleep experience. None of the drawings had pictures of faces with negative emotions on it. Regarding initiation of sleep (sleep onset latency), Jessica said, "it doesn't usually take me very long to fall asleep. I'm usually just like 'knocked out.'" Jessica also reported good sleep maintenance, "I don't usually wake up in the middle of the night." Amanda also said she had good sleep initiation and maintenance, "I don't have any problems throughout the night. I sleep throughout the night pretty good." David said he has occasional wake-ups in the middle of the night, but he still considers himself a good sleeper: "I do sleep really well, and I don't wake up that often. You know, like I said, once or twice during the week, I have to wake up and go to the bathroom."

**History of sleep issues and discipline.** Nine people described some problems with sleep at some point in their lives. There was awareness by these "good sleepers" that they have had

bad experiences in the past, and they want to avoid future issues with having sleep problems. Matt said, “If I start thinking too much, I'll stay awake, so I try to avoid that.”

Michael described needing to be disciplined to follow his routine.

> It affects my daily life is that if I don't do it consistently, my sleep gets really bad! You know, sometimes things happen...a favorite show will come out, or a book will come out that I've been waiting for, or something will throw me off, and I'll stay up for 3 or 4 hours, instead of doing what I need to go to get ready for bed, so that usually leads to some poor sleep for a while, until I get myself back on track.

Ashley also described a need to stay on track with her pre-sleep routine of keeping the time in each activity as short as possible to sleep well: “I tend to sleep well and be more rested. But, if I push all this back, or something's extended, I tend to *not* [emphasis added] sleep as well. Because, I'm waking myself up and not trying to fall asleep.”

Jessica related that maintaining consistency in her pre-sleep schedule helps her sleep better.

> I think I like to have consistent habits, and it throws me off if I vary a lot, like if I'm always going to bed at a different time every night, or if I skip like brushing my teeth or washing my face, it throws me off the next day.

**Discussion**

The discussion will focus on five things: 1) Pre-sleep routine as an occupation, 2) concept of routine, habit, rituals, pre-sleep routine, 3) environmental and sensory considerations, 4) a visual description in nature of what describes a pre-sleep routine in this group, 5) drawing as a way to collect data.

**Pre-sleep routine as an occupation**. Based on definitions by Pierce (2014), pre-sleep routines, as described by study participants, seems to be an occupation.

> An occupation is a specific individual's personally constructed, nonrepeatable experience. That is, an occupation is a subjective event in perceived temporal, spatial, and sociocultural conditions what are unique to that one-time occurrence. An occupation as a shape, a pace, a beginning and an ending, a shared or solitary aspect, a cultural meaning to the person, and an infinite number of other perceived contextual qualities (p. 3-4).

***Personal construction.*** People in this study formulated their own pre-sleep routines based on previous learnings and experience. For several, how the routine was constructed was dependent on the following day's activities. People also determined the content, pace and timing of their activities based on the day they just lived. Working people described the stresses of their work days and used the pre-sleep time to unwind and relax from the day's events. People determined their own core activities and fluidly determined elective ones.

***Non-repeatable and subjective***. Though it could be done on another day, the routine could not be done in exactly the same way in any other time. People's descriptions were all subjectively experienced.

***Temporal***. The routines occurred during a particular time of day, within a certain time-frame, before the longest consolidated bout of sleep, usually at night. Some people considered the pre-sleep time as occurring 15 to 30 minutes before falling asleep while others considered the four to four-and-a-half hours before bedtime as part of their pre-sleep routine. Some people used the clock to determine the appropriate time to sleep while others used different signals.

***Spatial***. The routines occurred in three to four particular locations in an enclosed and protected environment. The spaces were private places in private homes in the San Francisco Bay Area of California. The homes were houses, condominiums, or apartments. From the descriptions, everyone had a bedroom separated from other rooms. Married couples (except for one) shared the bedroom and bed, and others had the bed and room to themselves. Nobody described their spaces as too small or too large, cramped, or too spacious. See below for more on environments.

As in Royeen's (2010) study of morning routines, participants in this study also mentioned the use of objects in the spaces while engaged in a routine. The use of bed and bedding and objects to help with cleanliness and the comfort of people were mentioned. Technology-oriented objects such as mobile phone, tablets, TVs, and computers were important parts of people's pre-sleep routines. Books were also included in many people's pre-sleep routines.

***Sociocultural Conditions***. Consideration should be made that people in this study live in Westernized society where there are social and cultural expectations to pre-sleep routines and sleep. Steger (2012) opines that "bedtime routines give insights into the cultural and social significance of sleep arrangements" (p. 82). Though similarities were found across the adult age-span, in terms of socio-cultural context, people described how "getting ready for bed" was different based on age, stage in life, and whether they had a bed partner.

Anthropologists, Worthman and Melby (2002) described Western sleep as "patterns of solitary sleep on heavily cushioned substrates, consolidated in a single daily time block, and housed in roofed and solidly walled space" (p. 70), which seems to describe the sleep of people in this study.

The idea of being clean before bed may be socially and historically developed. Steger (2012) discussed the hygiene movements in Europe during the eighteenth and nineteenth centuries when bed bugs and fleas proliferated and efforts were made to clean things up to prevent disease and improve conditions.

People in this study also described adherence to a "monophasic sleep culture" (Steger, 2012, p. 74), where people obtain one major bout of approximately eight hours at night. This is different from other people who may adhere to a "siesta culture," where there are socially determined times for both daytime and nighttime sleep, or a "napping culture" where people have one long bout of sleep at night and several irregular naps during the day (Steger, p. 74).

The solitary nature of how one gets ready for bed may also be culturally related. Activities, such as bathing, were performed in private spaces, and were not performed communally, as they may be done in other countries such as Japan (Merry, 2013). Worthman and Melby (2002) also pointed out that for traditional Balinese people "sociality pervades sleeping and waking states" (p. 78) and that being alone for even five minutes may not be acceptable.

Considerations that pre-sleep routines were learned in childhood, over time and experience as teenagers and adults may also be considered cultural in that parents are expected to teach their children about how to get ready for bed. Steger (2012) discussed how sleep hygiene is "discussed from earliest childhood" (p. 71). There are expectations that adults in this study were independent in performing their routines.

***Shape***. The pre-sleep routines occurred in a relatively sequenced group of about eight activities. The activities of choice occurred in relatively the same sequence most of the time but could also change. People had a wide variation in types of activities performed during the pre-

sleep time, but they were relatively stable from day to day, could be adjusted, as needed, without too much effort.

***Pace, beginning and end***. Some people tried to keep the pre-sleep time as short as possible, so they went through it quickly with the goal to get to sleep. Those people considered the pre-sleep time as a transition to sleep. Others luxuriated in the pre-sleep time. The routines had a clear beginning, though they were highly variable between people. Most considered the end of the pre-sleep routine as falling asleep.

***Shared or solitary***. The pre-sleep routine occurred in solitude for most, but some participated in it with others. Rosenblatt (2006) interviewed 88 adult bed-sharers between 21 and 71 years old on the social system of bed sharing. Rosenblatt found that the most common transitional activities from wake to sleep was prayer, watching TV, reading, and sexual intercourse. The bed-sharers in this study also discussed watching TV, reading, and intimacy.

***Cultural meaning***. People described the importance of passing on the routine to future generations, a time to connect with people, to be rejuvenated by being home. Others described how after a long day of work, a relaxing pre-sleep time was not just a wind-down time, but it was a reward for a job done. Implications were also made that it is an individual's responsibility to perform self-care before going to sleep. This idea was embedded such that Karen assumed most people just did it. Other functions for pre-sleep routines were to close the day, get ready for the next day, get clean, prepare for sleep, and serve as a cap to end the day well.

**Concepts of routine, habit, rituals, and pre-sleep routine.**

***Routine.*** As previously mentioned in the literature review, Royeen (2010) came up with seven conclusions about routines after completing her literature review. The conclusions that

Royeen discovered in her literature review seems to be evident in this pilot study of pre-sleep routines.

*Routines can impact future participation in occupation.* People in this study indicated that what they did during the pre-sleep time impacted how their sleep-time went as well as their morning time. Using the toilet prior to sleep ensured that there would be minimal or no wake-ups during the sleep time. The finding that people did things during the pre-sleep time to prepare for the future such as sleep and for the next day, were also discovered by Royeen (2010, 2014) in her study of morning routines. Royeen (2014) pointed out that Kellegrew (2000) and Larson (2000) also discussed the "orchestration of the day through enactment of a routine" (p. 73).

*Routines can assist in transitioning from one activity to another.* Several people mentioned the importance of participating in activities during the pre-sleep time that would not overstimulate or arouse them so that their sleep would go well. Matt, discussed a series of activities during the pre-sleep time such as listening to music and said, "So, it kinda helps me relax from a long day of work. Kinda, unwind down." The pre-sleep time may be considered a transitional time for some people who went from the wakeful time to sleep time. They were doing things to get ready for the next phases of the day instead of focusing on the pre-sleep time itself. Ashley is an example of a person in the group who may consider the pre-sleep time a liminal experience where she is keeping the time as short and efficient as possible so that she could get to sleep. On the other hand, others relished the pre-sleep time as a time to reconnect with loved ones and as the goal of the whole day to get to the point where they could enjoy time to themselves before bedtime.

*Routines have a role in helping to plan daily activities.* Royeen (2010) discussed the role of routines to contribute to how families and professionals organize or plan activities of the day.

Several participants in this study also indicated using the pre-sleep time to orchestrate and plan upcoming events and daily activities. Even though study participants, such as Michael said he "just kinda see things and do things until I end up in bed," he also had an overall plan to maximize the quality of his sleep time. Jessica discussed the importance of ensuring her pre-sleep routine set the stage so that her sleep was good so that she would feel rested and not be "grumpy." Jessica, who works full time, described the regularity of her routine and said, "I think this is optimal for like waking up feeling rested and ready to start my work day."

*Routines can help with medication adherence.* Lisa and David described regularly taking their medications before bedtime. Lisa and David used the pre-sleep routines so that they could be on auto-pilot in terms remembering to take medications. This concurs with the findings of Sanders and Van Oss (2013), that the habit of taking medications before sleep were embedded into the pre-sleep routines. As previously mentioned, David, found comfort in relying on a routine in itself to take his medications. Lisa reported how the bedtime routine itself gave her a sense of control.

*Routines seem to organize actions in families and communities to maintain social support.* Study participants discussed how some activities in their pre-sleep routines helped them to stay connected to spouses, loved ones, and friends. For some, like Jessica, it was the only time during the day when she could touch base with a loved one, so having the routine of connecting was important. Chris also discussed that the pre-sleep routine was a way for him to connect with housemates as well as friends because most of them worked full time during the day and were unavailable to meet earlier.

*Routines can improve health conditions and conditions can interrupt routines.* People did not discuss how having a pre-sleep routine itself improved "health conditions," but they

discussed how having a routine gave them an overall feeling of wellness such as Jessica who said, “because if I don't sleep enough, I definitely feel it the next day.” As previously discussed, nine participants described having the occasional bad night of sleep, so people used the pre-sleep routine to avoid poor sleep. Because this was a healthy group of adults, nobody discussed chronic health conditions that interrupted routines.

In terms of short-term illness, Petra pondered that there are some “must-dos” that she performed even when she was sick, such as cleaning herself. Her usual “must-dos” of having all the dishes washed, or home tidy, were things she could care less about when ill. She did not describe this change as an interruption or disturbance but only as a short-term adjustment for a brief mild illness. Matuska and Barrett (2014) pointed out that management of routines can be a salient feature of managing one’s overall health, but that it could also be harmful in situations of chronic illness where people may choose to disengage in occupations. Since Petra was referring to shorter term illnesses, disengaging in her usual cleaning activities before going to bed would not be considered harmful, but would be considered healthy.

*Routines and learning seem to be connected.* Royeen (2010) described how there seemed to be a “strong link between routines and learning, as routines can foster social interactions, memory capacity and emotional development” (p. 33). Royeen’s literature review pointed mainly to research on children. Likewise, the adults in this study seemed to indicate learning occurring during the pre-sleep period. People learned from their parents about what to do before going to sleep, and they seemed to experiment with trying different things to improve their sleep as adults. In addition to previous and current learning occurring in the context of routines, both Petra and Kim mentioned teaching their children about what to do during the pre-sleep time. The previously mentioned study on the bedtime routines of 10 mothers by Evans and Rodger

(2011), showed that bedtime activities that the mothers performed with their young children were very similar to those that the adults did in this study: oral care, toileting, reading, and even cuddles. Evans and Rodger also found that the routines occurred primarily in the bedroom and bathroom.

***Habits***. This research did not answer the question of the difference between a habit and a routine, but some participants used the word "habit" when describing their pre-sleep routines. Clark (2000), described routines as having a regular, somewhat un-changing nature and as a sort of habit, which were described as being repeatedly performed in an automatic fashion, without much variation. This definition of routine seems to describe how participants in this study described their pre-sleep routines. Corbin (1999), who suggested that routines vary in type and frequency, as fixed or flexible, as adjustable, dynamic and even boring also seemed to hit the mark in terms of how study participants defined it. Pierce's (2003) description of habits also seem to align with how study participants used the word, habit.

Pierce (2003) described habits as, "potent organizing forces in our lives, enabling us to go through complex occupational patterns without constant processing and decision making about what to do next in routine activities. Habits are often formed when we are young and unable to discern how they may shape our lives in the long run" (p. 21).

Clark (2000) described habit as something that is performed repeatedly, pretty automatically, without much change. Dunn (2000) described how in habits neurological thresholds are required for actions to occur, how there is a balance of excitation and inhibition responses to occur, and how homeostasis is sought. Lisa's use of the word "habit" seems to align with Clark, Dunn, and Pierce.

> I do have a very *long-standing habit* [emphasis added] of having to go to sleep with the television on, so what I do is I turn on my remote, I turn on my TV, and I set the timer, and I probably watch TV probably less than 5 minutes before I go to sleep.

Others, like Chris, Daniel and Michael, also described ambient noise as helping them to fall asleep. Michael's night-shift schedule necessitates his need to have white noise only to drown out daytime sounds, but he did not need it when he had a customary daytime work schedule. Chris and Daniel also said they did not need the ambient noise to sleep. Dunn's description of habit impoverishment, habit domination and habit utility are interesting to consider in the situations above. Habit utility is a state where a person has just the right amount of the habitual behavior to live life, so perhaps people in this study seem to have this state as nobody discussed pre-sleep actions (or inactions) that were disruptive to how they wanted to live life. Lisa did not say whether she could sleep without the TV on, so it would be an interesting follow-up question. Would she be in a habit impoverished state if she could not sleep without the TV on? If so, would this be a bad habit that needs to be broken? Considering that Lisa is not in a situation where a TV is not available, it is not a problem for her when she sleeps at home.

***Rituals.*** Segal (2004) looked at the morning routines of 40 families with children with disabilities and looked at five families in particular. She separated out the morning routines as either routines or rituals based on how the narratives were told. Segal (2004) described routines as "patterned behaviors that have instrumental goals" (p. 500) and as "observable behaviors that repeated in predictable intervals" (p. 500). Rituals were described in terms of their affective or symbolic qualities. Segal considered that family rituals were mechanisms of affirming family identity. Some of these types of "rituals" to "affirm family identity" were seen in some of the pre-sleep routines in this study. Small gestures such as the good night kisses to pets and people,

the announcements that it was bedtime, and even the allowing of beloved people and pets into private areas could be ways to affirm identities. Petra and Kim discussed learning some behaviors they carried on from their mothers and are trying to pass them on to their daughters. Amanda, as a child, used to watch her mother engage in the grown-up practice of drinking coffee while watching TV dramas at night. Amanda was invited to join her mother to drink coffee with her when she was about 15-years-old, which was a sort of rite-of-passage. Now, Amanda drinks coffee with her husband in the pre-sleep time, something he did with his own mother.

***Pre-sleep routine.*** Similar to Royeen's (2010, 2014) findings in her study of morning routines, the pre-sleep routines were a collection of activities performed in a limited number of spaces where objects were used. Like Royeen found in morning routines, study participants also described activities occurring in sequence without much multi-tasking of activities. A major difference between the start of the morning routine in Royeen's study and the start of the pre-sleep routine was mood. While Royeen's study participants indicated that starting the morning routine was difficult, as evidenced by haggard eyes, study participants for the pre-sleep routines did not indicate it as such. By all accounts, starting the pre-sleep routine was a positive experience for all in this study. It should be pointed out that this study only included "good sleepers," as determined by scores on the PSQI, whereas the status of the sleep ability of those in Royeen's study are unknown.

The fact that self care was the most frequently mentioned type of activity performed in the pre-sleep time was not surprising. The higher prevalence of the use of technology use during the pre-sleep time was also expected. In the 2011 Sleep in America Poll nine out of 10 Americans between 13 and 64 years of age were found to use technological devices the hour before bed-time (Gradisar, Wolfson, Harvey, Hale, Rosenberg, & Czeisler, 2013). Charging the

phone ranked high on the list of last activities performed before bed and use of some screen was reported by seven adults in this study. Mobile phones were also placed close to the bed. Nobody in this study reported checking their phones during sleep-time. The 2017 Eleanor Clarke Slagle Lecture by Smith (2017) highlighted the importance of technology and how, "Today, increasing evidence documents that electronic technology dominates the majority of our waking occupations. Technology is no longer optional in our work, play, and self-care occupations" (p. 5). It appears that technology was also very important to the pre-sleep routines in this cohort.

***Must-dos and may-dos.*** People described things they had to do before going to sleep as well as things that could easily drop from the list of things to do before going to sleep. People varied on what they considered "must-dos" and "may-dos," and dropped and added as needed.

Pierce (2003) discussed the "creative design process by which humans plan and implement occupations" (p. 16). Pierce discussed seven phases of the design process, starting with motivation and ending with evaluation of the process. The participants seemed to engage in pre-sleep routines which had implicit pre-set designs and blueprints, which were assessed from time to time as life changes occurred.

**Environment and sensory experiences.**

***Environments.*** One of the unexpected findings was how physical and sensory environments affected pre-sleep routines. Because drawing pictures requires one to portray things, actions, or people, this way of gathering data may have brought this aspect of pre-sleep routines out.

Decreasing stimulation from higher stimulation to lower without much thought, people went from very social, to less social, to private. People described transitioning from loud, to quiet, to quieter but may also use ambient or white noise at the end of the pre-sleep routine to

help them fall asleep. People seem to switch from lots of stimulation and objects in the room to less and less. They may transition from more constricting clothes to comfortable clothes.

This cohort of sleepers also engaged in pre-sleep routines that drew them from the outside world into the inside world, and from the elements into a cave. Like bears going into hibernation, once people in this study entered the bed, they did not get out of it. In that sense, they were preserving the sanctity of the bedroom for preparing to sleep by decreasing stimuli and sleep. Eight people had bathrooms attached to the bedroom, so, the bathroom could be considered a part of the grotto of the bedroom.

The idea of reserving the bed and bedroom as spaces only for sleep (and intimacy) is not new in behavioral sleep medicine. Ong (2017) described how Bootzin (1972), a pioneer in the field, proposed that people with insomnia were equating the bed as stimulus for conditioned arousal. Stimulus control principles used in CBT-I include building strong associations between the bed, bedroom and sleep so that people can develop strong association between the bed and sleep (Ong, 2017). Many in this cohort of healthy sleepers were doing several things in bed that would normally not be recommended by sleep experts such as reading in bed, watching TV, or browsing on the phone. But, the types of reading or phone-browsing was not described as arousing or alerting by participants. When reading in bed, the materials were more for pleasure, and were not work-related. Even though it may have been watching the news, as Amanda did with her husband, or Kim, who said she watched "serious" movies (not in bed) with thick plots, when describing them, they were considered "enjoyable" or as a routine with a loved one. When Ashley and Amy browsed on a phone, the purpose was not to engage in new communication with people, but to finish the day.

Participants in this study described tactile, visual and auditory conditions in which they performed their pre-sleep routines, especially as it got closer to bedtime. Many activities were performed in conditions during the pre-sleep time that had optimal sensory comforts. Engle-Yeger and Shochat (2012) collected information on the sensory profiles of 185 healthy people using the Adolescent/Adult Sensory Profile (Brown & Dunn, 2002) and found that poorer sleep quality, as determined by scores on the PSQI (Buysse et al., 1989), was significantly correlated with "extreme sensory-processing patterns" (p. 138) such as low-neurological threshold or hypersensitivity and sensory avoidance. Good sleepers in Engle-Yeger and Shochat's study did not show these extreme sensory patterns. More tactile sensitivity and auditory avoidance were predictors of poorer sleep. Tendencies toward sensory-seeking behaviors correlated with fewer sleep issues. The sensory profiles of people in this study were not collected, but a few people in this cohort mentioned being able to fall asleep in noisier environments and in well-lit areas. A few also mentioned they could fall sleep with their street clothes on. Even though people described optimal sensory environments in which to maximize sleep, it appears that the study participants did not express extreme hypersensitivity to visual and auditory conditions in which to sleep. But, this was not fully tested.

**A visual description of pre-sleep routines: Crossing the beach**. Luebben and Royeen's (2007) used a metaphor of a wave to describe habits, routines, occupations, and participation. Similarly, the metaphor of entering the ocean can be used to conceptualize the overall grounded theory produced by the study. In literature, sleep and water have often been associated, such as in Eugene Field's poem, "Wynken, Blynken, and Nod," which was published in 1889 (see Appendix E for whole poem). Consider the journey towards the ocean as the whole

pre-sleep routine. Being awake just prior sleep is represented by entering the surf. Being fully asleep is represented by floating in the ocean on a raft.

***Attitude about going to the beach.*** Going to the seaside means leaving the cares of life on land behind, getting into beach clothes, preparing to do things once there, and enjoying the atmosphere. Participants described their pre-sleep time as a time to unwind and relax from the day. People changed into comfortable clothes, and they engaged in activities that they enjoyed, such as catching up with loved ones, or things they felt obliged to do such as brushing teeth. For the most part, people did not talk about doing work-type activities, once engaged in pre-sleep activities. They were oriented towards sleep, from the time they entered the pre-sleep period.

***When to go to the beach.*** People decide when to go to the beach, depending on the purpose of the visit. If the purpose is to watch the sun go down, people go in the early evening. Some people catch the sunset just minutes before it happens, while others go to the beach in anticipation of watching the sun go down in a few hours.

Except for Michael, who worked the night-shift, people went into the pre-sleep zone in the early evening to late evening hours, but they varied in terms of how much time was spent in the pre-sleep time. Some, like Kim and Chris, got off work, went home, and considered the several hours before they went to bed as part of their pre-sleep routine. Others, like Karen and Ashley, considered the pre-sleep time as very short. People were clear on when their pre-sleep routine started and when it ended.

***Activities on the beach.*** Some people like to go to the beach by themselves while others like some company. The types of activities people engage in once they get to the coast vary, though there are similarities. Some things, such as putting on sunscreen and donning swimwear, are imperatives to some, but not all. Other activities, such as making sand castles, are optional.

Most people performed their pre-sleep routines in solitude, while a few performed their activities with partners. The pre-sleep time included self-care activities and use of technology, instrumental ADL, communication and socialization-type activities. People described things they were obligated to do during the pre-sleep routine such as oral care, while activities such as reading a book, were optional.

***Knowing what to do at the beach.*** People learn and continue to learn about what to wear, what to do, and how to be at the beach through good and bad experiences. Through bad experiences, such as getting a sunburn, people learn from their mistakes and try to prevent them. They learn about acceptable shore-time behaviors and about appropriate conditions and times to enter the water.

Several people in this study learned about how to go about their pre-sleep routines from their parents. Regularly engaging in oral care, getting clean before bed, and making sure the house was clean were just a few things people mentioned learning from their parents about how to get ready for bed. A couple of people admitted to not following through with what their parents taught them about what to do during the pre-sleep time. People also learned, as adults, from experience, about what to do during the pre-sleep time to optimize sleep, or to minimize the rush the next morning.

***Beach sights, sounds and feel.*** Everything about the seaside environment is different when compared to dry land. The ocean breeze, the sound of seagulls and crashing waves, the feel of the sand, the briny smell, the relaxed people stripped down to nothing or to loose and light clothing. The pre-sleep time was also described as having a specific atmosphere to it: comfortable clothing, humming TV, sounds of quiet chattering and playing, lights turning off, dogs being walked, showers running, toilets flushing.

***Looking forward to floating on the raft.*** People look forward to the time of relaxing on the ocean. They are not afraid that dangers are lurking in the water, that they cannot get past the waves into the ocean, that they will not be able to float on the raft, or that they will drown. They are not afraid that their belongings will get stolen from the beach. People in this study described safe, enclosed environments in which to sleep. They described positive feelings about entering the bed, falling asleep naturally, staying asleep throughout the night, and anticipating that they will wake up the next day. Though many people described some experiences of a bad night of sleep, they were short term problems that could be fixed by things such as using the toilet prior to sleep, drinking a sip of water before bedtime, or not doing activities that overstimulated them.

***Time to enter the water.*** People observe environmental, social, temporal, and personal conditions to know when it is time to go in the water. People take their beach clothes off and get into swimsuits and wetsuits. They may tell people that they are going in the water. Belongings on the shore are secured and put together so that they will not be disturbed. Some people took time getting ready to go on the water, while others just run into the surf to their waiting rafts. In terms of pre-sleep, at some point, whether it is a certain time of day, a feeling of sleepiness or tiredness, or once the previous activity is done, people in this study entered the later phases of their pre-sleep routine at a time they could perceive to be the right time. People changed clothes, used the toilet, got a drink of water, and brushed their teeth.

***Trusting the raft to float.*** Once past the surf, people swim out a bit, and climb onto their waiting rafts by themselves, or with another. They may watch the stars, chat with their raft-mate, or they may even paddle a bit. At some point, they lie on their backs on the raft and let the water go under the raft and over them a bit until they float. They trust the raft to float without a need for them to paddle.

During the latest period of the pre-sleep time, people climbed into their beds, engaged in activities such as reading books, watching TV, and snuggling with spouses. Some people fell asleep while doing those activities, while others ended activities before falling asleep. Nobody tried to fall asleep, they just did it.

**Drawn data: Is a picture worth a thousand words?** Drawings are a relevant data collection technique. The interviews yielded more activities than what had been drawn, so having both the drawings and interview data was important. It must be noted, however, that all study participants were aware that an interview would follow their drawings, so they may not have felt a need to be too detailed in their drawings. Like Royeen's (2010) study, where participants tended to fill out the whole page of the paper, these study participants, filled out much of the paper (average 78%) with their drawings. The collection of drawn information was a useful data collection method for this study because it may have helped people to consider and think a little bit about what was actually in their routines. It provided a framework and raised points to consider and discuss in the interview. Three people in the interview (Lisa, Daniel, and David) added pictures to their drawings during the interviews when they realized that something was missing from a scene. If only an interview had been conducted, people may not have brought up important points about their pre-sleep routines. Without the drawings, it seems less likely that they would have spoken as much about the environment and important objects that were a part of their routines. For example, it was only when pointing to a fireplace in the drawing, which the PI originally thought was a coffee table, that Kim went into detail about how much she enjoyed experiencing the sensory pleasures of the fireplace.

Whether they were artists or not, people were able to get their message across using drawings in this study. One of the 16 drawings would not have been decipherable in regard to

sleep routines without the interview, so using both drawings and interviews were important. That one drawing by Amy may have not been included in the study if not for the interview, as it was a picture of a single orchid to represent a pre-sleep routine. During the course of the interview, Amy explained that the flower represented taking care of a plant as an important part of her pre-sleep routine.

Using drawings to describe a phenomenon that may have been sensitive to verbally discuss is another reason why drawings were a useful way to collect data. During the analysis phase, more careful scrutiny of the pictures was used to capture meanings which may have been missed during the interview. One picture drawn by Amanda depicted her cuddling with her husband in bed prior to sleep, and she wrote, "I hug" on it. She did not talk about this in the interview, even though she was asked to explain her drawings. Perhaps she considered that the drawing and words to describe the action were self-evident and did not require explanation. Or, she may have been uncomfortable discussing that pre-sleep activity.

Drawing pictures was also a quick and efficient way for people to express themselves, whether they were artistic or not. James mentioned his dislike of drawing, and he only took three minutes to draw his picture, but, his interview was the longest (23 minutes).

**Strengths and Limitations of Project**

The strengths of this study were the broad spectrum of ages and education levels that were in this sample. Participants were also relatively evenly divided among men and women, there were a variety of social-cultural backgrounds, and both married and single people. The paper size use was just the right size of paper for people to express themselves. Using both drawn and interview data was also useful to bring clarity to the object of study. For added trustworthiness, extensive memos were written throughout the process.

Weaknesses were the small sample size, only one interview was performed with each person, the interviewer was inexperienced, and not all participants answered all questions. This pilot study also used a sample of convenience of people who were mostly known to the investigator, though many were just acquaintances and several were first-time meetings. For this reason, generalization of the data is not recommended.

Taking Royeen's (2010) suggestion to improve resolution for future studies using graphic methods, crayons were not used by people in this study. A white paper with pencil was utilized by study participants. A pencil, instead of pen, was used, so that people would have a chance to make corrections, if needed. Yet, on close inspection of drawings, no erasures were visible in the drawings indicating that people just drew their pictures without making corrections. Two people used very faint lines with the pencils, so that resolution of pictures was poor when making digital copies. In order to improve resolution of the two pictures, the PI had to draw over the original lines on a copy of the pictures to make a better digital copy. The original pictures were not disturbed and were left as-is. Black ink would have been better to use for the drawings for better resolution for digital copies.

## Implications for Practice and Healthcare

**Variances on pre-sleep routines.** This study has brought to light that people vary in terms of what constitutes pre-sleep routines. It also highlighted what activities, environments, and sensory experiences people consider to be important before going to bed. Occupational therapists in all practices settings often consider routines and make recommendations on it, so learning that even this small cohort of adults had a variety of things that constituted what they did, in what conditions, before bedtime is important. This study showed that people seem to change their pre-sleep routines during adulthood so that the routines of someone in middle age,

such as in their 40s and 50s may differ vastly from one in their 20s. So, a 45-year-old married occupational therapist working with a 20-something single person needs to consider the possible differences without making assumptions or judgments. Occupational therapists should not impose their understanding of "imperative" occupations onto people during interventions. Thus, this research supports client-centeredness.

People in this study also expressed awareness of sleep hygiene recommendations for the pre-sleep time that they tried and dismissed. An occupational therapist making a recommendation for someone to stop drinking coffee at night needs to consider that a person, such as Amanda, may have a long-standing and possibly culturally-embedded tradition that was carried down from her mother.

**Beginning of pre-sleep.** This idea of having a clear beginning to the pre-sleep routine has been considered as a treatment intervention for people with insomnia (Wickwire et al., 2009). Wickwire and colleagues (2009) devised a treatment approach where people created a protected bedroom environment which only allowed sleep and sex and "sleep promoting factors," such as optimal sleep environments and "sleep promoting activities." Wickwire and team had nine people (mean age of 57.9 years), who were diagnosed with insomnia, devise a list of sleep promoting activities that could occur in that sacred space and helped them find "markers" to make an explicit transition from day to night. The marker signaled the time when people were required to only perform the agreed-upon sleep promoting activities in the time afterwards until sleep. Study participants were overall satisfied with the treatment approach and especially liked the "ritual of blocking out time to unwind before bed" (p. 73). This small study by Wickwire and associates showed that preliminary evidence that a focus on pre-sleep routines could help people with sleep issues. The treatment of having an explicit routine worked on and

spelled out plainly by this research group is an interesting one to consider. Study participants in this study also seemed to have start times that were quite evident, though it tended to be so well-embedded into routines that it was implicit.

**End of pre-sleep and sleep effort**. There also seemed to be a clear end to the pre-sleep routine in this pilot study, which was falling asleep. The seamlessness in which this cohort of good sleepers went from wakefulness to sleep was noteworthy. Broomfield and Espie (2005) describe sleep as an, "involuntary physiological process, which cannot be placed under full voluntary control, any effort to control sleep is likely to fail. Effort to sleep may, therefore, represent a key perpetuating factor in insomnia" (p. 401).

This idea of sleep effort is important to consider as this can be equated with "performance anxiety about sleep, a need for control over sleep, and/or trying too hard to sleep" (p. 401). Broomfield and Espie pointed out that good sleepers are the opposite of poor ones in that they "appear bewildered and report not consciously delivering any behavior" (p. 401) when they are asked what they do to fall asleep.

People's lack of overt awareness of routines as well as their lack of preoccupation of the pre-sleep routine period was not surprising with this group of good sleepers. This is especially true considering the research on sleep effort and how people with insomnia engage in inordinate amount of effort to fall asleep (Broomfield & Espie, 2005). Not one participant in this study described efforts to fall asleep. James even described his pre-sleep time as, "reading and accidental sleep."

This idea of sleep effort is important for occupational therapists to consider when helping people with sleep issues so as not to add to the problem of perpetuating the idea that putting effort into trying to fall asleep will help. Occupational therapists need to be aware that in terms

of falling asleep, educating about putting more effort into it may actually be detrimental. More education and research needs to be done in this area.

**Future Research**

Recommendations for future research include continued research to study descriptions of pre-sleep routines of typical adults and eventually across the lifespan and across different cultures for more understanding on the topic. The finding in this study of a clear beginning to pre-sleep routines in good adult sleepers can be further explored and eventually compared to poor sleepers. As non-pharmacological approaches in the treatment to chronic insomnia, such as CBT-I is recommended (Qaseem et al., 2016), but is not necessarily tolerated or appropriate to people (Wickwire et al., 2009), other avenues, such as a focus on "markers" to pre-sleep routines, need to be explored. The idea of markers could be studied at the descriptive level in normal sleepers to shed light on the topic and to design interventions for people who have problems with it.

Pierce (2003) explains how the "spatial dimensions of occupations are far more complex than the simple measures of height, width, and length with which we would described the spatial dimensions of, for example, a room" (p. 155). This study hinted at the importance of the context in which pre-sleep routines occurs, but it was outside the scope of this study to fully explore this idea. An area for future study is to delve more into the environment (social, cultural, built, sensory, virtual) and objects people use before they go to bed in typical adults. This pilot study looked at the pre-sleep routines of adults who live in comfortable homes of their choice, so studies on the pre-sleep routines of people who live in institutions and other atypical environments should be explored.

The participants in this pilot study described their sensory experiences when engaged in their pre-sleep routines, which was not expected and was not fully investigated. Further exploration of the sensory experiences, profiles and environments of the pre-sleep routines of normal adult sleepers may be revealing. Engle-Yeger and Shochat (2012) pointed out that the issue of sensory hyperarousability, shown to be present in people with insomnia and people with extreme sensory processing issues, has not been well-studied.

Many people in this study incorporated some sort of screens, media or technology into their pre-sleep routines. As Smith (2017) stated, electronic technology dominates waking activities and should be taken into consideration. As the current teenagers, who are considered digital natives (born into using available technology) will grow into adults, there seems to be urgency to study its incorporation in routines in emerging and young adults.

Drawings were found to be a useful way for people to describe their pre-sleep routines. More research on the usefulness of graphic (drawn) data for people to describe constructs or occupations of interest could be considered. Collecting data using drawings was efficient and doable, even to those who stated they could not draw well. Giving study participants a way to express themselves on a blank paper without a pre-chosen menu of options, allowed them opportunity to consider salient parts of the routines without bias. Having people draw pictures also served as an ice-breaker for the PI to collect data from people who were unfamiliar to them, especially considering that the topic was quite personal. If drawings can be a useful way to collect information in research on routines, can it be used to collect information on routines from people who speak different languages or come from different cultures?

**Summary**

Sleep is the most important restorative occupation in which people engage (Pierce, 2001, 2003). Interventions for common sleep problems such as insomnia (Geiger-Brown et al., 2015) and OSA (Epstein et al., 2009) require consideration of alteration of routines for good outcomes.

Although routines are important to the occupational therapy profession, routines have not been well-researched in the profession (Royeen, 2014; Segal, 2004). Helping people with interventions incorporated into routines (Leland et al., 2014; Smallfield & Lucas Molitor, 2018) have been presented as possible ways to help older adults with sleep issues. Occupational therapists trained in CBT-I (Eakman., 2017), which includes a change in routines, have also been successful in helping people with insomnia.

Pre-sleep routines require further description by its participants to be understood at the experiential level which is important to understanding client perspectives (Blesedell Crepeau & Cohn, 2014). This research is the first known study which specifically sought to describe pre-sleep routines in adults from the vantage point of the people living it. Furthermore, in terms of application, to make effective use of pre-sleep routines as an intervention, it is useful to first describe them in typical people.

The goal of the research project was to describe the pre-sleep routines of normal adult sleepers using graphic (drawing) and interview methods, while using the grounded theory approach. Another goal of this study is to add to the body of knowledge in occupational science and therapy regarding pre-sleep routines. Both goals were accomplished with this study.

None of the people interviewed for this study described obsessive thoughts of their pre-sleep routines or with their sleep. They just did it. The routines were basically solitary, pleasant,

and were learned. People retreated to their bedroom by themselves, or loved ones, after doing things they considered imperative, or not. A converse to Royeen's (2010) view of how the morning routine could be the precursor to "carpe diem" (Latin for "seize the day"), people used their pre-sleep routines to "prope diem" (close the day) before sleep.

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## Appendix A

## IRB Approval and Revision Approval

**From:** Sponsored Programs
**To:** Koketsu, Jean S.
**Cc:** jkoketsu@gmail.com; kjkoketsu@sbcglobal.net
**Subject:** IRB Approval Notification: Protocol Number #1343
**Date:**Monday, February 05, 2018 4:02:58 PM

Hello Jean Koketsu,

Congratulations! The Institutional Review Board at Eastern Kentucky University has approved your **IRB Application for Expedited Review** for application entitled, **"A Description of Pre-Sleep Routines of Adults Using Graphic and Interview Methods**." Your approval is effective immediately and will expire on 1/31/19. Your stamped consent form can be found by accessing your approved application files.

**Principal Investigator Responsibilities**: It is the responsibility of the principal investigator to ensure that all investigators and staff associated with this study meet the training requirements for conducting research involving human subjects, follow the approved protocol, use only the approved forms, keep appropriate research records, and comply with applicable University policies and state and federal regulations.

**Consent Forms**: All subjects must receive a copy of the consent form as approved with the EKU IRB approval stamp. You may access your stamped consent forms by logging into your InfoReady Review account and selecting your approved application. Copies of the signed consent forms must be kept on file unless a waiver has been granted by the IRB.

**Adverse Events**: Any adverse or unexpected events that occur in conjunction with this study must be reported to the IRB within ten calendar days of the occurrence.

**Research Records**: Accurate and detailed research records must be maintained for a minimum of three years following the completion of the research and are subject to audit.

**Changes to Approved Research Protocol**: If changes to the approved research protocol become necessary, a description of those changes must be submitted for IRB review and approval prior to implementation. Some changes may be approved by expedited review while others may require full IRB review. Changes include, but are not limited to, those involving study personnel, consent forms, subjects, and procedures.

**Annual IRB Continuing Review**: This approval is valid through the expiration date noted above and is subject to continuing IRB review on an annual basis for as long as the study is active. It is the responsibility of the principal investigator to submit the annual continuing review request and receive approval

prior to the anniversary date of the approval. Continuing reviews may be used to continue a project for up to three years from the original approval date, after which time a new application must be filed for IRB review and approval.

**Final Report**: Within 30 days from the expiration of the project, a final report must be filed with the IRB. A copy of the research results or an abstract from a resulting publication or presentation must be attached. If copies of significant new findings are provided to the research subjects, a copy must be also be provided to the IRB with the final report. Please log in to your InfoReady Review account, access your approved application, and click the option to submit a final report.

**Other Provisions of Approval, if applicable**: None

Please contact Sponsored Programs at 859-622-3636 or send email to lisa.royalty@eku.edu with questions about this approval or reporting requirements.

## IRB Revision Approval

Graduate Education and Research

EASTERN KENTUCKY UNIVERSITY

Division of Sponsored Programs Institutional Review Board *Serving Kentuckians Since 1906*

**NOTICE OF IRB APPROVAL**

**Protocol Number: 1343**

Jones 414, Coates CPO 20
521 Lancaster Avenue
Richmond, Kentucky 40475-3102
(859) 622-3636; Fax (859) 622-6610 *http://www.sponsoredprograms.eku.edu*

Institutional Review Board IRB00002836, DHHS
FWA00003332

Review Type: ☐Full ☒Expedited
Approval Type: ☐New ☐Extension of Time
☒Revision ☐Continuing Review

Principal Investigator: **Jean Koketsu** Faculty Advisor: **Dr. Doris Pierce** Project Title: **A Description of Pre-Sleep Routines of Adults Using Graphic and Interview Methods**

Approval Date: **4/4/18** Expiration Date: **1/31/19**

Approved by: **Dr. Deborah West, IRB Member**

This document confirms that the Institutional Review Board (IRB) has approved the above referenced research project as outlined in the application submitted for IRB review with an immediate effective date.

**Principal Investigator Responsibilities**: It is the responsibility of the principal investigator to ensure that all investigators and staff associated with this study meet the training requirements for conducting research involving human subjects, follow the approved protocol, use only the approved forms, keep appropriate research records, and comply with applicable University policies and state and federal regulations.

**Consent Forms**: All subjects must receive a copy of the consent form as approved with the EKU IRB approval stamp. You may access your stamped consent forms by logging into your InfoReady Review account and selecting your approved application. Copies of the signed consent forms must be kept on file unless a waiver has been granted by the IRB.

**Adverse Events**: Any adverse or unexpected events that occur in conjunction with this study must be reported to the IRB within ten calendar days of the occurrence.

**Research Records**: Accurate and detailed research records must be maintained for a minimum of three years following the completion of the research and are subject to audit.

**Changes to Approved Research Protocol**: If changes to the approved research protocol become necessary, a description of those changes must be submitted for IRB review and approval prior to implementation. Some changes may be approved by expedited review while others may require full IRB review. Changes include, but are not limited to, those involving study personnel, consent forms, subjects, and procedures.

**Annual IRB Continuing Review**: This approval is valid through the expiration date noted above and is subject to continuing IRB review on an annual basis for as long as the study is active. It is the responsibility of the principal investigator to submit the annual continuing review request and receive approval prior to the anniversary date of the approval. Continuing reviews may be used to continue a project for up to three years from the original approval date, after which time a new application must be filed for IRB review and approval.

**Final Report**: Within 30 days from the expiration of the project, a final report must be filed with the IRB. A copy of the research results or an abstract from a resulting publication or presentation must be attached. If copies of significant new findings are provided to the research subjects, a copy must be also be provided to the IRB with the final report. Please log in to your InfoReady Review account, access your approved application, and click the option to submit a final report.

**Other Provisions of Approval, if applicable**: None

Please contact Sponsored Programs at 859-622-3636 or send email to lisa.royalty@eku.edu with questions about this approval or reporting requirements.

Kentucky UNBRIDLED SPIRIT

# Appendix B

## Set-up, Instructions and Interview Questions

### Set-up, Environment and Supplies

The researcher will meet the participant at a quiet location of convenience (e.g. participant's home or office, or a community setting). The participant will sit in a comfortable location and have a table on which to draw. If the participant prefers, they may take the supplies home to draw the pictures in order to complete the activity at their convenience.

The participant will be given a sheet of white heavy paper that is 11" x 14," an eraser, and a pencil to draw their pictures.

After the drawing is completed, the investigator will meet with the participant in a quiet, private location to interview the participant.

### Verbal Instructions to be Given to Study Participants

#### Before Beginning Activity

Participants will be informed of the following: "This activity is not an assessment of your drawing ability or artistic skill. There is no right way or wrong way for you to draw your pictures. The main focus of this activity is for you to get your point of view across. There is no time limit for you to draw your pictures. Take as much time or as little time as you need to draw your picture."

#### Instruction for Drawing

"Using pictures and on this paper, tell the story of what you do before you go to bed at night."

After the Drawing is Completed

These questions will be asked of the study participants after they finish and turn in their drawing. With the drawing as a reference, which will be visible to the investigator and study participant, the following questions may be asked of the participants, as appropriate. The interview will be audiotaped.

1. Describe and clarify your drawing.
2. Please describe the sequence of events. Does it vary?
3. Does your pre-sleep routine have a beginning or end?
4. Explain what activity this picture is depicting.
5. Describe the importance of these activities.
6. Tell me about the objects you drew in this picture and any other objects you use in your routine.
7. Explain the words you wrote here.
8. Clarify and explain the locations of this activity.
9. What does the routine mean to you?
10. What is the overall purpose of your routine?
11. Does your pre-sleep routine affect your daily life? If so, how?
12. Are there parts of your routine that you did not draw? If not, why not? If so, describe the activity.
13. Is this pre-sleep routine done by yourself? Or, with others? Explain.
14. Is there anything else you would like to add about your pre-sleep routine?
15. What is your feedback regarding the process of drawing pictures to tell the story of your bedtime routine?

## Appendix C

## Field Journal Template

Date/Time of Day:

Participant Identification:

Length of time to draw:

Length of interview:

**Reflexivity:** How does my background, perceptions, interests and perspectives influence this experience or interview with the participant?

**Logistics of the study:** How did the interview go in terms of the context, environment, schedule, and communication? What went well? What could have gone better? How can this process be improved?

**Methods log:** How did the process go in terms of the participant drawing the pictures? How did the process go in terms of the interview? What went well? What could have gone better? How can this process be improved?

**Personal thoughts and feelings about the process and project:** Note any good or bad thoughts, frustrations, or joys from the experience.

**Ideas and Hypotheses:** Describe any "Aha" moments or any insights from this particular participant interaction or process. Explain any connections in ideas of themes that may be made between subjects thus far.

Quick Summary/Next Steps:

# Appendix D

## Drawing Coding Sheet and Audio Data

ID #:

Approximate Time to Draw: Where Picture Drawn: Home With JK

Interview Time:

Activities/Frames

Total # Frames:

Total # of Activities (from drawings and audio):

List of Activities:

1. 8.
2. 9.
3. 10.
4. 11.
5. 12.
6. 13.
7. 14.

Beginning of Pre-Sleep:

End of Pre-Sleep:

Amount of Time (for pre-sleep routines):

**General Locations**

Total # (from drawings and audio):

**Groups of Objects**:Specific Objects

Total # (from drawings and audio):

1. Were words included?  If so, describe:
2. Were people or drawn in the picture?  If so, describe (how many, who, expressions, etc.):

    Number of people:

3. What was the first picture in the drawing**?**
4. What was the last drawing in the drawing?
5. Were pictures sequenced?  Describe.

    Clearly sequenced

    Left to right

    Top to bottom

    No arrows

6. Special Notes:
7. Process of drawing:
8. Themes/Title:

## Appendix E

### "Wynken, Blynken, and Nod"

By Eugene Field (1889)

Wynken, Blynken, and Nod one night

Sailed off in a wooden shoe,—

Sailed on a river of crystal light

Into a sea of dew.

"Where are you going, and what do you wish?"

The old moon asked the three.

"We have come to fish for the herring-fish

That live in this beautiful sea;

Nets of silver and gold have we,"

Said Wynken,

Blynken,

And Nod.

The old moon laughed and sang a song,

As they rocked in the wooden shoe;

And the wind that sped them all night long

Ruffled the waves of dew;

The little stars were the herring-fish

That lived in the beautiful sea.

"Now cast your nets wherever you wish,—

Never afraid are we!"

So cried the stars to the fishermen three,

Wynken,

Blynken,

And Nod.

All night long their nets they threw

To the stars in the twinkling foam,—

Then down from the skies came the wooden shoe,

Bringing the fishermen home:

‘Twas all so pretty a sail, it seemed

As if it could not be;

And some folk thought ‘twas a dream they’d dreamed

Of sailing that beautiful sea;

But I shall name you the fishermen three:

Wynken,

Blynken,

And Nod.

Wynken and Blynken are two little eyes,

And Nod is a little head,

And the wooden shoe that sailed the skies

Is a wee one’s trundle-bed;

So shut your eyes while Mother sings

Of wonderful sights that be,

And you shall see the beautiful things

As you rock in the misty sea

Where the old shoe rocked the fishermen three:—

Wynken,

Blynken,

And Nod.

Table 1

*Demographic and Sleep Characteristics of Participants*

| Pseudonym | Age | Gender | Race/Ethnicity | Marital Status | Employment | Education | PSQI | Bed-mate | TTB | Wake-up time | TST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Daniel | 23 | M | White | Single | Part-time Student | High School | 4 | No | 12:00 a.m. | 7:00 a.m. | 7 |
| Amanda | 27 | F | Hispanic | Married | Full-time | Associates | 2 | Yes | 10:00 p.m. | 6:00 a.m. | 7 |
| Andrew | 28 | M | Asian | Married | Unemployed | Bachelors | 5 | Yes | 12:00 a.m. | 8:30 a.m. | 7.5 |
| Chris | 28 | M | White/Asian | Single | Part-time | Bachelors | 5 | No | 1:00 a.m. | 7:00 a.m. | 5 |
| Jessica | 28 | F | Asian | Single | Full-time | Bachelors | 4 | No | 11:30 p.m. | 6:30 a.m. | 7 |
| Emily | 29 | F | White/Asian | Single | Full-time | Doctorate | 4 | No | 10:45 p.m. | 6:35 a.m. | 7.5 |
| Ashley | 30 | F | Asian | Married | Full-time | Masters | 2 | Yes | 10:00 p.m. | 6:35 a.m. | 7.8 |
| Michael | 30 | M | White | Married | Full-time | Bachelors | 4 | Yes | 10:00 a.m. | 6:00 p.m. | 7 |
| Matt | 34 | M | Asian | Single | Full-time | Bachelors | 3 | No | 12:30 a.m. | 8:15 a.m. | 7.5 |
| Amy | 30-50 | F | Asian | Married | Full-time | High School | 1 | Yes | 10:00 p.m. | 6:00 a.m. | 9 |
| Kim | 45 | F | Black | Married | Full-time | High School | 1 | No | 10:00 p.m. | 6:00 a.m. | 8 |
| James | 47 | M | White | Married | Full-time | Masters | 4 | Yes | 10:15 p.m. | 6:00 a.m. | 8 |
| Karen | 54 | F | Asian | Single | Full-time | Bachelors | 3 | No | 12:00 a.m. | 8:00 a.m. | 7.8 |
| Lisa | 54 | F | White | Married | Full-time | Masters | 4 | Yes | 9:00 p.m. | 4:45 a.m. | 7.5 |
| Petra | 57 | F | Hispanic | Married | Semi-retired | Associates | 1 | Yes | 11:15 p.m. | 8:15 a.m. | 8.5 |
| David | 60 | M | White | Married | Retired | Masters | 2 | Yes | 10:00 p.m. | 6:00 a.m. | 8 |

*Note*. PSQI: Pittsburgh Sleep Quality Index (Buysse et al., 1989) global score. Calculated by adding up values set for 19 items having to do with sleep duration, disturbance, latency, quality, efficiency, daytime dysfunction due to sleepiness, use of sleep medicine. TTB: Time to bed. Indicates estimated time that people went to sleep for their longest bout of sleep. TST: Total sleep time. Estimated time (in hours) that people reported sleeping at night.